



APPENDIX A

BASELINE DATA COLLECTION AND RESULTS

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Attachments

Attachment A1 Certificates of Analysis

Attachment A2 Data Screen for Human Health

Attachment A3 Data Screen for Wildlife Health

Abbreviations

Abbreviation	Definition
ALS	ALS Environmental
COPC	constituent of potential concern
CVAFS	cold vapour atomic fluorescence spectrophotometry
DF	difference factor
DQO	data quality objective
Dominion Diamond	Dominion Diamond Ekati Corporation
EDL	estimated detection limit
e.g.	for example
ESA	effects study area
GC/HRMS	gas chromatography/ high resolution mass spectrometry
GC/MS	gas chromatography/mass spectrometry
GPS	global positioning system
HpCDD	heptachlorodibenzo-p-dioxin
HpCDF	heptachlorodibenzo-p-furan
HxCDD	hexachlorodibenzodioxin
HxCDF	hexachlorodibenzofuran
ICP/MS	inductively coupled plasma/mass spectrometry
ID	identification
i.e.	that is
OCDD	octachlorodibenzodioxin
OCDF	octachlorodibenzofuran
PAH	polycyclic aromatic hydrocarbon
PeCDD	pentachlorodibenzodioxin
PeCDF	pentachlorodibenzofuran
Project	Jay Project
QA	quality assurance
QC	quality control
RPD	relative percent difference
sp.	species
TCDD	tetrachlorodibenzodioxin
TCDF	tetrachlorodibenzofuran

Units of Measure

Unit	Definition
%	percent
<	less than
cm	centimetre
g	gram
km	kilometre
m	metre
m ²	square metre
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram

A1 INTRODUCTION

A soil and vegetation baseline sampling program was completed in August 2014 for the Jay Project (the Project). The Project site is located in the Northwest Territories, Canada, southeast of the existing Ekati Mine's main facilities, and approximately 300 kilometres (km) northeast of Yellowknife. The Project proponent is Dominion Diamond Ekati Corporation (Dominion Diamond), a Canadian diamond mining company.

The purpose of the sampling program was to provide chemistry data that will be used to determine baseline exposure concentrations and calculate site-specific bioaccumulation factors as a part of the human health and wildlife health risk assessment. The baseline sampling program focused on the collection of co-located soil and vegetation samples.

This appendix summarizes the sampling methods, results, and quality assurance/quality control (QA/QC) analysis for the sampling program.

A1.1 Program Objectives

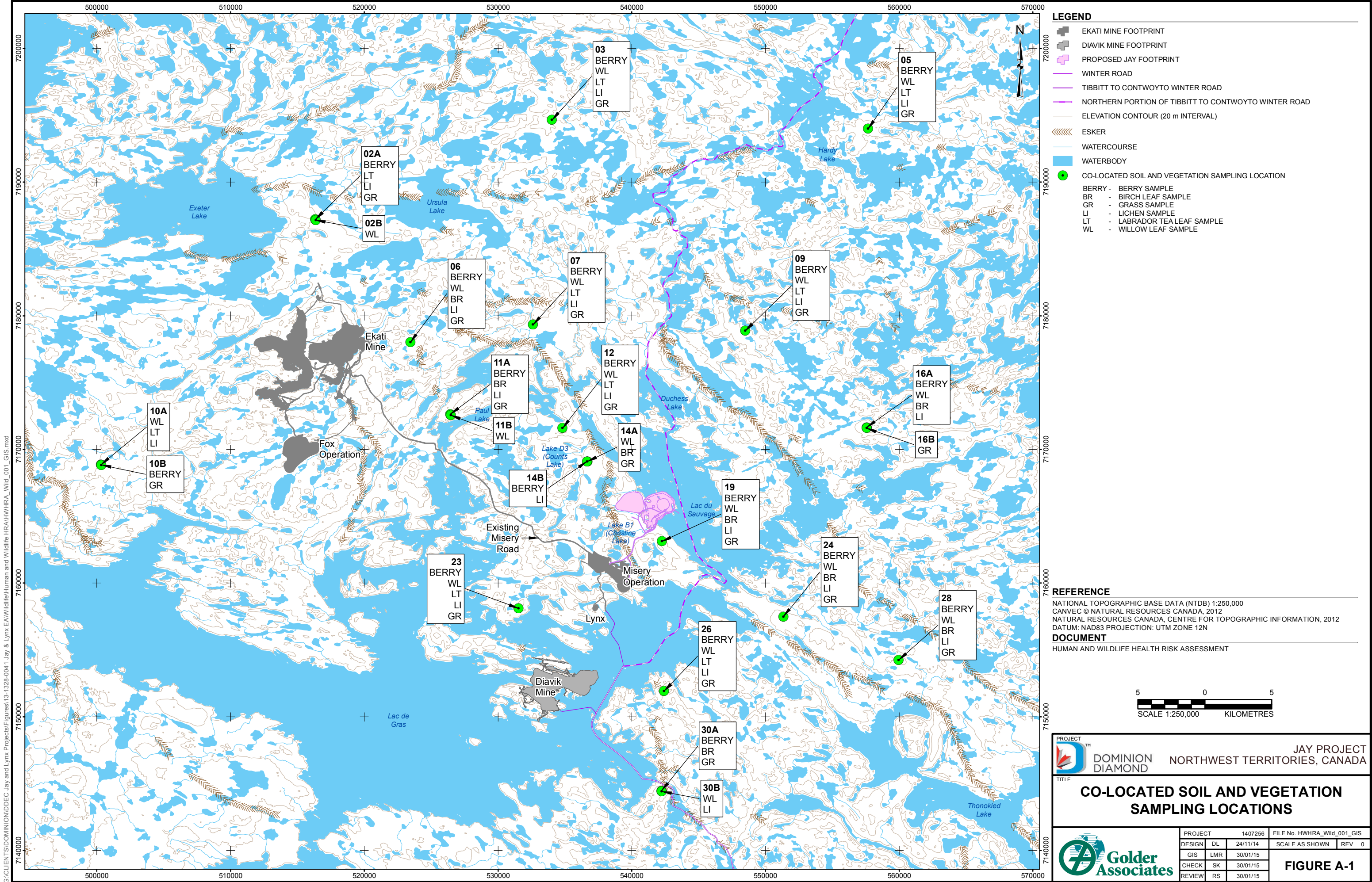
The soil and vegetation baseline sampling program was developed to be consistent with a guidance document prepared for Health Canada (Golder 2005) on the collection of country foods. Also known as traditional foods, country foods are dietary items from the local region which are used for sustenance. Country food items include fruit, vegetables, herbs, medicinal plants, fish, and game. This guidance was considered when developing study objectives, sample design, and QA/QC protocols for the sampling of soil and vegetation in the effects study area (ESA).

The overall objectives for the soil and vegetation baseline sampling program were:

- to measure baseline metal, polycyclic aromatic hydrocarbon (PAH), and dioxin and furan concentrations in soil and vegetation in the ESA; and,
- to obtain QA/QC duplicate samples for baseline soil and vegetation data.

A1.2 Study Area

Samples were collected within the ESA, and sampling effort focused on an area in proximity (within 30 km) of the proposed Project footprint, including around Lac du Sauvage, and north and east of Lac de Gras. Sampling locations and the types of vegetation collected are provided in Figure A-1.



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A2 METHODS

A2.1 Field Sampling and Analysis Program

A2.1.1 Program Overview

A sampling plan was developed to characterize baseline soil and vegetation chemistry data from within and around the proposed Project footprint. Seventeen sites were selected for vegetation and soil sampling (Figure A-1). Field personnel conducted sampling from July 27 to August 4, 2014, and sampling locations were accessed on foot and by helicopter. Co-located soil and vegetation samples were collected in accordance with Golder (2005).

The sampling program focused on collecting edible and medicinal plants specific to and widely found in the tundra of the Arctic region. The types of vegetation collected were based on local dietary preferences, including the types of vegetation consumed by people and wildlife, and where they were harvested.

Four vegetation types – leaves, berries, grass, and lichen, were collected with co-located soil samples. Berries (e.g., *Empetrum nigrum* [black crowberry], *Vaccinium uliginosum* [blueberry], *Rubus chamaemorus* [cloudberry]), and the leaves of dwarf birch (*Betula glandulosa*) and Labrador tea (*Rhododendron* sp.) were chosen because they are potential food items for people in the local communities. Willow leaves (*Salix planifolia*), grasses (e.g., *Carex* sp.), and lichen (e.g., *Cladonia* sp.) were chosen because they are potential food items for wildlife.

The edible parts of each plant species were collected and submitted to ALS Environmental (ALS) for chemical analysis. The types of vegetation collected, locations, sample identification numbers, soil types, and growing environment are summarized in Table A-1.

A2.1.2 Sampling Methods

One soil sample was collected to represent multiple plant samples if the plants were within 10 square metres (m²) of each other and within the same soil type. If one or more of the targeted vegetation types were not found within the 10 m² plot, then a separate co-located soil sample was taken in a nearby area (approximately 100 to 200 metres [m] away) from where that vegetation type was found. A letter (e.g., A or B) following the site number was used to differentiate the soil and corresponding vegetation samples. A video and photo of the ground cover were taken at each collection site. Relevant site information such as the global positioning system (GPS) centre-point of the plot was recorded on field data sheets.

Soil samples were collected using gloves and stainless-steel equipment, and then homogenized within a stainless-steel bowl. Before collecting the soil sample, the humus layer was removed and soil was collected up to the top 30 centimetres (cm) (until a permafrost layer was reached) using a garden trowel. When two soil layers (e.g., organic and mineral) of substantial depth (greater than 10 cm) were found, then both soil types were collected, labelled as Site number-S-01 for shallow and Site number-S-02 for deep, and the depths were noted. Soil profile was recorded at each sampling location to show relative depth, and a photo of each soil sample jar was taken.

Vegetation samples were collected using gloves and stainless-steel scissors. Samples generally exceeded the 20-gram (g) minimum weight requirement. For berry samples, undamaged berries were preferentially collected because they would be representative of those consumed by wildlife and people. Similarly, leaves that were located on the plant, and grass and lichen that did not appear wilted or dried

were collected. Plants and berries were not washed before submission to ALS. For each vegetation sample, a photo was taken showing the entire plant including the leaves, branches, and roots. A photo of the sample in the collection bag was also taken.

Disposable nitrile gloves were worn during the sampling and changed between samples to avoid cross-contamination. Sampling equipment was also cleaned with decontaminating detergent solution and rinsed with distilled water between samples. Samples were placed on ice in a cooler immediately after collection. Samples were kept cool for the duration of the field program and were packed on ice for shipment to ALS for analysis.

One duplicate sample was collected for approximately every 10 samples collected. For duplicate soil samples, adequate sample volume was collected from one location, homogenized, and evenly split into two discrete samples before submission to ALS. For duplicate plant samples, adequate sample mass (i.e., 40 g of leaves or berries) was collected from one or more plants within a sampling location, and samples were split into two discrete samples for submission to ALS.

A2.1.3 Sample Analyses

Soil and vegetation samples were submitted to ALS for chemistry analysis.

A total of 27 soil samples were collected: 17 at each sampling location plus 2 duplicate samples, and 8 additional samples to account for vegetation that was not present at the same location as the soil sample or multiple soil types at a sampling location. The samples were analyzed for the following:

- moisture (drying/gravimetric);
- pH (1:2 H₂O extract);
- total organic carbon (combustion and thermal conductivity detection);
- metals (combination of inductively coupled plasma/mass spectrometry [ICP/MS] and cold vapour atomic fluorescence spectrophotometry [CVAFS]); and,
- PAHs (rotary extraction with hexane/acetone followed by gas chromatography/mass spectrometry [GC/MS] detection);

In addition, a subset of soil samples was analyzed for dioxins and furans (7 samples; Soxhlet system extraction followed by gas chromatography/high resolution mass spectrometry [GC/HRMS] detection).

A total of 96 vegetation samples were collected: 18 berry samples; 17 samples each of willow leaves, lichen, and grass; 8 dwarf birch leaves; 9 Labrador tea leaves; plus 2 duplicate samples for each vegetation type except for dwarf birch for which no duplicates were collected. The samples were analyzed for the following:

- moisture (drying/gravimetric);
- metals (combination of ICP/MS and CVAFS); and,
- PAHs (Soxhlet system extraction followed by GC/MS);

In addition, a subset of vegetation samples was analyzed for dioxins and furans (25 samples; Soxhlet system extraction followed by GC/HRMS detection).

A2.1.4 Quality Assurance/Quality Control

A2.1.4.1 Field

For field QA/QC purposes, duplicate samples were collected with approximately 10 percent (%) frequency. The sites were chosen randomly or were based on sample medium availability during the field program. Sample duplicates are collected to provide an indication of natural sample variation and the reproducibility of results from within the same sample plot or plant.

A2.1.4.2 Laboratory

In addition to field duplicate QA/QC procedures, analyses conducted by ALS followed appropriate laboratory QA/QC procedures. Each analytical method and standard sample has control limits that must be met to verify the results for both the standard materials and the unknown samples submitted. These laboratory QA/QC results were reported with each laboratory certificate of analysis.

Laboratory QA/QC included analysis of method blanks, laboratory control samples, matrix spikes, and reference materials to assess precision and accuracy of analyses. Laboratory duplicate samples were analyzed for the full suite of analytes listed in Section A2.1.3. Laboratory QA/QC reports were reviewed upon receipt to confirm that the laboratory data quality objectives (DQOs) had been met and that the appropriate QA/QC information had been reported. The issues identified in the ALS laboratory certificates of analysis for soil and/or vegetation samples submitted included:

- Hold time exceedances were recorded for moisture content and PAHs.
- Adjustment of the detection limits for a number of PAHs in soil and vegetation samples due to matrix effects.
- Adjustment of the detection limits for a number of metals in vegetation samples due to high moisture content or insufficient sample volume.
- Reference material recovery was above the DQO for cadmium in one tissue sample, but the values had been qualified.
- Laboratory duplicate results were outside of the ALS DQO due to sample heterogeneity for benzo(g,h,i)pyrene, benzo(k)fluoranthene, and phenanthrene in one or more vegetation samples. The laboratory duplicate concentrations were below the detection limits in these cases.

Review of the laboratory QA/QC reports indicates that the data are reliable in terms of precision, bias, and reproducibility. As is common with heterogeneous matrices such as plant tissue, some detection limits (mainly PAHs and dioxins and furan) were raised, and were not consistent among samples. However, estimated detection limits for these parameters were below the relevant environmental quality guidelines and do not affect the outcome of the human health and wildlife risk assessment.

A3 RESULTS

A3.1 Analytical Results

A3.1.1 Soil

Laboratory certificates of analysis for the soil samples collected are provided in Attachment A1, and results are summarized in Tables A-2 and A-3.

Metals were detected in the soil samples analyzed. Beryllium, bismuth, cadmium, lithium, mercury, molybdenum, selenium, silver, sodium, and thallium, were detected at frequencies between 15% to 81%. Antimony and tin were not detected in the soil samples collected.

For PAHs, none of the parameters were detected in the samples collected with the exception of fluorene, which was detected in one sample (Table A-3).

Seven soil samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-3), OCDD was detected in each sample, whereas 1,2,3,4,6,7,8-HpCDD, total-PeCDD, total-HxCDD, total-HpCDD, 2,3,7,8-TCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,7,8,9-HpCDF, OCDF, total-TCDF, total-PeCDF, and total-HxCDF were detected in one or more samples. None of the other dioxins and furans analyzed were detected in the samples analyzed.

For information purposes, soil data were screened against environmental quality guidelines for the protection of human and ecological health. The screened data are provided in Attachments A2 (human health) and A3 (ecological health). Data screening for the selection of constituents of potential concern (COPCs) for the human and ecological multi-media assessment is summarized in Appendix C (multi-media screening).

A3.1.2 Vegetation

Laboratory certificates of analysis for the vegetation samples collected are provided in Attachment A1, and the analytical results are summarized in Tables A-4 to A-15.

A3.1.2.1 Berries

Metals results for berries are presented in Table A-4. Beryllium, bismuth, lead, mercury, selenium, tellurium, uranium, vanadium, and zirconium were not detected in the samples collected. The following metals were detected in one or more samples of berries with a detection frequency of 5% to 65%: antimony, arsenic, cadmium, chromium, cobalt, lithium, molybdenum, silver, sodium, thallium, and tin. The remaining metals were detected at frequencies greater than 80%.

No PAHs were detected in the berries samples collected (Table A-5). Five berry samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-5), 1,2,3,4,6,7,8-HpCDD, OCDD, total-TCDD, total-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8,9-HxCDF, OCDF, total-TCDF, and total-HxCDF were detected in one or more samples. None of the other dioxins and furans were detected in the samples analyzed.

A3.1.2.2 Dwarf Birch Leaves

Metals results for dwarf birch leaves are provided in Table A-6. Antimony, beryllium, sodium, tellurium, tin, and zirconium were not detected in the samples collected. The following metals were detected in one or

more samples of dwarf birch leaves with a detection frequency of 13% to 75%: arsenic, bismuth, chromium, lead, lithium, molybdenum, selenium, silver, thallium, and vanadium. The remaining metals analyzed were detected at frequencies higher than 80%.

Polycyclic aromatic hydrocarbons (PAHs) were not detected in dwarf birch leaves collected (Table A-7). Three of the dwarf birch leaves samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-7), OCDD, total-TCDD, total-HpCDD, 2,3,7,8-TCDF, and total-TCDF were detected in one or more samples. None of the other dioxins and furans were detected in the samples collected.

A3.1.2.3 *Labrador Tea Leaves*

Metals results for Labrador tea leaves are presented in Table A-8. Antimony, bismuth, lithium, tellurium, and tin were not detected in the samples collected. The following metals were detected in one or more samples of Labrador tea leaves with a detection frequency of 9% to 73%: arsenic, beryllium, cadmium, chromium, selenium, silver, sodium, vanadium, and zirconium. The remaining metals analyzed were detected at frequencies higher than 80%.

Polycyclic aromatic hydrocarbons (PAHs) were not detected in the Labrador tea leaves samples collected (Table A-9). Two of the Labrador tea leaves samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-9), 1,2,3,4,6,7,8-HpCDD, OCDD, and total-HpCDD were detected in both samples, whereas 2,3,7,8-TCDD, 1,2,3,6,7,8-HxCDD, total-TCDD, total-PeCDD, total-HxCDD, 1,2,3,7,8-PeCDF, 1,2,3,7,8,9-HxCDF, total-TCDF, total-PeCDF, and total-HxCDF were detected in one of the samples. None of the other dioxins and furans were detected in the samples analyzed.

A3.1.2.4 *Willow Leaves*

Metals results for willow leaves are provided in Table A-10. Antimony, bismuth, lithium, sodium, tellurium, tin, and zirconium were not detected in the samples collected. The following metals were detected in one or more samples of willow leaves with a detection frequency of 5% to 79%: arsenic, chromium, selenium, silver, thallium, and vanadium. The remaining metals were detected at frequencies greater than 80%.

No PAHs were detected in the willow leaves samples collected (Table A-11). Five of the willow leaves samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-11), total-TCDF were detected in all five samples, whereas 1,2,3,4,6,7,8-HpCDD, OCDD, total-TCDD, total-PeCDD, total-HxCDD, total-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, total-PeCDF, total-HxCDF, and total-HpCDF were detected in one or more samples. None of the other dioxins and furans were detected in the samples analyzed.

A3.1.2.5 *Lichen*

Metals results for lichen are presented in Table A-12. Tellurium and tin were not detected in the samples collected. The following metals were detected in one or more of the lichen samples with a detection frequency of 37% to 74%: antimony, bismuth, lithium, and selenium. The remaining metals were detected at frequencies higher than 80%.

Polycyclic aromatic hydrocarbons (PAHs) were not detected in the lichen samples collected (Table A-13). Five lichen samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-13), OCDD and total-TCDF were detected in each sample, whereas 1,2,3,7,8-PeCDD,

1,2,3,4,6,7,8-HpCDD, total-TCDD, total-PeCDD, total-HxCDD, total-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, OCDF, total-PeCDF, total-HxCDF, and total-HpCDF were detected in one or more samples. None of the other dioxins and furans were detected in the samples analyzed.

A3.1.2.6 Grass

Metals results for grass are provided in Table A-14. Antimony, bismuth, lithium, selenium, silver, tellurium, tin, and zirconium were not detected in the samples collected. The following metals were detected in one or more samples of grass with a detection frequency of 5% to 68%: beryllium, chromium, lead, mercury, sodium, thallium, uranium, and vanadium. The remaining metals were detected at frequencies greater than 80%.

Polycyclic aromatic hydrocarbons (PAHs) were not detected in the grass samples collected (Table A-15). Five of the grass samples were analyzed for dioxins and furans. Of the dioxins and furans analyzed (Table A-15), 1,2,3,4,6,7,8-HpCDD, OCDD, total-TCDD, total-PeCDD, total-HxCDD, total-HpCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,6,7,8-HpCDF, OCDF, total-TCDF, total-PeCDF, total-HxCDF, and total-HpCDF were detected in one or more samples. None of the other dioxins and furans were detected in the samples analyzed.

A3.1.3 Quality Assurance/Quality Control

For soil, a duplicate is a sample that has been homogenized and divided into two equal portions, each of which is analyzed in the same manner. For vegetation, duplicate sampling involved collection of separate samples of the same tissue type from the same location.

The results of the duplicate pair are often expressed as relative percent difference (RPD). The RPD is an indicator of sample heterogeneity. Lower RPD numbers indicate that samples are more homogeneous. The formula for determining the RPD is given below:

$$RPD = \frac{\text{abs}(\text{Sample} - \text{Dup})}{\text{Mean}} \times 100$$

Where:

- RPD is the relative percent difference;
- $\text{abs}(\text{Sample} - \text{Dup})$ is the absolute value of the original sample minus the duplicate sample; and,
- Mean is the average of the two samples.

For vegetation samples, RPDs were calculated based on dry weight concentrations. Relative percent differences were not calculated if concentrations were not detected in one or both of the two replicate samples. Given the low frequency of detection for PAHs in soil and vegetation, RPDs could not be calculated for most PAHs.

When detected concentrations are less than five times the detection limit, a difference factor (DF) is calculated according to the following formula:

$$DF = \frac{abs(Sample - Dup)}{Method\ Detection\ Limit}$$

Where:

- DF is the difference factor;
- abs(Sample - Dup) is the absolute value of the original sample minus the duplicate sample; and,
- Method Detection Limit - the smaller of the two detection limits is used when detection limits differ¹.

Variability in sample results can be introduced in the field and laboratory. Generally, higher variability is accepted from field duplicates relative to laboratory duplicates. Field duplicate variability of 30% to 50% (RPD) is common for soil, and could also be expected for vegetation, although because the vegetation duplicates are not true “split” samples, variability could also be higher. Results exceeding commonly accepted RPD should trigger a data review to determine the reason for the higher than expected variability.

A QA/QC RPD criterion of 30% and DF criterion of 2.0 (Golder 2005) was applied to identify soil and vegetation duplicates with higher than expected variability. Duplicate samples that have larger variation indicate high sample variability, which can be attributed to sampling technique or natural sample heterogeneity.

Standardized procedures were followed in the field during the collection of duplicate soil samples (i.e., sample homogenization) to reduce the effect of sampling techniques on variability. For plants, duplicate samples were separate plants and or plant parts collected at the same location.

A3.1.4 Soil Duplicate Quality Assurance/Quality Control

Duplicate soil samples were collected at locations 14-DDR-05-S-01 and 14-DDR-07-S-01 for metals and PAHs.

The results for the duplicate soil samples for metal analysis are provided in Table A-16. The RPDs for metals were either not calculated because the requirements of doing so were not met, or the differences were less than 30% for those parameters for which it was possible to calculate an RPD. For those that met the criterion for a DF calculation, the values were below the QA/QC criterion of 2.0.

The QA/QC duplicate samples results for PAHs in soil collected for the sampling program are presented in Table A-17. Given that PAHs were not detected in the duplicate samples, RPDs were not calculated.

A3.1.5 Vegetation Duplicate Quality Assurance/Quality Control

The QA/QC duplicate sample results for berries, dwarf birch leaves, Labrador tea leaves, willow leaves, grass, and lichen are presented in Tables A-18 to A-27. Relative percent differences for vegetation were greater than 30% or greater than 2.0 for DFs for several metals. Because PAHs were mostly not detected in vegetation, RPDs and DFs were not calculated. Results for each vegetation type are presented below.

¹ Detection limits may differ between duplicates when matrix interference occurs, when sample mass is low, or when moisture content is elevated.

A3.1.5.1 Berries

The QA/QC duplicate sample results for metal concentrations in berries collected at locations 14-DDR-05-BERRY-01 and 14-DDR-07-BERRY-01 are presented in Table A-18. The RPD exceeded 30% for cesium (63%), molybdenum (48%), and strontium (35%) at 14-DDR-07-BERRY-01, whereas such exceedance did not occur for any parameter at 14-DDR-05-BERRY-01. For those parameters for which a DF was calculated instead of an RPD, none of the values exceeded the criterion of 2.0. Few metals exceeded the 30% target for RPDs, indicating that heterogeneity is low in berries samples collected.

The QA/QC duplicate sample results for PAHs in berries collected for human health risk assessment are presented in Table A-19. Polycyclic aromatic hydrocarbons (PAHs) were not detected in any of the duplicate samples, and therefore, RPDs were not calculated.

A3.1.5.2 Dwarf Birch Leaves

A field duplicate was not collected for dwarf birch leaves. However, leaf duplicate samples were collected for willow and Labrador tea (Sections A3.1.5.3 and A3.1.5.4).

A3.1.5.3 Labrador Tea Leaves

The QA/QC duplicate sample results for metal concentrations in Labrador tea leaves collected at locations 14-DDR-05-LT-01 and 14-DDR-07-LT-01 are presented in Table A-20. The RPDs exceeded 30% for aluminum (132%), barium (106%), boron (160%), calcium (157%), cobalt (129%), iron (181%), magnesium (93%), manganese (190%), mercury (142%), nickel (88%), phosphorus (58%), potassium (95%), rubidium (61%), thallium (182%), and uranium (195%) at 14-DDR-07-LT-01, and for cobalt (43%) and nickel (41%) at 14-DDR-05-LT-01. For those parameters for which a DF was calculated instead of an RPD, lead (6.1) exceeded the criterion of 2.0 at 14-DDR-07-LT-01. Of those metals for which an RPD value was calculated, 6% exceeded the target of 30% at 14-DDR-05-LT-01, indicating there is little heterogeneity for metals in Labrador tea leaves samples at this location. For 14-DDR-07-LT-01, the frequency of such RPD exceedance was 68% indicating there is a higher degree of metals heterogeneity in leaves sampled at this location.

The QA/QC duplicate sample results for PAHs in Labrador tea leaves are presented in Table A-21. Polycyclic aromatic hydrocarbons (PAHs) were not detected in the duplicate samples and therefore RPDs were not calculated.

In this specific occasion, the magnitude of difference in moisture content between the duplicate samples may be reflective of the degree of heterogeneity between the duplicate samples. Moisture content was similar between duplicate samples collected at 14-DDR-05-LT-01 (55.7% vs. 54.3%), whereas the difference in moisture content at site 14-DDR-07-LT-01, which exhibited higher RPDs for metals, was much greater (44.7% vs. 14.9%). Lower moisture content can be indicative of a higher fraction of plant parts with low moisture (e.g., stems) in one duplicate versus the other, or of relatively younger plants versus older plants.

A3.1.5.4 Willow Leaves

The QA/QC duplicate sample results for metal concentrations in willow leaves collected at locations 14-DDR-05-WL-01 and 14-DDR-07-WL-01 are presented in Table A-22. The RPDs exceeded 30% for aluminum (49%), barium (43%), cesium (71%), cobalt (33%), and zinc (51%) at 14-DDR-07-WL-01, and for aluminum (49%), beryllium (39%), and strontium (31%) at 14-DDR-05-WL-01. For those where a DF

was calculated instead of an RPD, none of the values exceeded the criterion of 2.0 at either location. Of those metals where RPDs were calculated, 16% and 33% of metals exceeded the 30% criterion at 14-DDR-05-WL-01 and 14-DDR-07-WL-01, respectively, indicating there is little to some degree of heterogeneity in metals concentrations in willow leaves collected from the ESA.

The QA/QC duplicate sample results for PAHs in willow leaves are presented in Table A-23. Polycyclic aromatic hydrocarbons (PAHs) were not detected in any of the duplicate samples and therefore RPDs were not calculated.

A3.1.5.5 Lichen

The QA/QC duplicate sample results for metal concentrations in lichen collected at locations 14-DDR-05-LI-01 and 14-DDR-07-LI-01 are presented in Table A-24. The RPDs exceeded 30% for aluminum (160%), barium (109%), calcium (139%), cesium (73%), chromium (173%) cobalt (113%), copper (31%), iron (180%), lead (145%), magnesium (96%), manganese (162%), mercury (133%), molybdenum (71%), nickel (47%), phosphorus (60%), potassium (93%), rubidium (86%), thallium (157%), and uranium (193%) at 14-DDR-07-LI-01, and for aluminum (86%), arsenic (79%), chromium (113%), cobalt (37%), iron (101%), nickel (55%), thallium (34%), uranium (89%), and vanadium (97%) at 14-DDR-05-LI-01. For those where a DF was calculated instead of an RPD, boron (6.3) and zirconium (2.1) exceeded the criterion of 2.0 at 14-DDR-07-LI-01 and 14-DDR-05-LI-01, respectively. Of those metals for which an RPD was calculated, 38% exceeded the 30% target at 14-DDR-05-LI-01, indicating there is some degree of metals heterogeneity in lichen samples at this sampling location. For 14-DDR-07-LI-01, RPDs exceeded the target for 90% of metals indicating there is a higher degree of metals heterogeneity in lichen samples at the site.

The QA/QC duplicate sample results for PAHs in lichen collected are presented in Table A-25. Polycyclic aromatic hydrocarbons (PAHs) were not detected in any of the duplicate samples, and therefore, RPDs were not calculated.

The differences in moisture content between duplicate samples collected at 14-DDR-07-LI-01 (45.4% vs. 15.9%) were much greater than the differences in moisture content at 14-DDR-05-LI-01 (62.7% vs. 66.7%), which likely accounts for some of the additional variability observed at this sampling location. Differences in moisture can be attributable to the location in which the lichen were collected. Lichen growing in moist organic soil is likely to have higher moisture content than lichen growing on rocks. Although field duplicates were collected from the same sampling location (within an area of 10 m²), each duplicate includes a mixture of lichen species growing in different micro-habitats and would therefore be expected to exhibit higher variation in moisture content, and differences in the degree of metal uptake and accumulation.

A3.1.5.6 Grass

The QA/QC duplicate sample results for metal concentrations in grass collected at locations 14-DDR-05-WL-01 and 14-DDR-16B-GR-01 are presented in Table A-26. The RPDs exceeded 30% for cadmium (100%), molybdenum (49%), and nickel (31%) at 14-DDR-07-GR-01, and for cadmium (56%) at 14-DDR-16B-GR-01. For those parameters for which a DF was calculated instead of an RPD, cobalt (2.2) exceeded the criterion of 2.0 at 14-DDR-07-GR-01. Of those metals for which RPDs could be calculated, 20% and 7% exceeded 30% at 14-DDR-07-GR-01 and 14-DDR-16B-GR-01, respectively, indicating there is little to some degree of heterogeneity in metals concentration in grass samples collected in the ESA.

The QA/QC duplicate sample results for PAHs in grass collected are presented in Table A-27. Polycyclic aromatic hydrocarbons (PAHs) were not detected in the duplicate samples and therefore RPDs were not calculated.

A4 CONCLUSIONS

The purpose of the baseline sampling program was to determine the baseline concentrations of metals, PAHs, and dioxins and furans in vegetation and soil from the ESA. The review of the methods, results, detection limits, and QA/QC identified elevated variability within field duplicates, particularly for lichen and Labrador tea leaves. Variability within laboratory duplicates was generally within the acceptable limits, indicating that laboratory analysis was considered reliable.

Variability among plant samples can be due to several factors including heterogeneity within plant tissues or to the adherence of dust and/or soil on plant surfaces (plants were not washed before analysis). For lichen and Labrador tea leaves duplicates, higher variability was observed in duplicate samples that had a higher variation in moisture content. This result may be indicative of small-scale differences in habitat, or differences in age or relative health of duplicate samples, which could in turn influence the uptake of metals.

The observed field variability among vegetation samples should be considered when estimating exposure concentrations in the risk assessment. Use of statistics to estimate average exposure concentration (e.g., the 95% upper confidence limit) quantitatively accounts for the variability among samples to determine a conservative exposure concentration. Because the data will be pooled for calculation of statistics (sample size of at least 9 available for each matrix), and because the variability within samples was random (i.e., no systematic bias), the data are considered suitable for inclusion in the human and wildlife health risk assessment. Use of statistics (e.g., means or 95% upper confidence limits) to approximate exposure concentrations in the assessment would tend to reduce the random variability among individual plants.

A5 REFERENCES

- Golder (Golder Associates Ltd.). 2005. Guidance for Including Country Foods in Human Health Assessments for Federal Contaminated Sites. HECS-SEP-BC/Yukon/05/06-01. Submitted to Health Canada. Burnaby, BC, Canada.
- Van den Berg M, LS Birnbaum, M Denison, M De Vito, W Farland, M Feeley, et al. 2006. Review: The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds. *Toxicological Sciences* 93(2):223-241.

Table A-1 Soil and Vegetation Collected During the 2014 Sampling Program

Station	UTM Coordinates		Date Sampled	Plant Sample ID	Soil Sample ID	Elevation (m)	Soil depth (cm)	Soil Type	Growing Environment (%)			
	Eastings	Northing							Shrubs	Grass	Moss/Lichen	Rock/Bare ground
02A	516346	7187205	1-Aug-14	02A-BERRY-01 (<i>Rubus chamaemorus</i> [Cloudberry]); 02A-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 02-LI-01 (<i>Cladonia rangiferina</i> , <i>Cladonia mitis</i> and <i>Flavocetraria</i> spp [lichen]); 02A-GR-01 (<i>Eriophorum</i> spp [grass])	02A-S-01	459	0 - 8	organic	30	30	40	0
02B	516371	7187145	1-Aug-14	02B-WL-01 (<i>Salix</i> spp [Willow])	02B-S-01	462	0 - 15	mineral	25	15	30	30
03	534033	7194634	1-Aug-14	03-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]); 03-WL-01 (<i>Salix</i> spp [Willow]); 03-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 03-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen]); 03-GR-01 (<i>Carex</i> spp [grass])	03-S-01	468	0 - 5	organic	50	20	20	10
				n/a	03-S-02		5 - 15	mineral	n/a	n/a	n/a	n/a
05	557678	7193974	2-Aug-14	05-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]) (+Dup); 05-WL-01 (+Dup) (<i>Salix</i> spp [Willow]); 05-LT-01 (+Dup) (<i>Ledum decumbans</i> [Labrador tea]); 05-LI-01 (<i>Cladonia rangiferina</i> , <i>Cladonia mitis</i> and <i>Flavocetraria</i> spp [lichen]) (+Dup); 05-GR-01 (<i>Carex</i> spp [grass])	05-S-01 (+Dup)	476	0 - 20	mineral	60	10	10	20
06	523452	7178019	29-Jul-14	06-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); <i>Empetrum nigrum</i> [Black Crowberry]; 06-WL-01 (<i>Salix</i> spp [Willow]); 06-BR-01 (<i>Betula pumila</i>); 06-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen]); 06-GR-01 (<i>Carex</i> spp. [grass])	06-S-01	501	0 - 5	peat/organic	30	5	20	45
07	532624	7179330	29-Jul-14	07-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]) (+Dup); 07-WL-01 (+Dup) (<i>Salix</i> spp [Willow]); 07-LT-01 (<i>Ledum decumbans</i> [Labrador tea]) (+Dup) (<i>Ledum decumbans</i> [Labrador tea]); 07-LI-01 (<i>Cladonia</i> spp [lichen]) (+Dup); 07-GR-01 (<i>Carex</i> spp [grass]) (+Dup)	07-S-01 (+Dup)	430	0 - 25	mineral	65	20	10	5
09	548495	7178863	1-Aug-14	09-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]); 09-WL-01 (<i>Salix</i> spp [Willow]); 09-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 09-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen]); 09-GR-01 (<i>unknown graminoid species</i> [grass])	09-S-01	467	0 - 15	mineral, slightly organic	65	20	10	5
10A	500308	7168849	1-Aug-14	10A-WL-01 (<i>Salix</i> spp [Willow]); 10A-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 10A-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen])	10A-S-01	496	0 - 15	mineral	45	5	20	30
10B	500340	7168836		10B-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); <i>Empetrum nigrum</i> [Black Crowberry]; 10B-GR-01 (<i>Cottongrass</i> ; <i>Carex aquatilis</i>)	10B-S-01	491	0 - 15	peat/organic	30	40	20	10
11A	526437	7172629	29-Jul-14	11A-BERRY-01 (<i>Rubus chamaemorus</i> [Cloudberry]); 11A-BR-01 (<i>Betula pumila</i>); 11A-LI-01 (<i>Cladonia rangiferina</i> and <i>Flavocetraria</i> spp [lichen]); 11A-GR-01 (<i>unknown graminoid species</i> [grass])	11A-S-01	431	0 - 15	organic	70	20	5	5
11B	526470	7172552		11B-WL-01 (<i>Salix</i> spp [Willow])	11B-S-01	-	0 - 5	mineral	-	-	-	-
12	534821	7171582	30-Jul-14	12-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); 12-WL-01 (<i>Salix</i> spp [Willow]); 12-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 12-LI-01 (<i>Flavocetraria</i> spp [lichen]); 12-GR-01 (<i>Carex</i> spp [grass])	12-S-01	424	0 - 15	mineral	40	40	10	10
14A	536701	7169098	30-Jul-14	14A-WL-01 (<i>Salix</i> spp [Willow]); 14A-BR-01 (<i>Betula pumila</i>); 14A-GR-01 (<i>unknown graminoid species</i> [grass])	14A-S-01	451	0 - 30	peat/organic	55	40	0	5
14B	536660	7169093	30-Jul-14	14B-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); 14B-LI-01 (<i>Flavocetraria</i> spp [lichen])	14B-S-01	449	0 - 15	mineral	10	20	20	50
16A	557580	7171656	2-Aug-14	16A-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); 16A-WL-01 (<i>Salix</i> spp [Willow]); 16A-BR-01 (<i>Betula pumila</i>); 16A-LI-01 (<i>Stereocaulon</i> spp [lichen])	16A-S-01	450	0 - 15	mineral	45	5	20	30
16B	557570	7171577		16B-GR-01 (<i>Eriophorum</i> spp [grass]) (+Dup)	16B-S-01	446	0 - 10	organic	5	85	5	5
19	542266	7163111	30-Jul-14	19-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]); 19-WL-01 (<i>Salix</i> spp [Willow]); 19-BR-01 (<i>Betula pumila</i>); 19-LI-01 (<i>Cladonia rangiferina</i> and <i>Flavocetraria</i> spp [lichen]); 19-GR-01 (<i>Carex</i> spp [grass])	19-S-01	443	15 - 20	organic	65	5	10	20
23	531537	7158113	31-Jul-14	23-BERRY-01 (<i>Vaccinium uliginosum</i> [Blueberry]); 23-WL-01 (<i>Salix</i> spp [Willow]); 23-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 23-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen]); 23-GR-01 (<i>Carex aquatilis</i> [grass])	23-S-01	432	0 - 15	mineral	40	10	20	30

Table A-1 Soil and Vegetation Collected During the 2014 Sampling Program

Station	UTM Coordinates		Date Sampled	Plant Sample ID	Soil Sample ID	Elevation (m)	Soil depth (cm)	Soil Type	Growing Environment (%)			
	Easting	Northing							Shrubs	Grass	Moss/Lichen	Rock/Bare ground
24	551344	7157472	31-Jul-14	24-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]); 24-WL-01 (<i>Salix</i> spp [Willow]); 24-BR-01 (<i>Betula pumila</i>); 24-LI-01 (<i>Flavocetraria</i> spp [lichen]); 24-GR-01 (<i>Carex</i> spp [grass])	24-S-01	451	0 - 5	organic	65	20	10	5
				n/a	24-S-02		5 - 15	mineral	n/a	n/a	n/a	n/a
26	542421	7151924	31-Jul-14	26-BERRY-01 (<i>Empetrum nigrum</i> [Black Crowberry]); 26-BERRY-02 (<i>Vaccinium uliginosum</i> [Blueberry]; <i>Empetrum nigrum</i> [Black Crowberry]); 26-WL-01(<i>Salix</i> spp [Willow]); 26-LT-01 (<i>Ledum decumbans</i> [Labrador tea]); 26-LI-01(<i>Flavocetraria</i> spp [lichen]); 26-GR-01 (<i>Carex</i> spp or <i>Eriophorum</i> spp [grass])	26-S-01	459	0 - 20	mineral	65	25	5	5
28	559972	7154234	2-Aug-14	28-BERRY-01(<i>Empetrum nigrum</i> [Black Crowberry]); 28-WL-01 (<i>Salix</i> spp [Willow]); 28-BR-01 (<i>Betula pumila</i>); 28-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen]); 28-GR-01 (<i>Carex</i> spp [grass])	28-S-01	456	0 - 15	mineral	55	5	30	10
30A	542227	7144454	31-Jul-14	30A-BERRY-01 (<i>Rubus chamaemorus</i> [Cloudberry]); 30A-BR-01 (<i>Betula pumila</i>); 30A-GR-01 (<i>unknown graminoid species</i> [grass])	30A-S-01	443	0 - 15	organic	20	55	10	15
30B	542251	7144409	31-Jul-14	30B-WL-0 (<i>Salix</i> spp [Willow])1; 30B-LI-01 (<i>Stereocaulon</i> spp and <i>Flavocetraria</i> spp [lichen])	30B-S-01	451	-	organic	35	30	10	25

Notes:

"A" and "B" = different soil sample but at the same site. Not all vegetation types were found at one location, therefore another location at the Site was selected to sample the remaining vegetation types.

"S-01" and "S-02" = shallow and deep soil sample. Shallow and deep samples were collected at locations with different soil types.

"-" = data not recorded

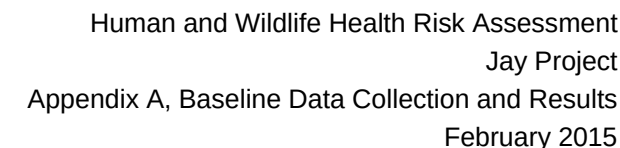
UTM = Universal Transverse Mercator; ID = identification number; cm = centimetre; m = metre; % = percent; n/a = sample not collected; Dup = duplicate sample; S = soil sample; BERRY = berries sample; WL = willow leaves sample; LT = Labrador tea leaves sample; BR = dwarf birch sample; LI = lichen sample; GR = grass sample.



Table A-2 Metal Concentrations in Soil

Parameter	Concentrations [mg/kg dry weight]																											
	14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01	14-DDR-12-S-01	14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01	
Aluminum (Al)	4390	6450	10700	15400	11400	10800	5420	6550	6210	10900	15600	3690	4210	21300	10700	303	8230	9960	3100	4450	11600	6570	8570	12100	9130	5030	10700	
Antimony (Sb)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Arsenic (As)	2.78	3.91	5.27	8.45	10.2	10.0	2.32	2.19	2.12	5.49	13.8	4.77	2.41	5.67	4.71	0.482	4.21	4.42	2.33	2.17	3.67	3.44	6.19	7.72	6.33	1.60	4.21	
Barium (Ba)	91.8	37.1	68.7	100	73.6	71.4	86.2	36.0	36.4	68.4	91.8	27.5	174	145	61.5	12.7	50.4	70.6	96.3	101	68.4	70.8	53.8	98.4	62.3	61.5	47.4	
Beryllium (Be)	0.20	0.22	0.30	0.49	0.45	0.43	0.26	0.36	0.34	0.35	0.37	<0.20	0.46	0.83	0.31	<0.20	0.27	0.25	<0.20	<0.20	0.24	<0.20	0.20	0.30	0.29	0.26	0.38	
Bismuth (Bi)	<0.20	<0.20	0.22	0.36	0.23	0.24	<0.20	<0.20	<0.20	0.24	0.24	<0.20	0.68	0.89	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	0.77	
Cadmium (Cd)	0.709	<0.050	0.121	0.354	<0.050	<0.050	0.225	<0.050	<0.050	<0.050	<0.050	0.183	0.176	0.053	<0.050	0.167	<0.050	<0.050	0.470	0.576	<0.050	0.210	<0.050	<0.050	<0.050	1.02	0.504	
Calcium (Ca)	1910	1230	2160	1920	1500	1340	2210	1330	1070	1340	1180	749	1270	2360	1660	1400	1590	1350	2950	1440	1870	881	954	1060	1460	1530	1020	
Chromium (Cr)	6.88	21.6	37.0	47.6	41.3	40.3	15.1	17.2	16.7	36.8	63.4	7.82	10.1	82.1	36.0	0.91	25.7	38.4	8.12	8.35	43.7	23.4	33.3	49.4	36.1	3.26	10.8	
Cobalt (Co)	11.7	4.44	7.91	11.6	8.15	7.38	4.91	3.73	3.44	5.49	10.1	4.06	4.03	15.1	8.27	1.07	5.80	7.54	9.42	8.65	8.15	5.95	5.74	9.02	6.68	5.43	5.42	
Copper (Cu)	12.6	9.86	16.0	28.3	16.8	15.8	13.4	6.10	5.48	9.59	30.6	47.2	119	32.6	11.3	3.68	9.57	11.6	9.93	13.7	14.1	9.45	12.4	21.6	13.7	11.8	19.1	
Iron (Fe)	7500	9650	16300	21500	16100	15200	6970	9920	9150	14400	22200	4770	6270	30600	16000	397	12800	14500	3800	4500	16200	9820	13400	17500	13600	5880	12400	
Lead (Pb)	2.52	2.52	3.74	4.59	3.67	3.52	3.69	2.86	2.71	3.31	3.39	1.84	4.39	5.59	3.69	1.52	3.61	2.56	2.15	1.24	3.48	2.02	2.24	3.78	2.77	3.10	8.62	
Lithium (Li)	<5.0	20.0	26.3	30.2	32.7	30.0	12.8	26.8	24.3	29.8	32.9	<5.0	<5.0	68.0	29.5	<5.0	23.9	31.2	<5.0	<5.0	35.3	9.7	22.1	32.8	26.0	<5.0	<5.0	
Magnesium (Mg)	1050	3380	5450	6790	5310	5040	2530	3090	2990	5190	8460	503	660	11700	5670	613	4140	5290	1570	1130	6040	2640	4560	6490	4880	513	839	
Manganese (Mn)	19.6	95.4	171	180	160	149	137	99.1	88.2	133	190	11.8	4.5	346	218	45.8	151	154	112	15.8	176	61.1	120	174	131	19.9	22.1	
Mercury (Hg)	0.128	<0.0050	<0.0050	0.0867	0.0051	0.0053	0.164	<0.0050	<0.0050	0.0058	0.0094	0.120	0.145	0.0063	0.0056	0.0958	<0.0050	0.0053	0.227	0.202	<0.0050	0.110	0.0080	0.0055	<0.0050	0.145	0.183	
Molybdenum (Mo)	<0.50	<0.50	<0.50	1.10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	1.08	0.68	0.56	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	0.52	<0.50	0.51	<0.50	0.77	1.24	
Nickel (Ni)	25.6	13.5	19.5	28.3	22.1	20.4	13.7	8.82	8.63	16.7	32.1	15.8	38.5	48.1	18.3	2.73	13.9	18.4	11.8	17.5	22.9	12.9	17.2	24.6	18.4	9.10	9.81	
Phosphorus (P)	1070	511	652	517	507	486	814	417	378	445	480	1030	858	569	421	559	567	465	821	860	677	644	319	362	464	1100	1420	
Potassium (K)	910	1790	2730	2980	3120	2900	1630	2100	1890	3010	4310	490	240	8090	2690	620	2620	3460	1120	940	4810	1440	2170	4050	2620	660	710	
Selenium (Se)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.35	0.58	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	0.42	
Silver (Ag)	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	0.27	
Sodium (Na)	<100	<100	190	290	150	200	<100	150	<100	150	160	<100	<100	380	300	120	130	120	<100	<100	230	<100	110	160	110	<100	<100	
Strontium (Sr)	24.7	3.97	11.4	17.9	6.35	5.69	15.5	5.91	4.85	6.56	4.87	9.21	33.9	15.1	9.22	7.99	6.54	5.47	30.6	18.3	7.25	10.7	4.48	5.22	5.87	20.3	13.9	
Thallium (Tl)	<0.050	0.099	0.173	0.274	0.160	0.161	0.152	0.164	0.147	0.181	0.189	<0.050	<0.050	0.457	0.158	<0.050	0.162	0.188	0.083	<0.050	0.242	0.092	0.103	0.186	0.130	0.056	0.081	
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Titanium (Ti)	132	387	703	778	778	721	254	494	464	713	750	73.9	139	1560	688	9.7	641	700	106	125	902	340	504	877	583	50.4	137	
Uranium (U)	1.30	1.45	3.09	4.60	1.77	1.79	1.28	2.42	2.33	1.94	1.21	2.01	8.22	3.41	2.14	0.067	2.57	1.09	0.873	0.708	2.39	0.905	0.718	1.55	1.12	5.50	11.4	
Vanadium (V)	5.45	18.9	31.8	39.6	35.0	32.1	12.5	19.0	15.8	30.8	44.9	6.40	8.49	66.1	30.4	0.67	23.8	30.5	5.89	5.95	34.5	17.5	28.2	40.2	29.0	1.88	9.65	
Zinc (Zn)	28.9	23.4	38.4	55.9	34.4	33.4	38.3	26.0	24.3	33.9	43.4	8.7	3.4	80.9	35.6	42.5	32.5	32.4	32.1	44.8	38.8	18.7	25.7	36.5	30.8	27.4	18.5	

Note: Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.



Parameter	Concentrations [dry weight]																											
	14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01	14-DDR-12-S-01	14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01	
% Moisture	76.6	12.1	8.58	43.1	13.2	13	34.5	8.92	8.08	12.2	13.2	80.5	69.4	19.9	7.99	84.2	8.86	8.79	69.4	71.8	9.07	22.2	8.68	7.26	10.0	78.8	59.9	
pH (1:2 soil:water)	4.00	5.04	5.57	4.14	5.35	5.35	4.06	5.47	5.42	4.80	5.18	4.04	3.89	6.29	6.05	3.59	5.58	5.20	3.98	3.63	5.70	4.06	4.72	4.91	5.28	4.01	4.27	
% Total Organic Carbon	35.6	0.60	0.34	17.5	0.52	0.46	12.1	0.31	0.38	0.71	0.66	43.6	48.8	0.62	0.39	45.4	0.31	0.53	41.1	39.1	0.30	11.6	1.02	0.60	0.29	41.9	37.3	
Polycyclic Aromatic Hydrocarbons [mg/kg]																												
Acenaphthene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.020	<0.0050	<0.0050	<0.0090	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Acenaphthylene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.030	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.040	<0.0050	
Anthracene	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0090	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0080	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.020	<0.0040	
Benz(a)anthracene	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.090	<0.010	
Benzo(a)pyrene	<0.050	<0.010	<0.010	<0.20	<0.010	<0.010	<0.050	<0.010	<0.010	<0.010	<0.010	<0.040	<0.80	<0.010	<0.010	<0.050	<0.010	<0.010	<0.50	<0.050	<0.010	<0.030	<0.010	<0.010	<0.010	<0.20	<0.060	
Benzo(b)fluoranthene	<0.080	<0.010	<0.010	<0.010	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.060	<0.040	<0.010	<0.010	<0.080	<0.010	<0.010	<0.020	<0.070	<0.010	<0.040	<0.010	<0.010	<0.010	<0.30	<0.10	
Benzo(b+j+k)fluoranthene	<0.085	<0.015	<0.015	<0.015	<0.015	<0.015	<0.071	<0.015	<0.015	<0.015	<0.015	<0.061	<0.050	<0.015	<0.015	<0.085	<0.015	<0.015	<0.073	<0.073	<0.015	<0.045	<0.015	<0.015	<0.015	<2.0	<0.10	
Benzo(g,h,i)perylene	<0.20	<0.010	<0.010	<0.040	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.020	<0.090	<0.010	<0.010	<0.080	<0.010	<0.010	<0.090	<0.40	<0.010	<0.060	<0.010	<0.010	<0.010	<0.30	<0.20	
Benzo(k)fluoranthene	<0.030	<0.010	<0.01																									



Table A-3 Polycyclic Aromatic Hydrocarbon, Total Organic Carbon, and Dioxin and Furan Concentrations in Soil

Parameter	Concentrations [dry weight]																										
	14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01	14-DDR-12-S-01	14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.014	<0.080	<0.029	-	-	<0.084	<0.017	<0.022	<0.011	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.027	0.32	<0.059	-	-	0.18	<0.040	<0.034	0.035	-	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.017	<0.088	<0.036	-	-	<0.092	<0.021	<0.021	<0.013	-	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.012	<0.39	<0.026	-	-	<0.19	<0.018	<0.037	<0.018	-	-	-	-
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.76	<0.048	-	-	0.72	<0.045	<0.063	<0.033	-	-	-	-
OCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.035	1.07	<0.060	-	-	<0.31	<0.050	<0.041	<0.036	-	-	-	-
Total-TCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.434	2.08	<0.069	-	-	2.69	0.149	1.59	0.121	-	-	-	-
Total-PeCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.274	<0.21	<0.034	-	-	2.67	0.381	1.14	0.333	-	-	-	-
Total-HxCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.078	0.43	<0.059	-	-	0.55	0.068	0.163	0.082	-	-	-	-
Total-HpCDF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022	<0.76	<0.048	-	-	<0.41	<0.045	<0.063	<0.033	-	-	-	-
Toxic Equivalency [ng/kg dwt]																											
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000438	0.132	0.0000669	-	-	0.0280	0.00	0.000132	0.000903	-	-	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0343	0.481	0.0910	-	-	0.398	0.0610	0.103	0.0380	-	-	-	-
Upper Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0683	0.803	0.182	-	-	0.743	0.122	0.205	0.0715	-	-	-	-

Notes:
Grey Shading indicates a duplicate sample.
“-“ = Analysis is not requested for these samples/stations.
a) Source: Van den Berg et al. (2006)
mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.



Table A-4 Metal Concentrations in Berries

Parameter	Concentrations [mg/kg dry weight]																			
	14-DDR-02A-BERRY-01	14-DDR-03-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	14-DDR-06-BERRY-01	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	14-DDR-09-BERRY-01	14-DDR-10B-BERRY-01	14-DDR-11A-BERRY-01	14-DDR-12-BERRY-01	14-DDR-14B-BERRY-01	14-DDR-16A-BERRY-01	14-DDR-19-BERRY-01	14-DDR-23-BERRY-01	14-DDR-24-BERRY-01	14-DDR-26-BERRY-01	14-DDR-26-BERRY-02	14-DDR-28-BERRY-01	14-DDR-30A-BERRY-01
	cloudberry	black crowberry	black crowberry	black crowberry	blueberry	blueberry	blueberry	black crowberry	blueberry	cloud-berry	blueberry	blueberry	blueberry	black crowberry	blueberry	black crowberry	black crowberry	blueberry	black crowberry	cloud-berry
Aluminum (Al)	3.8	<4.0	7.5	7.4	12.5	10.4	12.4	5.3	6.4	10.7	14.6	19.7	14.6	10	5.3	3.6	6.5	9	8.6	3.3
Antimony (Sb)	<0.010	<0.020	<0.020	<0.020	<0.020	<0.010	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.020	<0.010	<0.020	<0.010	<0.020	0.107	<0.020	<0.010
Arsenic (As)	<0.020	<0.040	<0.040	<0.040	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020	<0.020	<0.020	<0.040	0.024	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020
Barium (Ba)	0.745	1.97	6.74	6.11	6.59	12.8	15.5	5.58	6.15	1.46	10.4	18.6	16	4.73	3.51	4.44	7.3	10.4	5.32	0.593
Beryllium (Be)	<0.010	<0.020	<0.020	<0.020	<0.020	<0.010	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.020	<0.010	<0.020	<0.010	<0.020	<0.020	<0.020	<0.010
Bismuth (Bi)	<0.010	<0.020	<0.020	<0.020	<0.020	<0.010	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.020	<0.010	<0.020	<0.010	<0.020	<0.020	<0.020	<0.010
Boron (B)	8.7	<2.0	2.8	2.9	4.7	3.9	4.7	5.9	3.3	5.4	4.7	5.1	4	6.5	<2.0	4.1	6.1	7.7	3.7	15.7
Cadmium (Cd)	0.572	<0.010	<0.010	<0.010	0.016	0.158	0.167	<0.010	0.013	0.515	0.0765	0.0715	0.231	<0.0050	0.014	<0.0050	<0.010	0.135	<0.010	0.394
Calcium (Ca)	1090	528	601	573	765	1200	1350	605	787	731	1230	1710	1650	688	323	488	739	1270	990	1070
Cesium (Cs)	0.303	0.016	0.044	0.052	0.074	0.114	0.22	<0.010	0.194	0.879	0.0202	0.166	0.255	0.0347	0.027	0.0059	<0.010	<0.010	0.024	0.302
Chromium (Cr)	0.07	<0.10	<0.10	0.32	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	0.11	0.068	<0.10	0.095	<0.10	<0.050	<0.10	0.15	<0.10	<0.050
Cobalt (Co)	0.838	<0.040	<0.040	<0.040	<0.040	0.096	0.12	<0.040	<0.040	0.393	0.046	0.11	0.07	0.029	<0.040	0.025	0.049	0.158	<0.040	0.452
Copper (Cu)	6.09	1.8	3.96	4.59	4.26	4.54	5.13	4.4	3.34	11.8	3.98	4.9	4.89	4.93	0.92	3.11	4.52	3.18	3.9	6.61
Iron (Fe)	25.6	<6.0	12.5	12.5	16.3	14.8	15.5	11.5	10.4	30	14.4	22.2	19.5	16.1	<6.0	10.2	12.8	23.7	13	25.5
Lead (Pb)	<0.020	<0.040	<0.040	<0.040	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020	<0.020	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020
Lithium (Li)	<0.50	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<0.50	<0.50	<1.0	<0.50	<1.0	0.56	<1.0	<1.0	<1.0	<0.50
Magnesium (Mg)	2480	467	454	459	512	650	667	514	483	2120	590	729	747	471	134	381	553	757	454	2320
Manganese (Mn)	56.2	36.4	18.6	20.9	26.2	106	113	90.4	49.1	30	271	126	34.5	49.7	7.07	22.2	50.1	82	37.2	110
Mercury (Hg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum (Mo)	0.863	<0.040	<0.040	<0.040	0.116	0.831	1.35	<0.040	0.224	0.427	0.616	0.533	0.101	<0.020	0.059	<0.020	<0.040	0.072	0.045	1.38
Nickel (Ni)	7.19	0.55	1	1.16	1.01	1.33	1.32	0.63	1.21	7.99	1.29	1.97	2.72	1.12	<0.40	0.71	0.99	1.74	0.68	4.47
Phosphorus (P)	2810	492	881	1000	1070	1410	1470	966	652	2360	1030	1620	1810	924	319	832	1090	1270	877	2590
Potassium (K)	13700	8470	7980	7610	8150	9200	7730	9250	6170	7070	7130	6770	7630	8300	1430	6700	9200	7950	8110	13300
Rubidium (Rb)	63.9	16.8	28.4	28.4	25.4	31.4	27.9	12.1	19	31.2	9.16	19.8	33	16.9	3.76	10.3	12.8	8.16	20.2	53.2
Selenium (Se)	<0.050	<0.10	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050	<0.10	<0.050	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050
Silver (Ag)	0.0151	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0114	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	0.0133
Sodium (Na)	65	<40	<40	<40	<40	<20	<40	<40	<40	441	<20	<20	<40	<20	<40	<20	<40	<40	<40	95
Strontium (Sr)	3.3	0.65	3.05	2.7	1.8	1.98	2.83	1.03	1.55	4.52	2.52	5.03	8.96	1.24	0.88	0.832	0.86	1.49	1.28	2.93
Tellurium (Te)	<0.020	<0.040	<0.040	<0.040	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020	<0.020	<0.020	<0.040	<0.020	<0.040	<0.020	<0.040	<0.040	<0.040	<0.020
Thallium (Tl)	<0.0020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0020	<0.0040	<0.0040	<0.0040	0.0039	<0.0020	<0.0020	<0.0040	<0.0020	<0.0040	<0.0020	<0.0040	<0.0040	<0.0040	<0.0020
Tin (Sn)	0.3	<0.20	<0.20	<0.20	0.27	<0.10	<0.20	0.23	<0.20	<0.10	0.15	0.11	<0.20	<0.10	0.26	0.1	<0.20	<0.20	<0.20	0.43
Uranium (U)	<0.0020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0020	<0.0040	<0.0040	<0.0040	<0.0020	<0.0020	<0.0020	<0.0040	<0.0020	<0.0040	<0.0020	<0.0040	<0.0040	<0.0040	<0.0020
Vanadium (V)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.20	<0.10	<0.20	<0.20	<0.20	<0.10
Zinc (Zn)	31.4	4.1	5.9	6.1	7.1	20.9	18.2	6.2	11	29.2	14.4	20.6	17.6	5.95	3.4	4.5	6.8	12.3	9	31.7
Zirconium (Zr)	<0.20	<0.40	<0.40	<0.40	<0.40	<0.20	<0.40	<0.40	<0.40	<0.20	<0.20	<0.20	<0.40	<0.20	<0.40	<0.20	<0.40	<0.40	<0.40	<0.20

Note:
Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.

Table A-5 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Berries

Parameter	Concentrations [dry weight]																			
	14-DDR-02A-BERRY-01	14-DDR-03-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	14-DDR-06-BERRY-01	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	14-DDR-09-BERRY-01	14-DDR-10B-BERRY-01	14-DDR-11A-BERRY-01	14-DDR-12-BERRY-01	14-DDR-14B-BERRY-01	14-DDR-16A-BERRY-01	14-DDR-19-BERRY-01	14-DDR-23-BERRY-01	14-DDR-24-BERRY-01	14-DDR-26-BERRY-01	14-DDR-26-BERRY-02	14-DDR-28-BERRY-01	14-DDR-30A-BERRY-01
	cloudberry	black crowberry	black crowberry	black crowberry	blueberry	blueberry	blueberry	black crowberry	blueberry	cloud-berry	blueberry	blueberry	blueberry	black crowberry	blueberry	black crowberry	black crowberry	blueberry	black crowberry	cloud-berry
% Moisture	84.8	86.8	81.7	82.3	84.6	86.8	86.6	83.9	84.8	83.5	86.1	85.5	86.9	81.7	86.3	79.7	82.5	84.5	83.3	84
Polycyclic Aromatic Hydrocarbons [mg/kg]																				
Acenaphthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.060	<0.60	<0.050	<0.050	<0.080	<0.30	<1.5	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.070	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.40	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.40	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<1.0	<0.050
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.20	<0.30	<0.080	<0.050	<0.050	<0.050	<0.20	<0.50	<0.050	<0.30	<0.30	<0.40	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	<0.050	<0.070	<4.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<3.0	<0.050
Naphthalene	<0.050	<0.30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]																				
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	-	<0.072	<0.057	-	<0.039	<0.029	<0.26	-	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	-	-	<0.035	<0.027	-	<0.018	<0.016	<0.071	-	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.033	<0.026	-	<0.014	<0.012	<0.067	-	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.032	<0.027	-	<0.014	<0.012	<0.064	-	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.031	<0.026	-	<0.014	<0.012	<0.063	-	-	-	-
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	-	-	-	-	-	0.0369	<0.027	-	<0.032	<0.058	0.0940	-	-	-	-
OCDD	-	-	-	-	-	-	-	-	-	-	0.0510	<0.064	-	0.0796	0.243	0.372	-	-	-	-
Total-TCDD	-	-	-	-	-	-	-	-	-	-	<0.072	<0.057	-	0.0713	<0.029	<0.26	-	-	-	-
Total-PeCDD	-	-	-	-	-	-	-	-	-	-	<0.035	<0.027	-	<0.018	<0.016	<0.071	-	-	-	-
Total-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.033	<0.027	-	<0.014	<0.012	<0.067	-	-	-	-
Total-HpCDD	-	-	-	-	-	-	-	-	-	-	0.0369	<0.027	-	<0.011	0.0472	0.0940	-	-	-	-
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	-	-	<0.057	<0.080	-	0.0843	0.357	0.628	-	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.037	<0.031	-	<0.021	<0.025	<0.11	-	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.031	<0.027	-	<0.014	<0.012	<0.093	-	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.018	<0.018	-	<0.0095	<0.0095	<0.062	-	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.017	<0.019	-	<0.0089	<0.0087	<0.062	-	-	-	-

Table A-5 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Berries

Parameter	Concentrations [dry weight]																			
	14-DDR-02A-BERRY-01	14-DDR-03-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	14-DDR-06-BERRY-01	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	14-DDR-09-BERRY-01	14-DDR-10B-BERRY-01	14-DDR-11A-BERRY-01	14-DDR-12-BERRY-01	14-DDR-14B-BERRY-01	14-DDR-16A-BERRY-01	14-DDR-19-BERRY-01	14-DDR-23-BERRY-01	14-DDR-24-BERRY-01	14-DDR-26-BERRY-01	14-DDR-26-BERRY-02	14-DDR-28-BERRY-01	14-DDR-30A-BERRY-01
	cloudberry	black crowberry	black crowberry	black crowberry	blueberry	blueberry	blueberry	black crowberry	blueberry	cloud-berry	blueberry	blueberry	blueberry	black crowberry	blueberry	black crowberry	black crowberry	blueberry	black crowberry	cloud-berry
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.018	<0.021	-	<0.0083	<0.0097	<0.067	-	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.023	<0.026	-	0.0440	<0.050	<0.087	-	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.022	<0.022	-	<0.016	<0.030	<0.061	-	-	-	-
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.030	<0.029	-	<0.022	<0.014	<0.080	-	-	-	-
OCDF	-	-	-	-	-	-	-	-	-	-	<0.076	<0.12	-	<0.017	0.229	0.255	-	-	-	-
Total-TCDF	-	-	-	-	-	-	-	-	-	-	<0.057	0.126	-	0.0843	0.890	1.40	-	-	-	-
Total-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.037	<0.031	-	<0.017	<0.014	<0.11	-	-	-	-
Total-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.023	<0.026	-	0.0440	0.0165	<0.087	-	-	-	-
Total-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.030	<0.029	-	<0.022	<0.014	<0.080	-	-	-	-
Toxic Equivalency [ng/kg dwt]																				
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.000384	0	-	0.0129	0.0358	0.0639	-	-	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.0708	0.0631	-	0.0480	0.0700	0.269	-	-	-	-
Upper Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.141	0.118	-	0.0823	0.0976	0.475	-	-	-	-

Notes:

Grey Shading indicates a duplicate sample.

“-“ = Analysis is not requested for these samples/stations.

a) Source: Van den Berg et al. (2006)

mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-6 Metal Concentrations in Dwarf Birch Leaves

Parameter	Concentrations [mg/kg dry weight]							
	14-DDR-06-BR-01	14-DDR-11A-BR-01	14-DDR-14A-BR-01	14-DDR-16A-BR-01	14-DDR-19-BR-01	14-DDR-24-BR-01	14-DDR-28-BR-01	14-DDR-30A-BR-01
Aluminum (Al)	27.9	49.5	38	32.4	35.8	26.5	13.2	19.3
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	<0.020	<0.020	0.047	<0.020	<0.020	<0.020	<0.020	<0.020
Barium (Ba)	21.5	47.6	27.8	72.4	62.6	64.4	51.7	78.2
Beryllium (Be)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Boron (B)	2.5	6.9	4.6	4.8	8	6.9	5.1	14.2
Cadmium (Cd)	0.0292	0.0717	0.0382	0.0628	0.0521	0.0401	0.0855	0.112
Calcium (Ca)	2120	3670	3490	4390	3470	4790	3520	4460
Cesium (Cs)	0.0446	0.115	0.0736	0.021	0.043	0.012	0.158	0.0346
Chromium (Cr)	0.112	0.222	0.123	0.057	0.104	0.062	<0.050	<0.050
Cobalt (Co)	0.848	1.15	0.446	0.918	1.35	1.04	1.07	0.958
Copper (Cu)	3.97	5.13	3.57	3.84	3.63	4.72	4.19	4.52
Iron (Fe)	58.7	86.9	89.5	63.6	63.9	61.5	45.4	49.2
Lead (Pb)	0.021	0.021	0.025	0.034	0.023	<0.020	<0.020	<0.020
Lithium (Li)	0.88	<0.50	<0.50	1.03	<0.50	<0.50	<0.50	<0.50
Magnesium (Mg)	2070	3540	2360	3330	2990	3620	2350	3250
Manganese (Mn)	129	184	554	180	444	337	379	771
Mercury (Hg)	0.0087	0.0083	0.0084	0.0075	0.007	0.0082	0.009	0.0113
Molybdenum (Mo)	0.03	0.022	0.05	<0.020	<0.020	<0.020	<0.020	0.049
Nickel (Ni)	4.12	4.07	4.74	2.85	6.11	5.11	3.68	3.84
Phosphorus (P)	2200	1560	2050	2750	1980	3240	1610	2270
Potassium (K)	4940	3820	5140	4980	5080	6190	6530	6170
Rubidium (Rb)	7.69	7.22	6.62	6.35	7.1	4.96	8.11	7
Selenium (Se)	<0.050	<0.050	<0.050	0.064	<0.050	0.065	<0.050	<0.050
Silver (Ag)	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	0.008	<0.0050
Sodium (Na)	<20	<20	<20	<20	<20	<20	<20	<20
Strontium (Sr)	10.9	24.1	11.1	26	16.5	15.2	12.6	22.8
Tellurium (Te)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Thallium (Tl)	0.0041	0.0123	0.0039	<0.0020	0.0022	<0.0020	0.0022	<0.0020
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	0.0031	0.006	0.0087	0.0031	0.0065	0.0056	<0.0020	0.0032
Vanadium (V)	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	61.8	126	91	119	111	86.5	88.3	172
Zirconium (Zr)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

mg/kg = milligrams per kilogram; < = less than.

Table A-7 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Dwarf Birch Leaves

Parameter	Concentrations [dry weight]							
	14-DDR-06-BR-01	14-DDR-11A-BR-01	14-DDR-14A-BR-01	14-DDR-16A-BR-01	14-DDR-19-BR-01	14-DDR-24-BR-01	14-DDR-28-BR-01	14-DDR-30A-BR-01
% Moisture	58.9	52.6	55.4	56.8	57.9	58.5	57.8	60.1
Polycyclic Aromatic Hydrocarbons [mg/kg]								
Acenaphthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.060	<0.20	<0.050	<0.050	<0.20	<2.0	<0.20
Benzo(b)fluoranthene	<0.060	<0.050	<0.20	<0.20	<0.060	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.060	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.30	<0.050	<0.050	<0.050	<0.20	<0.40	<0.090	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050	<2.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.70
Naphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]								
2,3,7,8-TCDD	-	-	<0.078	-	<0.033	<0.041	-	-
1,2,3,7,8-PeCDD	-	-	<0.055	-	<0.022	<0.015	-	-
1,2,3,4,7,8-HxCDD	-	-	<0.047	-	<0.024	<0.018	-	-
1,2,3,6,7,8-HxCDD	-	-	<0.046	-	<0.025	<0.017	-	-
1,2,3,7,8,9-HxCDD	-	-	<0.045	-	<0.024	<0.017	-	-
1,2,3,4,6,7,8-HpCDD	-	-	<0.059	-	<0.029	<0.018	-	-
OCDD	-	-	<0.061	-	0.0844	0.0457	-	-
Total-TCDD	-	-	<0.078	-	0.150	0.149	-	-
Total-PeCDD	-	-	<0.055	-	<0.022	<0.015	-	-
Total-HxCDD	-	-	<0.047	-	<0.025	<0.018	-	-
Total-HpCDD	-	-	<0.059	-	<0.029	0.0199	-	-
2,3,7,8-TCDF	-	-	<0.077	-	<0.038	0.0570	-	-
1,2,3,7,8-PeCDF	-	-	<0.058	-	<0.017	<0.017	-	-
2,3,4,7,8-PeCDF	-	-	<0.050	-	<0.015	<0.015	-	-
1,2,3,4,7,8-HxCDF	-	-	<0.027	-	<0.018	<0.010	-	-
1,2,3,6,7,8-HxCDF	-	-	<0.028	-	<0.018	<0.010	-	-
2,3,4,6,7,8-HxCDF	-	-	<0.029	-	<0.020	<0.012	-	-
1,2,3,7,8,9-HxCDF	-	-	<0.041	-	<0.025	<0.015	-	-
1,2,3,4,6,7,8-HpCDF	-	-	<0.042	-	<0.016	<0.010	-	-

Table A-7 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Dwarf Birch Leaves

Parameter	Concentrations [dry weight]							
	14-DDR-06-BR-01	14-DDR-11A-BR-01	14-DDR-14A-BR-01	14-DDR-16A-BR-01	14-DDR-19-BR-01	14-DDR-24-BR-01	14-DDR-28-BR-01	14-DDR-30A-BR-01
1,2,3,4,7,8,9-HpCDF	-	-	<0.056	-	<0.021	<0.014	-	-
OCDF	-	-	<0.11	-	<0.049	<0.032	-	-
Total-TCDF	-	-	<0.077	-	0.322	0.482	-	-
Total-PeCDF	-	-	<0.058	-	<0.017	<0.017	-	-
Total-HxCDF	-	-	<0.039	-	<0.025	<0.015	-	-
Total-HpCDF	-	-	<0.056	-	<0.021	<0.014	-	-
Toxic Equivalency [ng/kg dwt]								
Lower Bound PCDD/F TEQ ^(a)	-	-	0	-	0.0000447	0.00571	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	0.0947	-	0.118	0.0414	-	-
Upper Bound PCDD/F ^(a)	-	-	0.185	-	0.235	0.0771	-	-

Note: "-" = Analysis is not requested for these samples/stations.

a) Source: Van den Berg et al. (2006)

mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-8 Metal Concentrations in Labrador Tea Leaves

Parameter	Concentrations [mg/kg dry weight]										
	14-DDR-02A-LT-01	14-DDR-03-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	14-DDR-09-LT-01	14-DDR-10A-LT-01	14-DDR-12-LT-01	14-DDR-23-LT-01	14-DDR-26-LT-01
Aluminum (Al)	71.4	54.4	91.4	68.1	52	256	51.3	45.4	60.9	68.6	56.5
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	<0.020	0.021	<0.020	<0.020	<0.020	0.253	<0.020	0.022	<0.020	<0.020	<0.020
Barium (Ba)	65.8	77.7	114	96.7	66	20.2	85.6	70.6	83.7	69.4	63.4
Beryllium (Be)	<0.010	<0.010	<0.010	<0.010	<0.010	0.022	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Boron (B)	12.8	8.9	8.2	10.3	9.8	1.1	9.3	8.6	11.6	12.5	15.5
Cadmium (Cd)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0242	0.0054	0.0058	0.0052	<0.0050	<0.0050
Calcium (Ca)	5260	5750	4960	5260	5070	616	5050	4240	4840	4460	5630
Cesium (Cs)	0.314	0.0883	0.777	0.582	0.172	0.198	0.0559	0.0964	0.0516	0.155	0.034
Chromium (Cr)	0.061	0.054	0.063	<0.050	<0.050	0.578	<0.050	0.077	0.187	0.12	0.056
Cobalt (Co)	0.232	0.256	0.173	0.112	0.1	0.465	0.184	0.141	0.119	0.113	0.276
Copper (Cu)	2.35	2.82	3.18	2.4	2.48	2.67	2.28	3.04	2.67	2.23	2.37
Iron (Fe)	30.8	24.4	28.9	24.7	26.9	537	22.6	33.1	37.7	45	29
Lead (Pb)	0.03	0.027	0.026	0.029	0.025	0.147	0.023	0.03	0.035	0.041	0.028
Lithium (Li)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium (Mg)	1060	1280	1280	1060	967	351	1220	962	1200	1040	1360
Manganese (Mn)	512	893	250	219	970	24.3	1740	464	1510	372	631
Mercury (Hg)	0.0101	0.0128	0.0116	0.0114	0.0143	0.0851	0.0131	0.0123	0.0123	0.0119	0.0177
Molybdenum (Mo)	<0.020	0.049	0.02	0.02	0.569	0.438	0.037	0.032	0.438	0.3	0.065
Nickel (Ni)	2.7	1.44	4.75	3.15	0.65	1.67	0.74	2.33	1.07	1.46	1.53
Phosphorus (P)	901	981	1290	1080	1030	564	959	1200	878	1060	1120
Potassium (K)	4420	4720	4820	3830	4630	1650	4430	5070	4350	4790	4690
Rubidium (Rb)	16.9	10.6	27.9	21.2	17.5	9.32	8.21	16.1	5.71	13.7	7.26
Selenium (Se)	<0.050	<0.050	<0.050	<0.050	<0.050	0.051	<0.050	<0.050	<0.050	<0.050	<0.050

Table A-8 Metal Concentrations in Labrador Tea Leaves

Parameter	Concentrations [mg/kg dry weight]										
	14-DDR-02A-LT-01	14-DDR-03-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	14-DDR-09-LT-01	14-DDR-10A-LT-01	14-DDR-12-LT-01	14-DDR-23-LT-01	14-DDR-26-LT-01
Silver (Ag)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0091	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium (Na)	<20	<20	<20	<20	<20	28	<20	<20	<20	<20	<20
Strontium (Sr)	9.62	14.7	26.7	24.6	7.28	7.45	8.33	7.06	8.94	7.86	5.39
Tellurium (Te)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Thallium (Tl)	0.212	0.0285	0.195	0.212	0.257	0.0122	0.127	0.164	0.0442	0.211	0.429
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	0.003	0.0023	0.0024	0.0024	0.183	0.0035	0.0024	0.0063	0.0164	0.0069
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	0.67	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	19.1	22.3	22.7	18.3	21.5	20.4	22	23.6	21.7	18.3	20.7
Zirconium (Zr)	<0.20	<0.20	<0.20	<0.20	<0.20	0.32	<0.20	<0.20	<0.20	<0.20	<0.20

Note: Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.

Table A-9 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Labrador Tea Leaves

Parameter	Concentrations [dry weight]										
	14-DDR-02A-LT-01	14-DDR-03-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	14-DDR-09-LT-01	14-DDR-10A-LT-01	14-DDR-12-LT-01	14-DDR-23-LT-01	14-DDR-26-LT-01
% Moisture	46	48.8	55.7	54.3	44.7	14.9	50	51.1	47.3	46.5	50.5
Polycyclic Aromatic Hydrocarbons [mg/kg]											
Acenaphthene	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	<0.050	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.090	<0.050	<0.50
Benzo(b)fluoranthene	<0.050	<0.30	<0.050	<0.050	<0.060	<0.060	<0.060	<0.050	<0.090	<0.060	<0.090
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.070	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.080	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.20
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.050	<0.60	<0.20	<0.20	<0.30	<0.30	<0.20	<0.050	<0.60	<0.30	<0.30
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070	<0.050	<0.050	<0.050
Naphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.090	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.080	<0.070	<0.050
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]											
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	0.637	<0.042	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	<0.049	<0.016	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	<0.0079	<0.020	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	0.0129	<0.019	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	<0.0077	<0.019	-
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	-	-	-	0.0232	0.0192	-
OCDD	-	-	-	-	-	-	-	-	0.0185	0.0895	-
Total-TCDD	-	-	-	-	-	-	-	-	0.947	<0.042	-
Total-PeCDD	-	-	-	-	-	-	-	-	0.291	<0.016	-
Total-HxCDD	-	-	-	-	-	-	-	-	0.200	<0.020	-
Total-HpCDD	-	-	-	-	-	-	-	-	0.0511	0.0192	-

Table A-9 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Labrador Tea Leaves

Parameter	Concentrations [dry weight]										
	14-DDR-02A-LT-01	14-DDR-03-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	14-DDR-09-LT-01	14-DDR-10A-LT-01	14-DDR-12-LT-01	14-DDR-23-LT-01	14-DDR-26-LT-01
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	<0.015	<0.091	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	0.00887	<0.022	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	<0.0048	<0.020	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	<0.0043	<0.0092	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	<0.0040	<0.0087	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	<0.0042	<0.0098	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	<0.015	0.0180	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	<0.0032	<0.046	-
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	<0.0042	<0.054	-
OCDF	-	-	-	-	-	-	-	-	<0.0055	<0.017	-
Total-TCDF	-	-	-	-	-	-	-	-	0.0194	<0.049	-
Total-PeCDF	-	-	-	-	-	-	-	-	0.0513	<0.022	-
Total-HxCDF	-	-	-	-	-	-	-	-	<0.0046	0.0180	-
Total-HpCDF	-	-	-	-	-	-	-	-	<0.0042	<0.054	-
Toxic Equivalency [ng/kg dwt]											
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	0.639	0.00202	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	0.692	0.0482	-
Upper Bound PCDD/F ^(a)	-	-	-	-	-	-	-	-	0.695	0.0854	-

Notes: Grey Shading indicates a duplicate sample.

"-" = Analysis is not requested for these samples/stations.

a) Source: Van den Berg et al. (2006)

mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-10 Metal Concentrations in Willow Leaves

Parameter	Concentrations [mg/kg dry weight]																		
	14-DDR-02B-WL-01	14-DDR-03-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	14-DDR-06-WL-01	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	14-DDR-09-WL-01	14-DDR-10A-WL-01	14-DDR-11B-WL-01	14-DDR-12-WL-01	14-DDR-14A-WL-01	14-DDR-16A-WL-01	14-DDR-19-WL-01	14-DDR-23-WL-01	14-DDR-24-WL-01	14-DDR-26-WL-01	14-DDR-28-WL-01	14-DDR-30B-WL-01
Aluminum (Al)	227	65.6	93.9	149	154	58.4	96	79.6	149	89.8	68.9	109	151	147	90.6	66.1	62.5	59.2	229
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.043	0.033	0.039	0.045	<0.020	<0.020	<0.020	0.024	0.032	0.033	<0.020	<0.020	0.036	0.025	0.023	0.024	0.04	0.029	<0.020
Barium (Ba)	42.7	32.7	10.8	13.9	41.8	12	18.6	18.8	50.2	20.7	16	30	51.2	42.2	17.1	15.3	12.7	15.6	15.2
Beryllium (Be)	0.052	0.026	0.052	0.077	0.029	0.03	0.05	0.031	0.025	0.021	0.017	0.031	0.028	0.031	0.011	0.01	0.019	0.02	0.055
Bismuth (Bi)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Boron (B)	16.3	5.4	5.4	6.5	5.8	4.8	6.2	6.1	7.1	17.1	3.6	3	4.3	16.6	7.5	16.6	13.6	8.3	3.8
Cadmium (Cd)	1.44	1.05	1.02	1.28	0.641	0.621	0.723	1.43	0.936	2.02	1.27	1.28	0.553	0.668	1.39	0.877	1.06	0.842	2.42
Calcium (Ca)	7880	7780	4280	5430	8910	5820	6080	5880	9890	6790	5220	6840	9090	9230	5440	6540	7610	5720	3900
Cesium (Cs)	0.0948	0.0143	0.138	0.172	0.124	0.0532	0.112	0.0147	0.0469	0.0218	0.0151	0.154	0.0573	0.0207	0.0363	0.0212	0.0119	0.0218	0.538
Chromium (Cr)	0.121	0.056	<0.050	<0.050	0.164	0.057	0.055	<0.050	0.108	0.302	0.126	0.126	0.191	0.174	0.124	0.077	0.103	<0.050	<0.050
Cobalt (Co)	15.4	13.3	7.52	7.06	7.22	5.93	4.27	10.4	5.77	10.2	9.33	7.99	4.93	8.91	8.39	7.76	6.89	8.74	6.2
Copper (Cu)	4.09	4.31	3.16	3.76	3.47	3.74	3.02	2.76	3.33	4.28	3.04	3.81	3.58	3.12	2.97	3.26	3.38	3.48	4.16
Iron (Fe)	58	67.7	76	83.9	69.8	99.3	135	80.1	74.6	152	76.6	99.8	87.4	77.1	66.9	47.6	50.3	39.3	129
Lead (Pb)	0.032	0.477	<0.020	0.027	0.03	<0.020	0.02	0.023	0.032	0.025	0.024	0.03	0.031	0.037	0.027	0.022	0.031	0.02	0.17
Lithium (Li)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium (Mg)	5300	4820	3220	3430	5420	3170	3160	4660	7860	7360	4030	4240	6100	6320	3300	5350	5740	3390	2050
Manganese (Mn)	450	431	217	244	100	439	464	554	192	552	551	177	100	249	308	208	344	276	85
Mercury (Hg)	0.01	0.0106	0.0098	0.0093	0.0103	0.0088	0.0111	0.0104	0.0107	0.0092	0.0076	0.009	0.0085	0.0063	0.0081	0.0096	0.0126	0.0129	0.0085
Molybdenum (Mo)	0.314	0.297	0.289	0.31	0.278	0.819	0.745	0.321	0.347	1.24	0.329	0.119	0.143	0.278	0.527	0.2	0.354	0.287	0.197
Nickel (Ni)	54.4	9.3	27	35.3	18.6	3.77	4.77	6.83	19.6	40.9	7.87	13.3	10.1	27.2	15	10.9	14.8	11.3	4.68
Phosphorus (P)	2040	1940	1880	2260	3900	1680	1930	2250	2710	4760	1480	2590	2560	1900	3810	2650	2470	1730	1340
Potassium (K)	12400	7080	8930	11000	12800	10300	9160	7600	8690	8770	7220	6950	12200	10700	12000	12900	9500	9340	4750
Rubidium (Rb)	29.9	7.5	21.8	26	28.6	15.9	16.2	6.02	12.1	2.87	4.45	11.4	18.1	9.86	17.7	8.14	4.95	8.89	12.3
Selenium (Se)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.054	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.0050	<0.0050	<0.0050	<0.0050	0.0161	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0065	<0.0050
Sodium (Na)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Strontium (Sr)	55.8	57.7	34.2	46.8	84.8	40.3	44	36.7	99.8	61.8	37.3	47	104	66.4	44.2	32.4	31.2	33.6	33.9
Tellurium (Te)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Thallium (Tl)	0.014	0.0024	0.0023	0.0045	0.0068	0.002	<0.0020	<0.0020	0.0124	0.0031	<0.0020	0.0021	0.0105	0.0029	0.0023	0.0033	0.0045	<0.0020	0.0045
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	0.0027	0.0029	<0.0020	0.0026	0.0038	0.003	0.0023	0.004	0.0028	0.0095	0.0083	0.0085	0.0087	0.0106	0.0167	0.0061	0.0078	0.0032	0.0029
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.22	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	116	206	132	163	56.3	70.1	41.4	99.9	32.1	125	95.7	34.5	49.3	48.5	73.4	43.5	70.8	40.2	32.3
Zirconium (Zr)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Note: Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.

Table A-11 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Willow Leaves

Parameter	Concentrations [dry weight]																		
	14-DDR-02B-WL-01	14-DDR-03-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	14-DDR-06-WL-01	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	14-DDR-09-WL-01	14-DDR-10A-WL-01	14-DDR-11B-WL-01	14-DDR-12-WL-01	14-DDR-14A-WL-01	14-DDR-16A-WL-01	14-DDR-19-WL-01	14-DDR-23-WL-01	14-DDR-24-WL-01	14-DDR-26-WL-01	14-DDR-28-WL-01	14-DDR-30B-WL-01
% Moisture	62.8	59.8	65.2	64.6	64.4	60.4	59.9	56.4	64.2	58.2	56.7	57.7	63.6	64.2	61.8	60.8	61.9	60	57.8
Polycyclic Aromatic Hydrocarbons [mg/kg]																			
Acenaphthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.90
Acenaphthylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.080
Anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	<0.20	<0.060	<0.20	<0.20	<0.050	<0.20	<0.050	<0.20	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.050	<0.050	<0.20	<0.60	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.80
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.20	<0.050	<0.050	<0.070	<4.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.20
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]																			
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	-	<0.082	<0.11	-	<0.050	<0.010	<0.011	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	-	-	<0.025	<0.037	-	<0.035	<0.0049	<0.0088	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.021	<0.040	-	<0.033	<0.0043	<0.0058	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.020	<0.038	-	<0.033	<0.0042	<0.0057	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.020	<0.038	-	<0.032	<0.0041	<0.0056	-	-	-
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	-	-	-	-	-	<0.017	<0.032	-	<0.032	0.0183	0.0175	-	-	-
OCDD	-	-	-	-	-	-	-	-	-	-	<0.031	<0.036	-	0.108	<0.088	0.128	-	-	-
Total-TCDD	-	-	-	-	-	-	-	-	-	-	0.296	<0.11	-	0.145	0.276	0.271	-	-	-
Total-PeCDD	-	-	-	-	-	-	-	-	-	-	<0.025	<0.037	-	<0.035	<0.0049	0.0174	-	-	-
Total-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.021	<0.040	-	<0.033	<0.0043	0.00923	-	-	-
Total-HpCDD	-	-	-	-	-	-	-	-	-	-	<0.017	<0.032	-	<0.032	0.0343	0.0388	-	-	-
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	-	-	<0.10	<0.11	-	<0.046	0.118	0.0740	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.029	<0.045	-	<0.026	0.0131	<0.0071	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.027	<0.040	-	<0.021	0.00661	<0.0049	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.014	<0.024	-	<0.020	<0.0037	0.00443	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.014	<0.023	-	<0.019	<0.0038	<0.0036	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.015	<0.025	-	<0.021	<0.0036	<0.0028	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.019	<0.031	-	0.0280	0.0139	<0.010	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.012	<0.020	-	<0.028	0.00508	<0.0074	-	-	-

Table A-11 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Willow Leaves

Parameter	Concentrations [dry weight]																		
	14-DDR-02B-WL-01	14-DDR-03-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	14-DDR-06-WL-01	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	14-DDR-09-WL-01	14-DDR-10A-WL-01	14-DDR-11B-WL-01	14-DDR-12-WL-01	14-DDR-14A-WL-01	14-DDR-16A-WL-01	14-DDR-19-WL-01	14-DDR-23-WL-01	14-DDR-24-WL-01	14-DDR-26-WL-01	14-DDR-28-WL-01	14-DDR-30B-WL-01
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.016	<0.027	-	<0.039	<0.0044	<0.0053	-	-	-
OCDF	-	-	-	-	-	-	-	-	-	-	<0.034	<0.060	-	<0.063	<0.0054	<0.0096	-	-	-
Total-TCDF	-	-	-	-	-	-	-	-	-	-	0.496	0.311	-	0.276	0.613	0.764	-	-	-
Total-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.029	<0.045	-	<0.026	0.0197	0.00828	-	-	-
Total-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.019	<0.031	-	0.0280	0.0139	0.00723	-	-	-
Total-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.016	<0.027	-	<0.039	0.00508	<0.0053	-	-	-
Toxic Equivalency [ng/kg dwt]																			
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0	0	-	0.00283	0.0158	0.00806	-	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.0694	0.0970	-	0.0596	0.0295	0.0214	-	-	-
Upper Bound PCDD/F ^(a)	-	-	-	-	-	-	-	-	-	-	0.139	0.194	-	0.116	0.0331	0.0330	-	-	-

Notes: Grey Shading indicates a duplicate sample.
“-“ = Analysis is not requested for these samples/stations.
a) Source: Van den Berg et al. (2006)
mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-12 Metal Concentrations in Lichen

Parameter	Concentrations [mg/kg dry weight]																		
	14-DDR-02A-LI-01	14-DDR-03-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	14-DDR-06-LI-01	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	14-DDR-09-LI-01	14-DDR-10A-LI-01	14-DDR-11A-LI-01	14-DDR-12-LI-01	14-DDR-14B-LI-01	14-DDR-16A-LI-01	14-DDR-19-LI-01	14-DDR-23-LI-01	14-DDR-24-LI-01	14-DDR-26-LI-01	14-DDR-28-LI-01	14-DDR-30B-LI-01
Aluminum (Al)	339	437	741	295	445	439	48.8	333	748	599	1640	587	700	378	880	237	338	341	596
Antimony (Sb)	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	0.075	<0.010	<0.010	0.016	0.019	0.011	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	0.015
Arsenic (As)	0.227	0.454	1.3	0.567	0.34	0.341	<0.020	0.418	0.563	0.373	0.844	0.428	0.578	0.31	0.408	0.215	0.194	0.362	0.407
Barium (Ba)	33.1	29.3	44.4	50.5	26.8	21.4	72.2	25.4	44.6	75.5	46.2	32.9	31.4	37.6	37.4	26.1	23	31.2	32.5
Beryllium (Be)	0.019	0.029	0.038	0.024	0.02	0.033	<0.010	0.034	0.023	0.031	0.074	0.028	0.033	0.018	0.032	0.011	0.014	0.036	0.031
Bismuth (Bi)	<0.010	<0.010	0.019	0.013	0.01	0.012	<0.010	<0.010	0.01	0.033	0.035	0.02	0.01	0.021	0.069	0.022	0.035	<0.010	0.037
Boron (B)	1.2	1.1	1.7	1.2	1.3	1.0	7.3	1.1	1.6	1.6	2.4	1.8	1.7	1.5	2.6	1.1	1.7	1.5	1.6
Cadmium (Cd)	0.0466	0.0448	0.083	0.0777	0.0482	0.0258	<0.0050	0.0577	0.101	0.121	0.102	0.0719	0.0339	0.0806	0.0774	0.0795	0.104	0.0668	0.0422
Calcium (Ca)	1840	1650	2510	2920	714	809	4530	1720	1860	2410	3240	2120	1120	2640	1790	2490	3070	1580	1170
Cesium (Cs)	0.256	0.118	0.262	0.22	0.28	0.157	0.336	0.138	0.2	0.433	0.349	0.183	0.193	0.154	0.444	0.0987	0.152	0.187	0.435
Chromium (Cr)	1.09	0.841	2.06	0.573	1.41	0.693	0.05	0.467	2.46	2.13	4.36	1.47	1.9	1.07	2.51	0.666	1.16	0.489	1.24
Cobalt (Co)	0.889	0.964	0.794	0.548	0.489	0.51	0.142	1.06	0.815	0.864	1.63	0.785	0.62	0.701	0.911	0.634	0.747	1.16	0.352
Copper (Cu)	1.99	3.84	2.75	2.12	3.02	2.62	3.58	2.93	3.11	5.72	4.76	3.13	2.89	2.03	3.51	1.95	2.27	3.71	2.53
Iron (Fe)	380	437	838	274	522	664	35.4	353	857	833	1780	652	746	348	900	259	337	368	554
Lead (Pb)	0.426	0.304	0.704	0.534	0.253	0.285	0.045	0.243	0.39	0.787	1.18	0.749	0.335	0.516	0.922	0.325	0.441	0.211	0.756
Lithium (Li)	<0.50	<0.50	1.08	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	<0.50	2.27	0.65	1.04	0.53	1.29	<0.50	0.54	<0.50	0.55
Magnesium (Mg)	600	592	724	608	553	395	1120	623	773	1210	1310	693	575	720	799	871	973	501	433
Manganese (Mn)	121	91	105	133	31.5	50.7	483	130	68.4	56.2	361	158	53.3	372	97.4	207	186	76.4	54.5
Mercury (Hg)	0.0922	0.0684	0.0904	0.071	0.0533	0.0549	0.011	0.0413	0.061	0.102	0.0819	0.0823	0.0569	0.0582	0.0732	0.0609	0.091	0.0408	0.0466
Molybdenum (Mo)	0.112	0.123	0.076	0.043	0.159	0.346	0.723	0.115	0.113	0.39	0.275	0.338	0.086	0.121	0.332	0.062	0.13	0.143	0.167
Nickel (Ni)	3.59	2.97	3.25	1.85	2.43	1.78	1.1	2.39	2.94	5.4	5.15	3.13	2.77	2.84	4.09	1.48	2.44	3.2	2.08
Phosphorus (P)	550	651	837	817	776	597	1110	718	1090	612	647	628	1130	610	922	846	995	754	585
Potassium (K)	1290	2030	1710	1530	1990	1510	4140	2200	2350	1050	1740	1640	2290	1230	1890	1820	2360	2100	1570
Rubidium (Rb)	5.86	6.67	7.3	5.8	10.3	8.01	20	6.13	8.88	5.13	5.36	4.42	7.45	2.95	7.83	4	4.54	7.31	7.52
Selenium (Se)	<0.050	<0.050	0.058	<0.050	0.059	<0.050	<0.050	<0.050	0.055	0.074	0.067	0.05	<0.050	<0.050	0.053	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	0.01	0.0096	0.0137	0.0111	0.0091	0.008	<0.0050	0.01	0.0201	0.0189	0.0206	0.0107	0.0099	0.0114	0.0154	0.0085	0.0141	0.0162	0.0111
Sodium (Na)	67	110	104	112	35	38	<20	114	58	80	181	42	30	54	60	191	178	66	37
Strontium (Sr)	9.43	12.5	10.9	12	8.3	6.45	7.96	10.7	15	20.4	14.5	9.27	7.46	8.19	9.93	7.56	7.18	10.9	10.5
Tellurium (Te)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Thallium (Tl)	0.0235	0.0131	0.0326	0.0232	0.0205	0.0152	0.125	0.0137	0.0258	0.0568	0.0317	0.0282	0.0247	0.0364	0.0341	0.0199	0.0135	0.011	0.0189
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	0.0394	0.404	0.123	0.047	0.107	0.199	0.0036	0.315	0.0729	0.303	0.458	0.205	0.134	0.117	0.379	0.0555	0.182	0.179	0.331
Vanadium (V)	0.82	0.82	1.76	0.61	1.08	0.89	<0.10	0.6	1.92	1.88	3.54	1.37	1.63	0.8	1.75	0.52	0.63	0.46	0.97
Zinc (Zn)	20.9	22.5	40.2	42.1	36.3	21	20.2	24.6	33.9	21.8	29.8	27.6	25.9	27.2	27.5	30.2	34.4	28.9	23.5
Zirconium (Zr)	0.29	0.58	0.69	0.28	0.36	0.36	<0.20	0.42	0.38	0.89	1.88	0.71	0.75	0.51	1.09	0.35	0.59	0.38	0.57

Note: Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.

Table A-13 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Lichen

Parameter	Concentrations [dry weight]																		
	14-DDR-02A-LI-01	14-DDR-03-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	14-DDR-06-LI-01	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	14-DDR-09-LI-01	14-DDR-10A-LI-01	14-DDR-11A-LI-01	14-DDR-12-LI-01	14-DDR-14B-LI-01	14-DDR-16A-LI-01	14-DDR-19-LI-01	14-DDR-23-LI-01	14-DDR-24-LI-01	14-DDR-26-LI-01	14-DDR-28-LI-01	14-DDR-30B-LI-01
% Moisture	26.2	30.8	62.7	66.7	21.6	15.9	45.4	11.8	23.3	3.16	5.8	4.75	40.1	11.9	8.64	12	18	12.4	18.1
Polycyclic Aromatic Hydrocarbons [mg/kg]																			
Acenaphthene	<0.060	<0.060	<0.050	<0.050	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.090	<0.050	<0.050	<0.050
Acenaphthylene	<0.050	<0.090	<0.20	<0.080	<0.050	<0.050	<0.090	<0.090	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050
Anthracene	<0.070	<0.050	<0.20	<0.090	<0.050	<0.050	<0.070	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.20	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.30	<0.050	<0.20	<0.050	<0.40	<0.50	<0.20	<0.20
Benzo(b)fluoranthene	<0.20	<0.050	<0.30	<0.30	<0.050	<0.050	<0.20	<0.20	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050	<0.20	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.080	<0.050	<0.070	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.080	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.070	<0.050	<0.20	<0.060	<0.050	<0.30	<0.070	<0.50	<0.20	<0.20	<0.60	<0.050	<0.050	<0.050	<0.40	<0.30	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.090	<0.050
Naphthalene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.050	<0.050	<0.060	<0.060	<0.050	<0.060	<0.090	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070	<0.050
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]																			
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	-	<0.019	<0.11	-	<0.10	<0.0086	<0.071	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	-	-	<0.018	<0.035	-	<0.067	0.0101	<0.019	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.018	<0.055	-	<0.066	<0.0046	<0.021	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.017	<0.053	-	<0.063	<0.0054	<0.019	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	-	-	<0.015	<0.052	-	<0.063	<0.0044	<0.020	-	-	-
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	-	-	-	-	-	0.0906	<0.11	-	<0.057	0.0829	0.0668	-	-	-
OCDD	-	-	-	-	-	-	-	-	-	-	0.411	0.473	-	0.149	0.358	0.184	-	-	-
Total-TCDD	-	-	-	-	-	-	-	-	-	-	0.344	1.98	-	0.448	1.05	<0.071	-	-	-
Total-PeCDD	-	-	-	-	-	-	-	-	-	-	0.0183	<0.035	-	<0.067	0.0961	<0.019	-	-	-
Total-HxCDD	-	-	-	-	-	-	-	-	-	-	0.106	0.0780	-	<0.066	0.0516	0.0328	-	-	-
Total-HpCDD	-	-	-	-	-	-	-	-	-	-	0.0906	0.142	-	<0.057	0.184	0.113	-	-	-
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	-	-	0.256	<0.089	-	<0.094	<0.051	0.127	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	0.0302	<0.055	-	<0.060	<0.015	<0.019	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-	-	<0.015	<0.045	-	<0.049	0.0117	<0.016	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	<0.0096	<0.042	-	<0.049	<0.0064	<0.0094	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	0.0134	<0.038	-	<0.048	0.00979	<0.0089	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	-	0.0141	<0.043	-	<0.054	<0.0090	<0.0087	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	-	0.0369	<0.051	-	<0.066	0.0150	0.0238	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	-	-	0.0316	<0.034	-	<0.039	0.0328	<0.016	-	-	-

Table A-13 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Lichen

Parameter	Concentrations [dry weight]																		
	14-DDR-02A-LI-01	14-DDR-03-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	14-DDR-06-LI-01	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	14-DDR-09-LI-01	14-DDR-10A-LI-01	14-DDR-11A-LI-01	14-DDR-12-LI-01	14-DDR-14B-LI-01	14-DDR-16A-LI-01	14-DDR-19-LI-01	14-DDR-23-LI-01	14-DDR-24-LI-01	14-DDR-26-LI-01	14-DDR-28-LI-01	14-DDR-30B-LI-01
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-	-	<0.014	<0.049	-	<0.056	<0.0050	<0.012	-	-	-
OCDF	-	-	-	-	-	-	-	-	-	-	0.0605	<0.076	-	<0.099	<0.021	<0.033	-	-	-
Total-TCDF	-	-	-	-	-	-	-	-	-	-	1.72	3.15	-	0.472	0.969	1.05	-	-	-
Total-PeCDF	-	-	-	-	-	-	-	-	-	-	0.0339	<0.055	-	<0.060	0.145	<0.019	-	-	-
Total-HxCDF	-	-	-	-	-	-	-	-	-	-	0.0762	<0.051	-	<0.066	0.0620	0.0433	-	-	-
Total-HpCDF	-	-	-	-	-	-	-	-	-	-	0.0316	<0.049	-	<0.056	0.0372	<0.012	-	-	-
Toxic Equivalency [ng/kg dwt]																			
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.0343	0.0000438	-	0.0000447	0.0174	0.0158	-	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	-	0.0706	0.0343	-	0.118	0.0298	0.0681	-	-	-
Upper Bound PCDD/F ^(a)	-	-	-	-	-	-	-	-	-	-	0.0819	0.0683	-	0.235	0.0345	0.120	-	-	-

Notes: Grey Shading indicates a duplicate sample.
“-“ = Analysis is not requested for these samples/stations.
a) Source: Van den Berg et al. (2006)
mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-14 Metal Concentrations in Grass

Parameter	Concentrations [mg/kg dry weight]																		
	14-DDR-02A-GR-01	14-DDR-03-GR-01	14-DDR-05-GR-01	14-DDR-06-GR-01	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	14-DDR-09-GR-01	14-DDR-10B-GR-01	14-DDR-11A-GR-01	14-DDR-12-GR-01	14-DDR-14A-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	14-DDR-19-GR-01	14-DDR-23-GR-01	14-DDR-24-GR-01	14-DDR-26-GR-01	14-DDR-28-GR-01	14-DDR-30A-GR-01
Aluminum (Al)	9.3	10.1	18.8	27	7.9	9.7	10.9	14.5	31.1	19.5	9.1	10.1	7.9	16.1	62.5	12.5	16.1	7.3	10.1
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.022	0.091	0.066	0.03	<0.020	<0.020	0.045	0.178	0.031	0.032	<0.020	0.021	0.025	0.041	0.052	0.04	0.037	0.047	0.021
Barium (Ba)	35.8	30.3	35.6	42.6	28.2	26.8	30.2	29.8	38.2	24.2	29.3	22.6	25	32.9	51.4	20.7	10.8	38.9	22.4
Beryllium (Be)	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth (Bi)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Boron (B)	4.1	3.4	4.9	5.4	4.1	3.3	2	3.7	3.9	3.8	1.7	3.5	3.6	4.7	8.6	6.5	2.1	4.6	9.1
Cadmium (Cd)	0.0157	0.0209	0.0471	0.0165	0.0467	0.0156	0.0139	0.0206	0.0427	0.0259	0.0143	0.0669	0.0376	0.022	0.0487	0.0154	0.0073	0.0222	0.0412
Calcium (Ca)	1500	2520	2420	2490	2400	2150	2030	1770	2080	2870	1190	1390	1430	1990	3740	1990	1410	1940	2190
Cesium (Cs)	0.125	0.0451	0.56	0.232	0.312	0.241	0.0325	0.186	0.325	0.0155	0.189	0.0323	0.0228	0.132	0.0876	0.0464	0.0206	0.103	0.0325
Chromium (Cr)	<0.050	<0.050	<0.050	0.091	<0.050	<0.050	<0.050	<0.050	0.301	0.061	<0.050	<0.050	0.079	0.1	0.173	0.055	0.1	<0.050	<0.050
Cobalt (Co)	0.089	0.42	0.186	0.088	0.097	0.054	0.297	0.258	0.117	0.119	0.04	0.126	0.11	0.356	0.305	0.285	0.166	0.337	0.083
Copper (Cu)	4.27	2.39	5.89	4.85	6.23	6.2	1.75	7.55	6.5	5.44	4.85	4.29	3.98	3.16	7.51	2.19	1.67	2.61	3.9
Iron (Fe)	46.5	60.1	41.6	55.9	45.4	41.9	37.9	93.9	83.3	51.8	39.5	35.5	31.6	37.1	85.9	35.5	38.6	31.6	45.5
Lead (Pb)	<0.020	0.034	0.054	0.041	0.022	<0.020	0.021	0.03	0.026	<0.020	<0.020	<0.020	<0.020	<0.020	0.05	<0.020	0.028	0.029	0.031
Lithium (Li)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium (Mg)	1180	1360	1410	1320	952	1090	1270	1340	2190	1460	980	1190	1150	1350	1880	1230	754	943	987
Manganese (Mn)	155	814	326	155	352	275	853	98.8	70.7	624	96.8	292	251	569	316	386	197	386	495
Mercury (Hg)	<0.0050	0.0064	0.0061	0.006	0.0053	<0.0050	<0.0050	0.0066	0.0069	0.0053	<0.0050	0.0054	<0.0050	<0.0050	0.0052	<0.0050	0.0094	<0.0050	0.0054
Molybdenum (Mo)	0.449	0.875	0.666	0.331	1.89	1.15	0.624	1.23	1.5	0.376	0.292	1.03	0.946	0.305	0.794	0.205	0.452	0.377	0.388
Nickel (Ni)	2.66	1.93	7.91	9.6	3.34	4.57	1.21	3.08	3.3	2.31	1.46	1.28	1.3	6.7	9.19	1.68	5.94	3.61	0.95
Phosphorus (P)	1590	1420	1480	1450	1500	1470	998	809	1080	1340	1580	1550	1470	1380	1450	1430	2030	1100	1290
Potassium (K)	10200	13300	13900	12700	16700	19100	11800	6620	5500	14500	8020	11200	10700	14400	12800	13700	9960	11200	9140
Rubidium (Rb)	12.2	14.9	31.4	26.8	32.7	34.4	11.2	15.3	11.1	5.43	20	11.7	10.2	18.4	12.2	17.6	9.94	17.4	6.86
Selenium (Se)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium (Na)	<20	<20	<20	<20	<20	<20	<20	36	22	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Strontium (Sr)	10.5	15.7	18.6	18.9	12.8	12.9	9.21	11.4	18.6	17.3	7.35	8.19	8.99	11.7	30.4	6.82	4.06	11.3	12.2
Tellurium (Te)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Thallium (Tl)	<0.0020	0.0034	0.0022	<0.0020	<0.0020	<0.0020	0.0035	0.0047	0.0108	<0.0020	0.0035	<0.0020	<0.0020	<0.0020	0.0024	0.0026	0.0031	0.002	<0.0020
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	0.0051	0.0022	0.0027	<0.0020	<0.0020	0.0032	0.0021	0.0043	0.0053	0.0023	<0.0020	<0.0020	0.0038	0.0187	0.0037	0.0056	<0.0020	0.004
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	34.2	18.9	29.9	25.8	28.5	25	17.8	38.4	26	15.2	21.7	28.8	28	23.6	21.5	17.2	14.2	19	57.6
Zirconium (Zr)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Note: Grey Shading indicates a duplicate sample.
mg/kg = milligrams per kilogram; < = less than.

Table A-15 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Grass

Parameter	Concentrations [dry weight]																		
	14-DDR-02A-GR-01	14-DDR-03-GR-01	14-DDR-05-GR-01	14-DDR-06-GR-01	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	14-DDR-09-GR-01	14-DDR-10B-GR-01	14-DDR-11A-GR-01	14-DDR-12-GR-01	14-DDR-14A-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	14-DDR-19-GR-01	14-DDR-23-GR-01	14-DDR-24-GR-01	14-DDR-26-GR-01	14-DDR-28-GR-01	14-DDR-30A-GR-01
% Moisture	65.8	57.9	64.7	61.5	61.1	58.1	56.5	65.5	58	58.1	61.1	65.6	62	58.5	57.7	56.1	64	56.8	65.1
Polycyclic Aromatic Hydrocarbons [mg/kg]																			
Acenaphthene	<0.10	<0.050	<0.60	<0.050	<0.050	<0.050	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	<0.20	<0.050	<0.070	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30	<0.050	<0.050	<0.050	<0.050	<2.0	<0.050	<0.050	<0.30	<0.20	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.20	<0.050	<0.050	<0.060	<0.050	<0.050	<0.050	<0.070
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.060	<0.050	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.30
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Fluorene	<0.050	<0.20	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.060	<0.30	<0.20	<0.050	<0.050	<0.050	<0.30
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	<0.050	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phenanthrene	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050	<0.70	<0.20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxins and Furans [ng/kg]																			
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	<0.019	<0.064	-	-	<0.28	<0.017	<0.025	-	-	-
1,2,3,7,8-PeCDD	-	-	-	-	-	-	-	-	-	<0.0071	<0.022	-	-	<0.12	<0.0070	<0.012	-	-	-
1,2,3,4,7,8-HxCDD	-	-	-	-	-	-	-	-	-	<0.0082	<0.027	-	-	<0.084	<0.0053	<0.011	-	-	-
1,2,3,6,7,8-HxCDD	-	-	-	-	-	-	-	-	-	<0.0078	<0.026	-	-	<0.084	<0.0052	<0.010	-	-	-
1,2,3,7,8,9-HxCDD	-	-	-	-	-	-	-	-	-	<0.0077	<0.026	-	-	<0.082	<0.0051	<0.010	-	-	-
1,2,3,4,6,7,8-HpCDD	-	-	-	-	-	-	-	-	-	0.0276	<0.027	-	-	<0.12	0.0466	0.0250	-	-	-
OCDD	-	-	-	-	-	-	-	-	-	<0.072	<0.051	-	-	<0.12	0.289	0.113	-	-	-
Total-TCDD	-	-	-	-	-	-	-	-	-	0.189	<0.064	-	-	<0.28	0.116	0.314	-	-	-
Total-PeCDD	-	-	-	-	-	-	-	-	-	0.00978	<0.022	-	-	<0.12	0.0466	<0.012	-	-	-
Total-HxCDD	-	-	-	-	-	-	-	-	-	<0.0082	<0.027	-	-	<0.084	0.0217	<0.011	-	-	-
Total-HpCDD	-	-	-	-	-	-	-	-	-	0.0276	<0.027	-	-	<0.12	0.0863	0.0482	-	-	-
2,3,7,8-TCDF	-	-	-	-	-	-	-	-	-	0.160	<0.043	-	-	<0.26	0.170	0.0956	-	-	-
1,2,3,7,8-PeCDF	-	-	-	-	-	-	-	-	-	0.0166	<0.026	-	-	<0.10	<0.016	<0.014	-	-	-
2,3,4,7,8-PeCDF	-	-	-	-	-	-	-	-	-	0.00935	<0.022	-	-	<0.083	<0.0088	<0.0093	-	-	-
1,2,3,4,7,8-HxCDF	-	-	-	-	-	-	-	-	-	<0.0062	<0.015	-	-	<0.078	<0.0046	<0.0065	-	-	-
1,2,3,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	<0.0046	<0.015	-	-	<0.078	<0.0044	<0.0061	-	-	-
2,3,4,6,7,8-HxCDF	-	-	-	-	-	-	-	-	-	<0.0051	<0.017	-	-	<0.083	<0.0048	<0.0064	-	-	-
1,2,3,7,8,9-HxCDF	-	-	-	-	-	-	-	-	-	0.0262	<0.021	-	-	<0.11	0.0240	<0.021	-	-	-
1,2,3,4,6,7,8-HpCDF	-	-	-	-	-	-	-	-	-	<0.0071	<0.016	-	-	<0.074	0.0127	<0.0063	-	-	-

Table A-15 Polycyclic Aromatic Hydrocarbon and Dioxin and Furan Concentrations in Grass

Parameter	Concentrations [dry weight]																		
	14-DDR-02A-GR-01	14-DDR-03-GR-01	14-DDR-05-GR-01	14-DDR-06-GR-01	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	14-DDR-09-GR-01	14-DDR-10B-GR-01	14-DDR-11A-GR-01	14-DDR-12-GR-01	14-DDR-14A-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	14-DDR-19-GR-01	14-DDR-23-GR-01	14-DDR-24-GR-01	14-DDR-26-GR-01	14-DDR-28-GR-01	14-DDR-30A-GR-01
1,2,3,4,7,8,9-HpCDF	-	-	-	-	-	-	-	-	-	<0.0051	<0.022	-	-	<0.096	<0.0056	<0.0083	-	-	-
OCDF	-	-	-	-	-	-	-	-	-	<0.020	<0.043	-	-	<0.17	0.0596	0.0348	-	-	-
Total-TCDF	-	-	-	-	-	-	-	-	-	0.540	<0.043	-	-	<0.26	0.543	0.463	-	-	-
Total-PeCDF	-	-	-	-	-	-	-	-	-	0.0259	<0.026	-	-	<0.10	0.00954	<0.011	-	-	-
Total-HxCDF	-	-	-	-	-	-	-	-	-	0.0262	<0.021	-	-	<0.11	0.0294	<0.0077	-	-	-
Total-HpCDF	-	-	-	-	-	-	-	-	-	<0.0051	<0.022	-	-	<0.096	0.0127	<0.0083	-	-	-
Toxic Equivalency [ng/kg dwt]																			
Lower Bound PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	0.0222	0	-	-	0	0.0201	0.00985	-	-	-
Mid Point PCDD/F TEQ ^(a)	-	-	-	-	-	-	-	-	-	0.0377	0.0565	-	-	0.258	0.0369	0.0348	-	-	-
Upper Bound PCDD/F ^(a)	-	-	-	-	-	-	-	-	-	0.0524	0.113	-	-	0.517	0.0502	0.0573	-	-	-

Notes: Grey Shading indicates a duplicate sample.
“-“ = Analysis is not requested for these samples/stations.
a) Source: Van den Berg et al. (2006)
mg/kg = milligrams per kilogram; ng/kg = nanograms per kilogram; dwt = dry weight; % = percent; < = less than; TEQ = toxic equivalency.

Table A-16 Relative Percent Difference and Difference Factor of Duplicates for Metals in Soil

Parameter	14-DDR-05-S-01	14-DDR-05-S-01-DUP	MDL	RPD-14-DDR-05-S-01	DF-14-DDR-05-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	MDL	RPD-14-DDR-07-S-01	DF-14-DDR-07-S-01
Aluminum (Al)	11400	10800	50	5%	NC	6550	6210	50	5%	NC
Antimony (Sb)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.10	NC	NC
Arsenic (As)	10.2	10.0	0.05	2%	NC	2.19	2.12	0.050	3%	NC
Barium (Ba)	73.6	71.4	0.5	3%	NC	36.0	36.4	0.50	1%	NC
Beryllium (Be)	0.45	0.43	0.20	NC	0.1	0.36	0.34	0.20	NC	0.1
Bismuth (Bi)	0.23	0.24	0.20	NC	0.05	<0.20	<0.20	0.20	NC	NC
Cadmium (Cd)	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.050	NC	NC
Calcium (Ca)	1500	1340	50	11%	NC	1330	1070	50	22%	NC
Chromium (Cr)	41.3	40.3	0.5	2%	NC	17.2	16.7	0.50	3%	NC
Cobalt (Co)	8.15	7.38	0.10	10%	NC	3.73	3.44	0.10	8%	NC
Copper (Cu)	16.8	15.8	0.5	6%	NC	6.10	5.48	0.50	11%	NC
Iron (Fe)	16100	15200	50	6%	NC	9920	9150	50	8%	NC
Lead (Pb)	3.67	3.52	0.50	4%	NC	2.86	2.71	0.50	5%	NC
Lithium (Li)	32.7	30.0	05.0	9%	NC	26.8	24.3	5.0	10%	NC
Magnesium (Mg)	5310	5040	20	5%	NC	3090	2990	20	3%	NC
Manganese (Mn)	160	149	1	7%	NC	99.1	88.2	1.0	12%	NC
Mercury (Hg)	0.0051	0.0053	0.0050	NC	0.04	<0.0050	<0.0050	0.0050	NC	NC
Molybdenum (Mo)	<0.50	<0.50	0.5	NC	NC	<0.50	<0.50	0.50	NC	NC
Nickel (Ni)	22.1	20.4	0.5	8%	NC	8.82	8.63	0.50	2%	NC
Phosphorus (P)	507	486	50	4%	NC	417	378	50	10%	NC
Potassium (K)	3120	2900	100	7%	NC	2100	1890	100	11%	NC
Selenium (Se)	<0.20	<0.20	0.2	NC	NC	<0.20	<0.20	0.20	NC	NC
Silver (Ag)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.10	NC	NC
Sodium (Na)	150	200	100	NC	0.5	150	<100	100	NC	NC
Strontium (Sr)	6.35	5.69	0.50	11%	NC	5.91	4.85	0.50	20%	NC
Thallium (Tl)	0.160	0.161	0.050	NC	0.02	0.164	0.147	0.050	NC	0.3

Table A-16 Relative Percent Difference and Difference Factor of Duplicates for Metals in Soil

Parameter	14-DDR-05-S-01	14-DDR-05-S-01-DUP	MDL	RPD-14-DDR-05-S-01	DF-14-DDR-05-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	MDL	RPD-14-DDR-07-S-01	DF-14-DDR-07-S-01
Tin (Sn)	<2.0	<2.0	2	NC	NC	<2.0	<2.0	2.0	NC	NC
Titanium (Ti)	778	721	1	8%	NC	494	464	1.0	6%	NC
Uranium (U)	1.77	1.79	0.05	1%	NC	2.42	2.33	0.050	4%	NC
Vanadium (V)	35.0	32.1	0.2	9%	NC	19.0	15.8	0.20	18%	NC
Zinc (Zn)	34.4	33.4	1	3%	NC	26.0	24.3	1.0	7%	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than; % = percent.

Table A-17 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons and Total Organic Carbon in Soil

Parameter	14-DDR-05-S-01	14-DDR-05-S-01-DUP	MDL	RPD-14-DDR-05-S-01	DF-14-DDR-05-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	MDL	RPD-14-DDR-07-S-01	DF-14-DDR-07-S-01
pH (1:2 soil:water)	5.35	5.35	0.10	0	NC	5.47	5.42	0.10	1%	NC
% Total Organic Carbon	0.52	0.46	0.10	NC	0.6	0.31	0.38	0.10	NC	0.7
Acenaphthene	<0.0050	<0.0050	0.005	NC	NC	<0.0050	<0.0050	0.0050	NC	NC
Acenaphthylene	<0.0050	<0.0050	0.005	NC	NC	<0.0050	<0.0050	0.0050	NC	NC
Anthracene	<0.0040	<0.0040	0.004	NC	NC	<0.0040	<0.0040	0.0040	NC	NC
Benz(a)anthracene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Benzo(a)pyrene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Benzo(b)fluoranthene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Benzo(b+j+k)fluoranthene	<0.015	<0.015	0.015	NC	NC	<0.015	<0.015	0.015	NC	NC
Benzo(g,h,i)perylene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Benzo(k)fluoranthene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Chrysene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Dibenz(a,h)anthracene	<0.0050	<0.0050	0.005	NC	NC	<0.0050	<0.0050	0.0050	NC	NC
Fluoranthene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Fluorene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Indeno(1,2,3-c,d)pyrene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
2-Methylnaphthalene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Naphthalene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Phenanthrene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC
Pyrene	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.010	NC	NC

Notes: All concentrations are in milligrams per kilogram (mg/kg) dry weight.

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

< = less than; % = percent.

Table A-18 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Berries

Parameter	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	MDL	RPD-14-DDR-07-BERRY-01	DF-14-DDR-07-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	MDL	RPD-14-DDR-05-BERRY-01	DF-14-DDR-05-BERRY-01
Percent Moisture (%)	86.8	86.6	0.1	0.2%	NC	81.7	82.3	0.1	1%	NC
Aluminum (Al)	10.4	12.4	2	18%	NC	7.5	7.4	4	NC	0.02
Antimony (Sb)	<0.010	<0.020	0.01	NC	NC	<0.020	<0.020	0	NC	NC
Arsenic (As)	<0.020	<0.040	0.02	NC	NC	<0.040	<0.040	0.04	NC	NC
Barium (Ba)	12.8	15.5	0.05	19%	NC	6.74	6.11	0.1	10%	NC
Beryllium (Be)	<0.010	<0.020	0.01	NC	NC	<0.020	<0.020	0.02	NC	NC
Bismuth (Bi)	<0.010	<0.020	0.01	NC	NC	<0.020	<0.020	0.02	NC	NC
Boron (B)	3.9	4.7	1	NC	0.8	2.8	2.9	2	NC	0.05
Cadmium (Cd)	0.158	0.167	0.01	6%	NC	<0.010	<0.010	0.01	NC	NC
Calcium (Ca)	1200	1350	20	12%	NC	601	573	40	5%	NC
Cesium (Cs)	0.114	0.22	0.01	63%	NC	0.044	0.052	0.01	NC	0.8
Chromium (Cr)	<0.050	<0.10	0.05	NC	NC	<0.10	0.32	0.1	NC	NC
Cobalt (Co)	0.096	0.12	0.02	22%	NC	<0.040	<0.040	0.04	NC	NC
Copper (Cu)	4.54	5.13	0.1	12%	NC	3.96	4.59	0.2	15%	NC
Iron (Fe)	14.8	15.5	3	5%	NC	12.5	12.5	6	NC	0
Lead (Pb)	<0.020	<0.040	0.02	NC	NC	<0.040	<0.040	0.04	NC	NC
Lithium (Li)	<0.50	<1.0	0.5	NC	NC	<1.0	<1.0	1	NC	NC
Magnesium (Mg)	650	667	2	3%	NC	454	459	4	1%	NC
Manganese (Mn)	106	113	0.05	6%	NC	18.6	20.9	0.1	12%	NC
Mercury (Hg)	<0.0050	<0.0050	0.01	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Molybdenum (Mo)	0.831	1.35	0.02	48%	NC	<0.040	<0.040	0.04	NC	NC
Nickel (Ni)	1.33	1.32	0.2	1%	NC	1	1.16	0.4	NC	0.4
Phosphorus (P)	1410	1470	10	4%	NC	881	1000	20	13%	NC
Potassium (K)	9200	7730	20	17%	NC	7980	7610	40	5%	NC
Rubidium (Rb)	31.4	27.9	0.05	12%	NC	28.4	28.4	0.1	0%	NC
Selenium (Se)	<0.050	<0.10	0.05	NC	NC	<0.10	<0.10	0.1	NC	NC

Table A-18 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Berries

Parameter	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	MDL	RPD-14-DDR-07-BERRY-01	DF-14-DDR-07-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	MDL	RPD-14-DDR-05-BERRY-01	DF-14-DDR-05-BERRY-01
Silver (Ag)	<0.0050	<0.0050	0.01	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Sodium (Na)	<20	<40	20	NC	NC	<40	<40	40	NC	NC
Strontium (Sr)	1.98	2.83	0.05	35%	NC	3.05	2.7	0.1	12%	NC
Tellurium (Te)	<0.020	<0.040	0.02	NC	NC	<0.040	<0.040	0.04	NC	NC
Thallium (Tl)	<0.0020	<0.0040	0	NC	NC	<0.0040	<0.0040	0	NC	NC
Tin (Sn)	<0.10	<0.20	0.1	NC	NC	<0.20	<0.20	0.2	NC	NC
Uranium (U)	<0.0020	<0.0040	0	NC	NC	<0.0040	<0.0040	0	NC	NC
Vanadium (V)	<0.10	<0.20	0.1	NC	NC	<0.20	<0.20	0.2	NC	NC
Zinc (Zn)	20.9	18.2	0.5	14%	NC	5.9	6.1	1	3%	NC
Zirconium (Zr)	<0.20	<0.40	0.2	NC	NC	<0.40	<0.40	0.4	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

Bold indicates a relative percent difference above the Quality Assurance/Quality Control (QA/QC) criterion (30%).

< = less than; % = percent.

Table A-19 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons in Berries

Parameter	14-DDR-07-BERRY-01	14-DDR-07-BERRY-01-DUP	MDL	RPD-14-DDR-07-BERRY-01	DF-14-DDR-07-BERRY-01	14-DDR-05-BERRY-01	14-DDR-05-BERRY-01-DUP	MDL	RPD-14-DDR-05-BERRY-01	DF-14-DDR-05-BERRY-01
Acenaphthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Acenaphthylene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benz(a)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(a)pyrene	<0.050	<0.060	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(b)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.20	<0.20	0.2	NC	NC
Benzo(g,h,i)perylene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(k)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Chrysene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluorene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Indeno(1,2,3-c,d)pyrene	<4.0	<2.0	2.0	NC	NC	<0.050	<0.050	0.05	NC	NC
Naphthalene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Phenanthrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than.

Table A-20 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Labrador Tea Leaves

Parameter	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	MDL	RPD-14-DDR-07-LT-01	DF-14-DDR-07-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	MDL	RPD-14-DDR-05-LT-01	DF-14-DDR-05-LT-01
Percent Moisture (%)	44.7	14.9	0.1	100%	NC	55.7	54.3	0.1	3%	NC
Aluminum (Al)	52	256	2	132%	NC	91.4	68.1	2	29%	NC
Antimony (Sb)	<0.010	<0.010	0	NC	NC	<0.010	<0.010	0.01	NC	NC
Arsenic (As)	<0.020	0.253	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Barium (Ba)	66	20.2	0.05	106%	NC	114	96.7	0.05	16%	NC
Beryllium (Be)	<0.010	0.022	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Bismuth (Bi)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Boron (B)	9.8	1.1	1	160%	NC	8.2	10.3	1	23%	NC
Cadmium (Cd)	<0.0050	0.0242	0.005	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Calcium (Ca)	5070	616	20	157%	NC	4960	5260	20	6%	NC
Cesium (Cs)	0.172	0.198	0.005	14%	NC	0.777	0.582	0.01	29%	NC
Chromium (Cr)	<0.050	0.578	0.05	NC	NC	0.063	<0.050	0.05	NC	NC
Cobalt (Co)	0.1	0.465	0.02	129%	NC	0.173	0.112	0.02	43%	NC
Copper (Cu)	2.48	2.67	0.1	7%	NC	3.18	2.4	0.1	28%	NC
Iron (Fe)	26.9	537	3	181%	NC	28.9	24.7	3	16%	NC
Lead (Pb)	0.025	0.147	0.02	NC	6.1	0.026	0.029	0.02	NC	0.2
Lithium (Li)	<0.50	<0.50	0.5	NC	NC	<0.50	<0.50	0.5	NC	NC
Magnesium (Mg)	967	351	2	93%	NC	1280	1060	2	19%	NC
Manganese (Mn)	970	24.3	0.05	190%	NC	250	219	0.05	13%	NC
Mercury (Hg)	0.0143	0.0851	0.005	142%	NC	0.0116	0.0114	0.01	NC	0.04
Molybdenum (Mo)	0.569	0.438	0.02	26%	NC	0.02	0.02	0.02	NC	0
Nickel (Ni)	0.65	1.67	0.2	88%	NC	4.75	3.15	0.2	41%	NC
Phosphorus (P)	1030	564	10	58%	NC	1290	1080	10	18%	NC
Potassium (K)	4630	1650	20	95%	NC	4820	3830	20	23%	NC
Rubidium (Rb)	17.5	9.32	0.05	61%	NC	27.9	21.2	0.05	27%	NC
Selenium (Se)	<0.050	0.051	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Table A-20 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Labrador Tea Leaves

Parameter	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	MDL	RPD-14-DDR-07-LT-01	DF-14-DDR-07-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	MDL	RPD-14-DDR-05-LT-01	DF-14-DDR-05-LT-01
Silver (Ag)	<0.0050	0.0091	0.005	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Sodium (Na)	<20	28	20	NC	NC	<20	<20	20	NC	NC
Strontium (Sr)	7.28	7.45	0.05	2%	NC	26.7	24.6	0.05	8%	NC
Tellurium (Te)	<0.020	<0.020	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Thallium (Tl)	0.257	0.0122	0.002	182%	NC	0.195	0.212	0	8%	NC
Tin (Sn)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Uranium (U)	0.0024	0.183	0.002	195%	NC	0.0023	0.0024	0	NC	0.05
Vanadium (V)	<0.10	0.67	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Zinc (Zn)	21.5	20.4	0.5	5%	NC	22.7	18.3	0.5	21%	NC
Zirconium (Zr)	<0.20	0.32	0.2	NC	NC	<0.20	<0.20	0.2	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.)

Bold indicates a relative percent difference above the Quality Assurance/Quality Control (QA/QC) criterion (30%).

< = less than; % = percent.

Table A-21 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons in Labrador Tea Leaves

Parameter	14-DDR-07-LT-01	14-DDR-07-LT-01-DUP	MDL	RPD-14-DDR-07-LT-01	DF-14-DDR-07-LT-01	14-DDR-05-LT-01	14-DDR-05-LT-01-DUP	MDL	RPD-14-DDR-05-LT-01	DF-14-DDR-05-LT-01
Acenaphthene	<0.080	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Acenaphthylene	<0.090	<0.050	0.05	NC	NC	<0.080	<0.050	0.05	NC	NC
Anthracene	<0.070	<0.050	0.05	NC	NC	<0.090	<0.050	0.05	NC	NC
Benz(a)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(a)pyrene	<0.050	<0.050	0.05	NC	NC	<0.060	<0.050	0.05	NC	NC
Benzo(b)fluoranthene	<0.20	<0.050	0.05	NC	NC	<0.30	<0.20	0.2	NC	NC
Benzo(g,h,i)perylene	<0.050	<0.050	0.05	NC	NC	<0.20	<0.050	0.05	NC	NC
Benzo(k)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.060	<0.050	0.05	NC	NC
Chrysene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluorene	<0.070	<0.050	0.05	NC	NC	<0.060	<0.050	0.05	NC	NC
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Naphthalene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Phenanthrene	<0.060	<0.050	0.05	NC	NC	<0.060	<0.050	0.05	NC	NC
Pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than.

Table A-22 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Willow Leaves

Parameter	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	MDL	RPD-14-DDR-07-WL-01	DF-14-DDR-07-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	MDL	RPD-14-DDR-05-WL-01	DF-14-DDR-05-WL-01
Percent Moisture (%)	60.4	59.9	0.1	1%	NC	65.2	64.6	0.1	1%	NC
Aluminum (Al)	58.4	96	2	49%	NC	93.9	149	2	45%	NC
Antimony (Sb)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Arsenic (As)	<0.020	<0.020	0.02	NC	NC	0.039	0.045	0.02	NC	0.3
Barium (Ba)	12	18.6	0.05	43%	NC	10.8	13.9	0.05	25%	NC
Beryllium (Be)	0.03	0.05	0.01	NC	2.0	0.052	0.077	0.01	39%	NC
Bismuth (Bi)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Boron (B)	4.8	6.2	1	25%	NC	5.4	6.5	1	18%	NC
Cadmium (Cd)	0.621	0.723	0.01	15%	NC	1.02	1.28	0.01	23%	NC
Calcium (Ca)	5820	6080	20	4%	NC	4280	5430	20	24%	NC
Cesium (Cs)	0.0532	0.112	0.01	71%	NC	0.138	0.172	0.01	22%	NC
Chromium (Cr)	0.057	0.055	0.05	NC	0.04	<0.050	<0.050	0.05	NC	NC
Cobalt (Co)	5.93	4.27	0.02	33%	NC	7.52	7.06	0.02	6%	NC
Copper (Cu)	3.74	3.02	0.1	21%	NC	3.16	3.76	0.1	17%	NC
Iron (Fe)	99.3	135	3	30%	NC	76	83.9	3	10%	NC
Lead (Pb)	<0.020	0.02	0.02	NC	NC	<0.020	0.027	0.02	NC	NC
Lithium (Li)	<0.50	<0.50	0.5	NC	NC	<0.50	<0.50	0.5	NC	NC
Magnesium (Mg)	3170	3160	2	0%	NC	3220	3430	2	6%	NC
Manganese (Mn)	439	464	0.05	6%	NC	217	244	0.05	12%	NC
Mercury (Hg)	0.0088	0.0111	0.01	NC	0.5	0.0098	0.0093	0.01	NC	0.1
Molybdenum (Mo)	0.819	0.745	0.02	9%	NC	0.289	0.31	0.02	7%	NC
Nickel (Ni)	3.77	4.77	0.2	23%	NC	27	35.3	0.2	27%	NC
Phosphorus (P)	1680	1930	10	14%	NC	1880	2260	10	18%	NC
Potassium (K)	10300	9160	20	12%	NC	8930	11000	20	21%	NC
Rubidium (Rb)	15.9	16.2	0.05	2%	NC	21.8	26	0.05	18%	NC
Selenium (Se)	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Table A-22 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Willow Leaves

Parameter	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	MDL	RPD-14-DDR-07-WL-01	DF-14-DDR-07-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	MDL	RPD-14-DDR-05-WL-01	DF-14-DDR-05-WL-01
Silver (Ag)	<0.0050	<0.0050	0.01	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Sodium (Na)	<20	<20	20	NC	NC	<20	<20	20	NC	NC
Strontium (Sr)	40.3	44	0.05	9%	NC	34.2	46.8	0.05	31%	NC
Tellurium (Te)	<0.020	<0.020	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Thallium (Tl)	0.002	<0.0020	0	NC	NC	0.0023	0.0045	0	NC	1.1
Tin (Sn)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Uranium (U)	0.003	0.0023	0	NC	0.4	<0.0020	0.0026	0	NC	NC
Vanadium (V)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Zinc (Zn)	70.1	41.4	0.5	51%	NC	132	163	0.5	21%	NC
Zirconium (Zr)	<0.20	<0.20	0.2	NC	NC	<0.20	<0.20	0.2	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

Bold indicates a relative percent difference above the Quality Assurance/Quality Control (QA/QC) criterion (30%).

< = less than; % = percent.

Table A-23 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons in Willow Leaves

Parameter	14-DDR-07-WL-01	14-DDR-07-WL-01-DUP	MDL	RPD-14-DDR-07-WL-01	DF-14-DDR-07-WL-01	14-DDR-05-WL-01	14-DDR-05-WL-01-DUP	MDL	RPD-14-DDR-05-WL-01	DF-14-DDR-05-WL-01
Acenaphthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Acenaphthylene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benz(a)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(a)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(b)fluoranthene	<0.060	<0.080	0.06	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(g,h,i)perylene	<0.050	<0.060	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(k)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Chrysene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluorene	<0.30	<0.20	0.2	NC	NC	<0.20	<0.050	0.05	NC	NC
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Naphthalene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Phenanthrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than.

Table A-24 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Lichen

Parameter	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	MDL	RPD-14-DDR-07-LI-01	DF-14-DDR-07-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	MDL	RPD-14-DDR-05-LI-01	DF-14-DDR-05-LI-01
Percent Moisture (%)	15.9	45.4	0.1	96%	NC	62.7	66.7	0.1	6%	NC
Aluminum (Al)	439	48.8	2	160%	NC	741	295	2	86%	NC
Antimony (Sb)	<0.010	0.075	0	NC	NC	0.011	<0.010	0.01	NC	NC
Arsenic (As)	0.341	<0.020	0.02	NC	NC	1.3	0.567	0.02	79%	NC
Barium (Ba)	21.4	72.2	0.05	109%	NC	44.4	50.5	0.05	13%	NC
Beryllium (Be)	0.033	<0.010	0.01	NC	NC	0.038	0.024	0.01	NC	1.4
Bismuth (Bi)	0.012	<0.010	0.01	NC	NC	0.019	0.013	0.01	NC	0.6
Boron (B)	1.0	7.3	1	NC	6.3	1.7	1.2	1	NC	0.5
Cadmium (Cd)	0.0258	<0.0050	0.01	NC	NC	0.083	0.0777	0.01	7%	NC
Calcium (Ca)	809	4530	20	139%	NC	2510	2920	20	15%	NC
Cesium (Cs)	0.157	0.336	0.01	73%	NC	0.262	0.22	0.01	17%	NC
Chromium (Cr)	0.693	0.05	0.05	173%	NC	2.06	0.573	0.05	113%	NC
Cobalt (Co)	0.51	0.142	0.02	113%	NC	0.794	0.548	0.02	37%	NC
Copper (Cu)	2.62	3.58	0.1	31%	NC	2.75	2.12	0.1	26%	NC
Iron (Fe)	664	35.4	3	180%	NC	838	274	3	101%	NC
Lead (Pb)	0.285	0.045	0.02	145%	NC	0.704	0.534	0.02	27%	NC
Lithium (Li)	<0.50	<0.50	0.5	NC	NC	1.08	<0.50	0.5	NC	NC
Magnesium (Mg)	395	1120	2	96%	NC	724	608	2	17%	NC
Manganese (Mn)	50.7	483	0.05	162%	NC	105	133	0.05	24%	NC
Mercury (Hg)	0.0549	0.011	0.01	133%	NC	0.0904	0.071	0.01	24%	NC
Molybdenum (Mo)	0.346	0.723	0.02	71%	NC	0.076	0.043	0.02	NC	1.7
Nickel (Ni)	1.78	1.1	0.2	47%	NC	3.25	1.85	0.2	55%	NC
Phosphorus (P)	597	1110	10	60%	NC	837	817	10	2%	NC
Potassium (K)	1510	4140	20	93%	NC	1710	1530	20	11%	NC
Rubidium (Rb)	8.01	20	0.05	86%	NC	7.3	5.8	0.05	23%	NC
Selenium (Se)	<0.050	<0.050	0.05	NC	NC	0.058	<0.050	0.05	NC	NC

Table A-24 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Lichen

Parameter	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	MDL	RPD-14-DDR-07-LI-01	DF-14-DDR-07-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	MDL	RPD-14-DDR-05-LI-01	DF-14-DDR-05-LI-01
Silver (Ag)	0.008	<0.0050	0.01	NC	NC	0.0137	0.0111	0.01	NC	0.5
Sodium (Na)	38	<20	20	NC	NC	104	112	20	7%	NC
Strontium (Sr)	6.45	7.96	0.05	21%	NC	10.9	12	0.05	10%	NC
Tellurium (Te)	<0.020	<0.020	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Thallium (Tl)	0.0152	0.125	0	157%	NC	0.0326	0.0232	0	34%	NC
Tin (Sn)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Uranium (U)	0.199	0.0036	0	193%	NC	0.123	0.047	0	89%	NC
Vanadium (V)	0.89	<0.10	0.1	NC	NC	1.76	0.61	0.1	97%	NC
Zinc (Zn)	21	20.2	0.5	4%	NC	40.2	42.1	0.5	5%	NC
Zirconium (Zr)	0.36	<0.20	0.2	NC	NC	0.69	0.28	0.2	NC	2.1

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

Bold indicates a relative percent difference above the Quality Assurance/Quality Control (QA/QC) criterion (30%).

< = less than; % = percent.

Table A-25 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons in Lichen

Parameter	14-DDR-07-LI-01	14-DDR-07-LI-01-DUP	MDL	RPD-14-DDR-07-LI-01	DF-14-DDR-07-LI-01	14-DDR-05-LI-01	14-DDR-05-LI-01-DUP	MDL	RPD-14-DDR-05-LI-01	DF-14-DDR-05-LI-01
Acenaphthene	<0.050	<0.050	0.05	NC	NC	<0.10	<0.060	0.06	NC	NC
Acenaphthylene	<0.050	<0.20	0.05	NC	NC	<0.050	<0.20	0.05	NC	NC
Anthracene	<0.050	<0.10	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benz(a)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(a)pyrene	<0.050	<0.050	0.05	NC	NC	<0.60	<2.0	0.6	NC	NC
Benzo(b)fluoranthene	<0.050	<0.20	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(g,h,i)perylene	<0.050	<0.050	0.05	NC	NC	<0.40	<0.050	0.05	NC	NC
Benzo(k)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.20	0.05	NC	NC
Chrysene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluorene	<0.050	<0.20	0.05	NC	NC	<0.050	<0.060	0.05	NC	NC
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Naphthalene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Phenanthrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than.

Table A-26 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Grass

Parameter	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	MDL	RPD-14-DDR-07-GR-01	DF-14-DDR-07-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	MDL	RPD-14-DDR-16B-GR-01	DF-14-DDR-16B-GR-01
Percent Moisture (%)	61.1	58.1	0.1	5%	NC	65.6	62	0.1	6%	NC
Aluminum (Al)	7.9	9.7	2	NC	0.9	10.1	7.9	2	NC	1.1
Antimony (Sb)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Arsenic (As)	<0.020	<0.020	0.02	NC	NC	0.021	0.025	0.02	NC	0.2
Barium (Ba)	28.2	26.8	0.05	5%	NC	22.6	25	0.05	10%	NC
Beryllium (Be)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Bismuth (Bi)	<0.010	<0.010	0.01	NC	NC	<0.010	<0.010	0.01	NC	NC
Boron (B)	4.1	3.3	1	NC	0.8	3.5	3.6	1	NC	0.1
Cadmium (Cd)	0.0467	0.0156	0.01	100%	NC	0.0669	0.0376	0.01	56%	NC
Calcium (Ca)	2400	2150	20	11%	NC	1390	1430	20	3%	NC
Cesium (Cs)	0.312	0.241	0.01	26%	NC	0.0323	0.0228	0.01	NC	1.0
Chromium (Cr)	<0.050	<0.050	0.05	NC	NC	<0.050	0.079	0.05	NC	NC
Cobalt (Co)	0.097	0.054	0.02	NC	2.15	0.126	0.11	0.02	14%	NC
Copper (Cu)	6.23	6.2	0.1	0%	NC	4.29	3.98	0.1	7%	NC
Iron (Fe)	45.4	41.9	3	8%	NC	35.5	31.6	3	12%	NC
Lead (Pb)	0.022	<0.020	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Lithium (Li)	<0.50	<0.50	0.5	NC	NC	<0.50	<0.50	0.5	NC	NC
Magnesium (Mg)	952	1090	2	14%	NC	1190	1150	2	3%	NC
Manganese (Mn)	352	275	0.05	25%	NC	292	251	0.05	15%	NC
Mercury (Hg)	0.0053	<0.0050	0.01	NC	NC	0.0054	<0.0050	0.01	NC	NC
Molybdenum (Mo)	1.89	1.15	0.02	49%	NC	1.03	0.946	0.02	9%	NC
Nickel (Ni)	3.34	4.57	0.2	31%	NC	1.28	1.3	0.2	2%	NC
Phosphorus (P)	1500	1470	10	2%	NC	1550	1470	10	5%	NC
Potassium (K)	16700	19100	20	13%	NC	11200	10700	20	5%	NC
Rubidium (Rb)	32.7	34.4	0.05	5%	NC	11.7	10.2	0.05	14%	NC
Selenium (Se)	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Table A-26 Relative Percent Difference and Difference Factor of Duplicates for Percent Moisture and Metals in Grass

Parameter	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	MDL	RPD-14-DDR-07-GR-01	DF-14-DDR-07-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	MDL	RPD-14-DDR-16B-GR-01	DF-14-DDR-16B-GR-01
Silver (Ag)	<0.0050	<0.0050	0.01	NC	NC	<0.0050	<0.0050	0.01	NC	NC
Sodium (Na)	<20	<20	20	NC	NC	<20	<20	20	NC	NC
Strontium (Sr)	12.8	12.9	0.05	1%	NC	8.19	8.99	0.05	9%	NC
Tellurium (Te)	<0.020	<0.020	0.02	NC	NC	<0.020	<0.020	0.02	NC	NC
Thallium (Tl)	<0.0020	<0.0020	0	NC	NC	<0.0020	<0.0020	0	NC	NC
Tin (Sn)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Uranium (U)	<0.0020	<0.0020	0	NC	NC	<0.0020	<0.0020	0	NC	NC
Vanadium (V)	<0.10	<0.10	0.1	NC	NC	<0.10	<0.10	0.1	NC	NC
Zinc (Zn)	28.5	25	0.5	13%	NC	28.8	28	0.5	3%	NC
Zirconium (Zr)	<0.20	<0.20	0.2	NC	NC	<0.20	<0.20	0.2	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

Bold indicates a relative percent difference above the Quality Assurance/Quality Control (QA/QC) criterion (30%).

< = less than; % = percent.

Table A-27 Relative Percent Difference and Difference Factor of Duplicates for Polycyclic Aromatic Hydrocarbons in Grass

Parameter	14-DDR-07-GR-01	14-DDR-07-GR-01-DUP	MDL	RPD-14-DDR-07-GR-01	DF-14-DDR-07-GR-01	14-DDR-16B-GR-01	14-DDR-16B-GR-01-DUP	MDL	RPD-14-DDR-16B-GR-01	DF-14-DDR-16B-GR-01
Acenaphthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Acenaphthylene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benz(a)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(a)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(b)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(g,h,i)perylene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Benzo(k)fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Chrysene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Dibenz(a,h)anthracene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluoranthene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Fluorene	<0.30	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Naphthalene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Phenanthrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC
Pyrene	<0.050	<0.050	0.05	NC	NC	<0.050	<0.050	0.05	NC	NC

Notes:

NC = Not calculated; one or both samples was below the MDL.

MDL = Method detection limit.

All concentrations are in milligrams per kilogram (mg/kg) dry weight.

< = less than.



ATTACHMENT A1

CERTIFICATES OF ANALYSIS



GOLDER ASSOCIATES LTD.
ATTN: Stephanie Ko
500 - 4260 Still Creek Drive
Burnaby BC V5C 6C6

Date Received: 05-AUG-14
Report Date: 30-NOV-14 20:20 (MT)
Version: FINAL

Client Phone: 604-296-4200

Certificate of Analysis

Lab Work Order #: L1497000
Project P.O. #: NOT SUBMITTED
Job Reference: 14 07256/7044/30
C of C Numbers: 10-365152, 10-365153, 10-365154, 10-365155, 10-365156, 10-365157, 10-365158, 10-365159, 10-365160, 10-365161, 10-365162
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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-1 Soil 29-JUL-14 10:39 14-DDR-06-S-01	L1497000-7 Soil 29-JUL-14 13:10 14-DDR-07-S-01	L1497000-13 Soil 29-JUL-14 13:10 14-DDR-07-S-01-DUP	L1497000-19 Soil 29-JUL-14 15:13 14-DDR-11A-S-01	L1497000-24 Soil 29-JUL-14 15:13 14-DDR-11B-S-01
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	34.5	8.92	8.08	69.4	19.9
	pH (1:2 soil:water) (pH)	4.06	5.47	5.42	3.89	6.29
Organic / Inorganic Carbon	Total Organic Carbon (%)	12.1	0.31	0.38	48.8	0.62
Metals	Aluminum (Al) (mg/kg)	5420	6550	6210	4210	21300
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	2.32	2.19	2.12	2.41	5.67
	Barium (Ba) (mg/kg)	86.2	36.0	36.4	174	145
	Beryllium (Be) (mg/kg)	0.26	0.36	0.34	0.46	0.83
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	0.68	0.89
	Cadmium (Cd) (mg/kg)	0.225	<0.050	<0.050	0.176	0.053
	Calcium (Ca) (mg/kg)	2210	1330	1070	1270	2360
	Chromium (Cr) (mg/kg)	15.1	17.2	16.7	10.1	82.1
	Cobalt (Co) (mg/kg)	4.91	3.73	3.44	4.03	15.1
	Copper (Cu) (mg/kg)	13.4	6.10	5.48	119	32.6
	Iron (Fe) (mg/kg)	6970	9920	9150	6270	30600
	Lead (Pb) (mg/kg)	3.69	2.86	2.71	4.39	5.59
	Lithium (Li) (mg/kg)	12.8	26.8	24.3	<5.0	68.0
	Magnesium (Mg) (mg/kg)	2530	3090	2990	660	11700
	Manganese (Mn) (mg/kg)	137	99.1	88.2	4.5	346
	Mercury (Hg) (mg/kg)	0.164	<0.0050	<0.0050	0.145	0.0063
	Molybdenum (Mo) (mg/kg)	<0.50	<0.50	<0.50	0.68	0.56
	Nickel (Ni) (mg/kg)	13.7	8.82	8.63	38.5	48.1
	Phosphorus (P) (mg/kg)	814	417	378	858	569
	Potassium (K) (mg/kg)	1630	2100	1890	240	8090
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	0.58	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	0.20	<0.10
	Sodium (Na) (mg/kg)	<100	150	<100	<100	380
	Strontium (Sr) (mg/kg)	15.5	5.91	4.85	33.9	15.1
	Thallium (Tl) (mg/kg)	0.152	0.164	0.147	<0.050	0.457
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	254	494	464	139	1560
	Uranium (U) (mg/kg)	1.28	2.42	2.33	8.22	3.41
	Vanadium (V) (mg/kg)	12.5	19.0	15.8	8.49	66.1
	Zinc (Zn) (mg/kg)	38.3	26.0	24.3	3.4	80.9
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.020 ^{DLM}	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.020 ^{DLM}	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-26 Soil 30-JUL-14 09:00 14-DDR-19-S-01	L1497000-32 Soil 30-JUL-14 12:15 14-DDR-14A-S-01	L1497000-36 Soil 30-JUL-14 12:45 14-DDR-14B-S-01	L1497000-39 Soil 30-JUL-14 13:54 14-DDR-12-S-01	L1497000-45 Soil 31-JUL-14 08:50 14-DDR-24-S-01
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	71.8	84.2	8.86	7.99	22.2
	pH (1:2 soil:water) (pH)	3.63	3.59	5.58	6.05	4.06
Organic / Inorganic Carbon	Total Organic Carbon (%)	39.1	45.4	0.31	0.39	11.6
Metals	Aluminum (Al) (mg/kg)	4450	303	8230	10700	6570
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	2.17	0.482	4.21	4.71	3.44
	Barium (Ba) (mg/kg)	101	12.7	50.4	61.5	70.8
	Beryllium (Be) (mg/kg)	<0.20	<0.20	0.27	0.31	<0.20
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd) (mg/kg)	0.576	0.167	<0.050	<0.050	0.210
	Calcium (Ca) (mg/kg)	1440	1400	1590	1660	881
	Chromium (Cr) (mg/kg)	8.35	0.91	25.7	36.0	23.4
	Cobalt (Co) (mg/kg)	8.65	1.07	5.80	8.27	5.95
	Copper (Cu) (mg/kg)	13.7	3.68	9.57	11.3	9.45
	Iron (Fe) (mg/kg)	4500	397	12800	16000	9820
	Lead (Pb) (mg/kg)	1.24	1.52	3.61	3.69	2.02
	Lithium (Li) (mg/kg)	<5.0	<5.0	23.9	29.5	9.7
	Magnesium (Mg) (mg/kg)	1130	613	4140	5670	2640
	Manganese (Mn) (mg/kg)	15.8	45.8	151	218	61.1
	Mercury (Hg) (mg/kg)	0.202	0.0958	<0.0050	0.0056	0.110
	Molybdenum (Mo) (mg/kg)	<0.50	<0.50	<0.50	<0.50	0.52
	Nickel (Ni) (mg/kg)	17.5	2.73	13.9	18.3	12.9
	Phosphorus (P) (mg/kg)	860	559	567	421	644
	Potassium (K) (mg/kg)	940	620	2620	2690	1440
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	0.11	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	<100	120	130	300	<100
	Strontium (Sr) (mg/kg)	18.3	7.99	6.54	9.22	10.7
	Thallium (Tl) (mg/kg)	<0.050	<0.050	0.162	0.158	0.092
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	125	9.7	641	688	340
	Uranium (U) (mg/kg)	0.708	0.067	2.57	2.14	0.905
	Vanadium (V) (mg/kg)	5.95	0.67	23.8	30.4	17.5
	Zinc (Zn) (mg/kg)	44.8	42.5	32.5	35.6	18.7
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0090 ^{DLM}	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-46 Soil 31-JUL-14 08:50 14-DDR-24-S-02	L1497000-52 Soil 31-JUL-14 10:25 14-DDR-26-S-01	L1497000-59 Soil 31-JUL-14 12:15 14-DDR-30A-S-01	L1497000-75 Soil 31-JUL-14 12:40 14-DDR-30B-S-01	L1497000-78 Soil 31-JUL-14 13:49 14-DDR-23-S-01
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	8.68	7.26	78.8	59.9	9.07
	pH (1:2 soil:water) (pH)	4.72	4.91	4.01	4.27	5.70
Organic / Inorganic Carbon	Total Organic Carbon (%)	1.02	0.60	41.9	37.3	0.30
Metals	Aluminum (Al) (mg/kg)	8570	12100	5030	10700	11600
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	6.19	7.72	1.60	4.21	3.67
	Barium (Ba) (mg/kg)	53.8	98.4	61.5	47.4	68.4
	Beryllium (Be) (mg/kg)	0.20	0.30	0.26	0.38	0.24
	Bismuth (Bi) (mg/kg)	<0.20	<0.20	0.20	0.77	<0.20
	Cadmium (Cd) (mg/kg)	<0.050	<0.050	1.02	0.504	<0.050
	Calcium (Ca) (mg/kg)	954	1060	1530	1020	1870
	Chromium (Cr) (mg/kg)	33.3	49.4	3.26	10.8	43.7
	Cobalt (Co) (mg/kg)	5.74	9.02	5.43	5.42	8.15
	Copper (Cu) (mg/kg)	12.4	21.6	11.8	19.1	14.1
	Iron (Fe) (mg/kg)	13400	17500	5880	12400	16200
	Lead (Pb) (mg/kg)	2.24	3.78	3.10	8.62	3.48
	Lithium (Li) (mg/kg)	22.1	32.8	<5.0	<5.0	35.3
	Magnesium (Mg) (mg/kg)	4560	6490	513	839	6040
	Manganese (Mn) (mg/kg)	120	174	19.9	22.1	176
	Mercury (Hg) (mg/kg)	0.0080	0.0055	0.145	0.183	<0.0050
	Molybdenum (Mo) (mg/kg)	<0.50	0.51	0.77	1.24	<0.50
	Nickel (Ni) (mg/kg)	17.2	24.6	9.10	9.81	22.9
	Phosphorus (P) (mg/kg)	319	362	1100	1420	677
	Potassium (K) (mg/kg)	2170	4050	660	710	4810
	Selenium (Se) (mg/kg)	<0.20	<0.20	0.22	0.42	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	0.21	0.27	<0.10
	Sodium (Na) (mg/kg)	110	160	<100	<100	230
	Strontium (Sr) (mg/kg)	4.48	5.22	20.3	13.9	7.25
	Thallium (Tl) (mg/kg)	0.103	0.186	0.056	0.081	0.242
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	504	877	50.4	137	902
	Uranium (U) (mg/kg)	0.718	1.55	5.50	11.4	2.39
	Vanadium (V) (mg/kg)	28.2	40.2	1.88	9.65	34.5
	Zinc (Zn) (mg/kg)	25.7	36.5	27.4	18.5	38.8
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.040 ^{DLM}	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-84 Soil 01-AUG-14 08:12 14-DDR-10A-S-01	L1497000-88 Soil 01-AUG-14 08:40 14-DDR-10B-S-01	L1497000-91 Soil 01-AUG-14 09:36 14-DDR-02A-S-01	L1497000-96 Soil 01-AUG-14 10:15 14-DDR-02B-S-01	L1497000-110 Soil 01-AUG-14 11:15 14-DDR-03-S-01
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	13.2	80.5	76.6	12.1	8.58
	pH (1:2 soil:water) (pH)	5.18	4.04	4.00	5.04	5.57
Organic / Inorganic Carbon	Total Organic Carbon (%)	0.66	43.6	35.6	0.60	0.34
Metals	Aluminum (Al) (mg/kg)	15600	3690	4390	6450	10700
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	13.8	4.77	2.78	3.91	5.27
	Barium (Ba) (mg/kg)	91.8	27.5	91.8	37.1	68.7
	Beryllium (Be) (mg/kg)	0.37	<0.20	0.20	0.22	0.30
	Bismuth (Bi) (mg/kg)	0.24	<0.20	<0.20	<0.20	0.22
	Cadmium (Cd) (mg/kg)	<0.050	0.183	0.709	<0.050	0.121
	Calcium (Ca) (mg/kg)	1180	749	1910	1230	2160
	Chromium (Cr) (mg/kg)	63.4	7.82	6.88	21.6	37.0
	Cobalt (Co) (mg/kg)	10.1	4.06	11.7	4.44	7.91
	Copper (Cu) (mg/kg)	30.6	47.2	12.6	9.86	16.0
	Iron (Fe) (mg/kg)	22200	4770	7500	9650	16300
	Lead (Pb) (mg/kg)	3.39	1.84	2.52	2.52	3.74
	Lithium (Li) (mg/kg)	32.9	<5.0	<5.0	20.0	26.3
	Magnesium (Mg) (mg/kg)	8460	503	1050	3380	5450
	Manganese (Mn) (mg/kg)	190	11.8	19.6	95.4	171
	Mercury (Hg) (mg/kg)	0.0094	0.120	0.128	<0.0050	<0.0050
	Molybdenum (Mo) (mg/kg)	0.77	1.08	<0.50	<0.50	<0.50
	Nickel (Ni) (mg/kg)	32.1	15.8	25.6	13.5	19.5
	Phosphorus (P) (mg/kg)	480	1030	1070	511	652
	Potassium (K) (mg/kg)	4310	490	910	1790	2730
	Selenium (Se) (mg/kg)	<0.20	0.35	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	0.13	<0.10	<0.10
	Sodium (Na) (mg/kg)	160	<100	<100	<100	190
	Strontium (Sr) (mg/kg)	4.87	9.21	24.7	3.97	11.4
	Thallium (Tl) (mg/kg)	0.189	<0.050	<0.050	0.099	0.173
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	750	73.9	132	387	703
	Uranium (U) (mg/kg)	1.21	2.01	1.30	1.45	3.09
	Vanadium (V) (mg/kg)	44.9	6.40	5.45	18.9	31.8
	Zinc (Zn) (mg/kg)	43.4	8.7	28.9	23.4	38.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.010 ^{DLM}	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-111 Soil 01-AUG-14 11:15 14-DDR-03-S-02	L1497000-117 Soil 01-AUG-14 13:03 14-DDR-09-S-01	L1497000-123 Soil 02-AUG-14 08:20 14-DDR-05-S-01	L1497000-129 Soil 02-AUG-14 08:20 14-DDR-05-S-01-DUP	L1497000-134 Soil 02-AUG-14 10:30 14-DDR-16A-S-01
Grouping	Analyte					
SOIL						
Physical Tests	Moisture (%)	43.1	12.2	13.2	13.0	8.79
	pH (1:2 soil:water) (pH)	4.14	4.80	5.35	5.35	5.20
Organic / Inorganic Carbon	Total Organic Carbon (%)	17.5	0.71	0.52	0.46	0.53
Metals	Aluminum (Al) (mg/kg)	15400	10900	11400	10800	9960
	Antimony (Sb) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Arsenic (As) (mg/kg)	8.45	5.49	10.2	10.0	4.42
	Barium (Ba) (mg/kg)	100	68.4	73.6	71.4	70.6
	Beryllium (Be) (mg/kg)	0.49	0.35	0.45	0.43	0.25
	Bismuth (Bi) (mg/kg)	0.36	0.24	0.23	0.24	<0.20
	Cadmium (Cd) (mg/kg)	0.354	<0.050	<0.050	<0.050	<0.050
	Calcium (Ca) (mg/kg)	1920	1340	1500	1340	1350
	Chromium (Cr) (mg/kg)	47.6	36.8	41.3	40.3	38.4
	Cobalt (Co) (mg/kg)	11.6	5.49	8.15	7.38	7.54
	Copper (Cu) (mg/kg)	28.3	9.59	16.8	15.8	11.6
	Iron (Fe) (mg/kg)	21500	14400	16100	15200	14500
	Lead (Pb) (mg/kg)	4.59	3.31	3.67	3.52	2.56
	Lithium (Li) (mg/kg)	30.2	29.8	32.7	30.0	31.2
	Magnesium (Mg) (mg/kg)	6790	5190	5310	5040	5290
	Manganese (Mn) (mg/kg)	180	133	160	149	154
	Mercury (Hg) (mg/kg)	0.0867	0.0058	0.0051	0.0053	0.0053
	Molybdenum (Mo) (mg/kg)	1.10	<0.50	<0.50	<0.50	<0.50
	Nickel (Ni) (mg/kg)	28.3	16.7	22.1	20.4	18.4
	Phosphorus (P) (mg/kg)	517	445	507	486	465
	Potassium (K) (mg/kg)	2980	3010	3120	2900	3460
	Selenium (Se) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Silver (Ag) (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Sodium (Na) (mg/kg)	290	150	150	200	120
	Strontium (Sr) (mg/kg)	17.9	6.56	6.35	5.69	5.47
	Thallium (Tl) (mg/kg)	0.274	0.181	0.160	0.161	0.188
	Tin (Sn) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Titanium (Ti) (mg/kg)	778	713	778	721	700
	Uranium (U) (mg/kg)	4.60	1.94	1.77	1.79	1.09
	Vanadium (V) (mg/kg)	39.6	30.8	35.0	32.1	30.5
	Zinc (Zn) (mg/kg)	55.9	33.9	34.4	33.4	32.4
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Acenaphthylene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-139	L1497000-142			
		Description	Soil	Soil			
		Sampled Date	02-AUG-14	02-AUG-14			
		Sampled Time	11:00	12:30			
		Client ID	14-DDR-16B-S-01	14-DDR-28-S-01			
Grouping	Analyte						
SOIL							
Physical Tests	Moisture (%)		69.4	10.0			
	pH (1:2 soil:water) (pH)		3.98	5.28			
Organic / Inorganic Carbon	Total Organic Carbon (%)		41.1	0.29			
Metals	Aluminum (Al) (mg/kg)		3100	9130			
	Antimony (Sb) (mg/kg)		<0.10	<0.10			
	Arsenic (As) (mg/kg)		2.33	6.33			
	Barium (Ba) (mg/kg)		96.3	62.3			
	Beryllium (Be) (mg/kg)		<0.20	0.29			
	Bismuth (Bi) (mg/kg)		<0.20	<0.20			
	Cadmium (Cd) (mg/kg)		0.470	<0.050			
	Calcium (Ca) (mg/kg)		2950	1460			
	Chromium (Cr) (mg/kg)		8.12	36.1			
	Cobalt (Co) (mg/kg)		9.42	6.68			
	Copper (Cu) (mg/kg)		9.93	13.7			
	Iron (Fe) (mg/kg)		3800	13600			
	Lead (Pb) (mg/kg)		2.15	2.77			
	Lithium (Li) (mg/kg)		<5.0	26.0			
	Magnesium (Mg) (mg/kg)		1570	4880			
	Manganese (Mn) (mg/kg)		112	131			
	Mercury (Hg) (mg/kg)		0.227	<0.0050			
	Molybdenum (Mo) (mg/kg)		0.95	<0.50			
	Nickel (Ni) (mg/kg)		11.8	18.4			
	Phosphorus (P) (mg/kg)		821	464			
	Potassium (K) (mg/kg)		1120	2620			
	Selenium (Se) (mg/kg)		<0.20	<0.20			
	Silver (Ag) (mg/kg)		<0.10	<0.10			
	Sodium (Na) (mg/kg)		<100	110			
	Strontium (Sr) (mg/kg)		30.6	5.87			
	Thallium (Tl) (mg/kg)		0.083	0.130			
	Tin (Sn) (mg/kg)		<2.0	<2.0			
	Titanium (Ti) (mg/kg)		106	583			
	Uranium (U) (mg/kg)		0.873	1.12			
	Vanadium (V) (mg/kg)		5.89	29.0			
	Zinc (Zn) (mg/kg)		32.1	30.8			
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)		<0.020 ^{DLM}	<0.0050			
	Acenaphthylene (mg/kg)		<0.030 ^{DLM}	<0.0050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-1 Soil 29-JUL-14 10:39 14-DDR-06-S-01	L1497000-7 Soil 29-JUL-14 13:10 14-DDR-07-S-01	L1497000-13 Soil 29-JUL-14 13:10 14-DDR-07-S-01-DUP	L1497000-19 Soil 29-JUL-14 15:13 14-DDR-11A-S-01	L1497000-24 Soil 29-JUL-14 15:13 14-DDR-11B-S-01
Grouping	Analyte					
SOIL						
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)	<0.0090 ^{DLM}	<0.0040	<0.0040	<0.0080	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.020	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050 ^{DLM}	<0.010	<0.010	<0.80 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.070 ^{DLM}	<0.010	<0.010	<0.040 ^{DLM}	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.071	<0.015	<0.015	<0.050	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.070 ^{DLM}	<0.010	<0.010	<0.090 ^{DLM}	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.020 ^{DLM}	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Fluorene (mg/kg)	<0.20 ^{DLM}	<0.010	<0.010	<0.40 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.020	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.020	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.020	<0.010
	Surrogate: Acenaphthene d10 (%)	106.9	94.5	86.6	120.6	92.2
	Surrogate: Chrysene d12 (%)	105.8	116.4	109.3	126.2	120.0
	Surrogate: Naphthalene d8 (%)	96.4	91.1	84.9	101.7	88.7
	Surrogate: Phenanthrene d10 (%)	104.9	103.0	97.8	112.2	105.3
	B(a)P Total Potency Equivalent (mg/kg)	<0.033	<0.020	<0.020	<0.42	<0.020
	IACR (CCME) (mg/kg)	<0.35	<0.15	<0.15	<1.4	<0.15
Dioxins and Furans	2,3,7,8-TCDD (pg/g)					
	1,2,3,7,8-PeCDD (pg/g)					
	1,2,3,4,7,8-HxCDD (pg/g)					
	1,2,3,6,7,8-HxCDD (pg/g)					
	1,2,3,7,8,9-HxCDD (pg/g)					
	1,2,3,4,6,7,8-HpCDD (pg/g)					
	OCDD (pg/g)					
	Total-TCDD (pg/g)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-26 Soil 30-JUL-14 09:00 14-DDR-19-S-01	L1497000-32 Soil 30-JUL-14 12:15 14-DDR-14A-S-01	L1497000-36 Soil 30-JUL-14 12:45 14-DDR-14B-S-01	L1497000-39 Soil 30-JUL-14 13:54 14-DDR-12-S-01	L1497000-45 Soil 31-JUL-14 08:50 14-DDR-24-S-01
Grouping	Analyte					
SOIL						
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.020 ^{DLM}	<0.010	<0.010	<0.010 ^{DLM}
	Benzo(a)pyrene (mg/kg)	<0.050 ^{DLM}	<0.050 ^{DLM}	<0.010	<0.010	<0.030 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.070 ^{DLM}	<0.080 ^{DLM}	<0.010	<0.010	<0.040 ^{DLM}
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.073 ^{DLM}	<0.085 ^{DLM}	<0.015	<0.015	<0.045 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.40 ^{DLM}	<0.080 ^{DLM}	<0.010	<0.010	<0.060 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.020 ^{DLM}	<0.030 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010 ^{DLM}
	Fluorene (mg/kg)	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.010	<0.010	<0.040 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	105.9	102.7	87.2	90.1	105.1
	Surrogate: Chrysene d12 (%)	99.1	114.7	105.9	111.8	88.6
	Surrogate: Naphthalene d8 (%)	91.1	90.5	84.8	87.1	96.2
	Surrogate: Phenanthrene d10 (%)	105.7	107.3	96.8	103.8	103.0
	B(a)P Total Potency Equivalent (mg/kg)	<0.035	<0.035	<0.020	<0.020	<0.022
	IACR (CCME) (mg/kg)	<0.41	<0.46	<0.15	<0.15	<0.26
Dioxins and Furans	2,3,7,8-TCDD (pg/g)	<0.31 ^[U]	<0.25 ^[U]	<0.072 ^[U]	<0.019 ^[U]	<0.11 ^[U]
	1,2,3,7,8-PeCDD (pg/g)	<0.21 ^[U]	<0.22 ^[U]	<0.061 ^[U]	<0.026 ^[U]	<0.048 ^[U]
	1,2,3,4,7,8-HxCDD (pg/g)	<0.20 ^[U]	<0.28 ^[U]	<0.052 ^[U]	<0.024 ^[U]	<0.029 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g)	<0.18 ^[U]	<0.27 ^[U]	<0.048 ^[U]	<0.022 ^[U]	<0.027 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g)	<0.19 ^[U]	<0.27 ^[U]	<0.050 ^[U]	<0.023 ^[U]	<0.028 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g)	2.37 ^{M,J}	1.50 ^{J,R}	<0.058 ^[U]	0.031 ^{M,J,R}	0.130 ^{J,R}
	OCDD (pg/g)	14.2 ^[J]	24.1 ^[J]	0.22 ^{M,J,B}	0.146 ^{J,B}	0.440 ^{M,J}
	Total-TCDD (pg/g)	<0.31 ^[U]	<0.25 ^[U]	<0.072 ^[U]	<0.019 ^[U]	<0.11 ^[U]
	Total TCDD # Homologues	0	0 ^[U]	0 ^[U]	0 ^[U]	0
	Total-PeCDD (pg/g)	0.32	<0.22 ^[U]	<0.061 ^[U]	<0.026 ^[U]	0.731
	Total PeCDD # Homologues	1	0 ^[U]	0 ^[U]	0 ^[U]	2
	Total-HxCDD (pg/g)	<0.20 ^[U]	<0.28 ^[U]	<0.052 ^[U]	<0.024 ^[U]	0.056
	Total HxCDD # Homologues	0	0	0 ^[U]	0	1 ^[U]
	Total-HpCDD (pg/g)	4.23	1.73	<0.058 ^[U]	0.054	<0.033 ^[U]

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-46 Soil 31-JUL-14 08:50 14-DDR-24-S-02	L1497000-52 Soil 31-JUL-14 10:25 14-DDR-26-S-01	L1497000-59 Soil 31-JUL-14 12:15 14-DDR-30A-S-01	L1497000-75 Soil 31-JUL-14 12:40 14-DDR-30B-S-01	L1497000-78 Soil 31-JUL-14 13:49 14-DDR-23-S-01
Grouping	Analyte					
SOIL						
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)	<0.0040	<0.0040	<0.020 ^{DLM}	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.090 ^{DLM}	<0.010 ^{DLM}	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.010	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.010	<0.010	<0.30 ^{DLM}	<0.10 ^{DLM}	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.015	<2.0 ^{DLM}	<0.10 ^{DLM}	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.010	<0.30 ^{DLM}	<0.20 ^{DLM}	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<2.0 ^{DLM}	<0.030 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.20 ^{DLM}	<0.010 ^{DLM}	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.010 ^{DLM}	<0.0050 ^{DLM}	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.030 ^{DLM}	<0.010 ^{DLM}	<0.010
	Fluorene (mg/kg)	<0.010	<0.010	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.010	<0.20 ^{DLM}	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	96.2	90.2	116.3	103.3	90.7
	Surrogate: Chrysene d12 (%)	106.2	106.9	105.9	88.9	98.8
	Surrogate: Naphthalene d8 (%)	89.4	84.7	105.0	93.0	87.5
	Surrogate: Phenanthrene d10 (%)	107.5	106.0	117.2	104.9	102.7
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.020	<0.24	<0.041	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.15	<7.7	<0.53	<0.15
Dioxins and Furans	2,3,7,8-TCDD (pg/g)	<0.029 ^[U]				<0.056 ^[U]
	1,2,3,7,8-PeCDD (pg/g)	<0.018 ^[U]				<0.036 ^[U]
	1,2,3,4,7,8-HxCDD (pg/g)	<0.023 ^[U]				<0.023 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g)	<0.022 ^[U]				<0.022 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g)	<0.022 ^[U]				<0.022 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g)	0.070 ^{J,B}				<0.048 ^[U]
	OCDD (pg/g)	0.687 ^[J]				0.130 ^{M,J,R}
	Total-TCDD (pg/g)	<0.029 ^[U]				<0.056 ^[U]
	Total TCDD # Homologues	0				0
	Total-PeCDD (pg/g)	<0.018 ^[U]				<0.036 ^[U]
	Total PeCDD # Homologues	0				0
	Total-HxCDD (pg/g)	<0.023 ^[U]				<0.023 ^[U]
	Total HxCDD # Homologues	0				0
	Total-HpCDD (pg/g)	0.136				<0.048 ^[U]

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-84 Soil 01-AUG-14 08:12 14-DDR-10A-S-01	L1497000-88 Soil 01-AUG-14 08:40 14-DDR-10B-S-01	L1497000-91 Soil 01-AUG-14 09:36 14-DDR-02A-S-01	L1497000-96 Soil 01-AUG-14 10:15 14-DDR-02B-S-01	L1497000-110 Soil 01-AUG-14 11:15 14-DDR-03-S-01
Grouping	Analyte					
SOIL						
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.010	<0.040 ^{DLM}	<0.050 ^{DLM}	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.010	<0.060 ^{DLM}	<0.080 ^{DLM}	<0.010	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.061 ^{DLM}	<0.085 ^{DLM}	<0.015	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.010	<0.020	<0.20 ^{DLM}	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010 ^{DLM}	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.010	<0.090 ^{DLM}	0.174	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.010	<0.050 ^{DLM}	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	84.0	104.2	108.6	91.4	86.8
	Surrogate: Chrysene d12 (%)	99.0	93.9	87.2	93.3	87.9
	Surrogate: Naphthalene d8 (%)	77.1	90.4	94.3	87.1	84.6
	Surrogate: Phenanthrene d10 (%)	93.5	106.9	108.9	105.4	95.8
	B(a)P Total Potency Equivalent (mg/kg)	<0.020	<0.029	<0.035	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.15	<0.31	<0.46	<0.15	<0.15
Dioxins and Furans	2,3,7,8-TCDD (pg/g)					
	1,2,3,7,8-PeCDD (pg/g)					
	1,2,3,4,7,8-HxCDD (pg/g)					
	1,2,3,6,7,8-HxCDD (pg/g)					
	1,2,3,7,8,9-HxCDD (pg/g)					
	1,2,3,4,6,7,8-HpCDD (pg/g)					
	OCDD (pg/g)					
	Total-TCDD (pg/g)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-111 Soil 01-AUG-14 11:15 14-DDR-03-S-02	L1497000-117 Soil 01-AUG-14 13:03 14-DDR-09-S-01	L1497000-123 Soil 02-AUG-14 08:20 14-DDR-05-S-01	L1497000-129 Soil 02-AUG-14 08:20 14-DDR-05-S-01-DUP	L1497000-134 Soil 02-AUG-14 10:30 14-DDR-16A-S-01
Grouping	Analyte					
SOIL						
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Benz(a)anthracene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.20 ^{DLM}	<0.010	<0.010	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b+j+k)fluoranthene (mg/kg)	<0.015	<0.015	<0.015	<0.015	<0.015
	Benzo(g,h,i)perylene (mg/kg)	<0.040 ^{DLM}	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Fluoranthene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.060 ^{DLM}	<0.010	<0.010	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.20 ^{DLM}	<0.010	<0.010	<0.010	<0.010
	2-Methylnaphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	96.0	93.1	95.1	88.1	99.6
	Surrogate: Chrysene d12 (%)	92.2	97.2	95.2	95.8	96.2
	Surrogate: Naphthalene d8 (%)	96.3	87.6	92.8	92.6	96.5
	Surrogate: Phenanthrene d10 (%)	98.6	102.8	101.4	90.9	106.5
	B(a)P Total Potency Equivalent (mg/kg)	<0.11	<0.020	<0.020	<0.020	<0.020
	IACR (CCME) (mg/kg)	<0.40	<0.15	<0.15	<0.15	<0.15
Dioxins and Furans	2,3,7,8-TCDD (pg/g)					
	1,2,3,7,8-PeCDD (pg/g)					
	1,2,3,4,7,8-HxCDD (pg/g)					
	1,2,3,6,7,8-HxCDD (pg/g)					
	1,2,3,7,8,9-HxCDD (pg/g)					
	1,2,3,4,6,7,8-HpCDD (pg/g)					
	OCDD (pg/g)					
	Total-TCDD (pg/g)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-139	L1497000-142			
		Description	Soil	Soil			
		Sampled Date	02-AUG-14	02-AUG-14			
		Sampled Time	11:00	12:30			
		Client ID	14-DDR-16B-S-01	14-DDR-28-S-01			
Grouping	Analyte						
SOIL							
Polycyclic Aromatic Hydrocarbons	Anthracene (mg/kg)		<0.020 ^{DLM}	<0.0040			
	Benz(a)anthracene (mg/kg)		<0.010	<0.010			
	Benzo(a)pyrene (mg/kg)		<0.50 ^{DLM}	<0.010			
	Benzo(b)fluoranthene (mg/kg)		<0.020 ^{DLM}	<0.010			
	Benzo(b+j+k)fluoranthene (mg/kg)		<0.073	<0.015			
	Benzo(g,h,i)perylene (mg/kg)		<0.090 ^{DLM}	<0.010			
	Benzo(k)fluoranthene (mg/kg)		<0.070 ^{DLM}	<0.010			
	Chrysene (mg/kg)		<0.010	<0.010			
	Dibenz(a,h)anthracene (mg/kg)		<0.0060 ^{DLM}	<0.0050			
	Fluoranthene (mg/kg)		<0.010	<0.010			
	Fluorene (mg/kg)		<0.20 ^{DLM}	<0.010			
	Indeno(1,2,3-c,d)pyrene (mg/kg)		<0.020 ^{DLM}	<0.010			
	2-Methylnaphthalene (mg/kg)		<0.010	<0.010			
	Naphthalene (mg/kg)		<0.010	<0.010			
	Phenanthrene (mg/kg)		<0.010	<0.010			
	Pyrene (mg/kg)		<0.010	<0.010			
	Surrogate: Acenaphthene d10 (%)		104.3	93.1			
	Surrogate: Chrysene d12 (%)		92.6	74.6			
	Surrogate: Naphthalene d8 (%)		103.8	89.9			
	Surrogate: Phenanthrene d10 (%)		101.6	100.5			
	B(a)P Total Potency Equivalent (mg/kg)		<0.26	<0.020			
	IACR (CCME) (mg/kg)		<1.0	<0.15			
Dioxins and Furans	2,3,7,8-TCDD (pg/g)						
	1,2,3,7,8-PeCDD (pg/g)						
	1,2,3,4,7,8-HxCDD (pg/g)						
	1,2,3,6,7,8-HxCDD (pg/g)						
	1,2,3,7,8,9-HxCDD (pg/g)						
	1,2,3,4,6,7,8-HpCDD (pg/g)						
	OCDD (pg/g)						
	Total-TCDD (pg/g)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-1 Soil 29-JUL-14 10:39 14-DDR-06-S-01	L1497000-7 Soil 29-JUL-14 13:10 14-DDR-07-S-01	L1497000-13 Soil 29-JUL-14 13:10 14-DDR-07-S-01-DUP	L1497000-19 Soil 29-JUL-14 15:13 14-DDR-11A-S-01	L1497000-24 Soil 29-JUL-14 15:13 14-DDR-11B-S-01
Grouping	Analyte					
SOIL						
Dioxins and Furans	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g)					
	1,2,3,7,8-PeCDF (pg/g)					
	2,3,4,7,8-PeCDF (pg/g)					
	1,2,3,4,7,8-HxCDF (pg/g)					
	1,2,3,6,7,8-HxCDF (pg/g)					
	1,2,3,7,8,9-HxCDF (pg/g)					
	2,3,4,6,7,8-HxCDF (pg/g)					
	1,2,3,4,6,7,8-HpCDF (pg/g)					
	1,2,3,4,7,8,9-HpCDF (pg/g)					
	OCDF (pg/g)					
	Total-TCDF (pg/g)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-26 Soil 30-JUL-14 09:00 14-DDR-19-S-01	L1497000-32 Soil 30-JUL-14 12:15 14-DDR-14A-S-01	L1497000-36 Soil 30-JUL-14 12:45 14-DDR-14B-S-01	L1497000-39 Soil 30-JUL-14 13:54 14-DDR-12-S-01	L1497000-45 Soil 31-JUL-14 08:50 14-DDR-24-S-01
Grouping	Analyte					
SOIL						
Dioxins and Furans	Total HpCDD # Homologues	2	1	0	1	0
	2,3,7,8-TCDF (pg/g)	<0.40 ^[U]	0.92 ^[J]	<0.069 ^[U]	<0.022 ^[U]	<0.089 ^[U]
	1,2,3,7,8-PeCDF (pg/g)	<0.14 ^[U]	<0.21 ^[U]	<0.034 ^[U]	<0.020 ^[U]	<0.055 ^[U]
	2,3,4,7,8-PeCDF (pg/g)	<0.13 ^[U]	<0.19 ^[U]	<0.029 ^[U]	<0.018 ^[U]	<0.051 ^[U]
	1,2,3,4,7,8-HxCDF (pg/g)	<0.10 ^[U]	0.120 ^{M,J,R}	<0.036 ^[U]	<0.017 ^[U]	<0.027 ^[U]
	1,2,3,6,7,8-HxCDF (pg/g)	<0.084 ^[U]	<0.080 ^[U]	<0.029 ^[U]	<0.014 ^[U]	<0.022 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g)	0.18 ^{M,J,R}	0.32 ^{M,J}	<0.059 ^[U]	<0.027 ^[U]	<0.034 ^{M,U}
	2,3,4,6,7,8-HxCDF (pg/g)	<0.092 ^[U]	<0.088 ^{M,U}	<0.036 ^[U]	<0.017 ^[U]	<0.021 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g)	<0.19 ^[U]	<0.39 ^[U]	<0.026 ^{M,U}	<0.012 ^[U]	<0.037 ^[U]
	1,2,3,4,7,8,9-HpCDF (pg/g)	0.72 ^{M,J,R}	<0.76 ^[U]	<0.048 ^[U]	<0.022 ^[U]	<0.063 ^[U]
	OCDF (pg/g)	<0.31 ^{M,U}	1.07 ^[J]	<0.060 ^[U]	<0.035 ^[U]	<0.041 ^{M,U}
	Total-TCDF (pg/g)	2.69	2.08	<0.069 ^[U]	0.434	1.59
	Total TCDF # Homologues	2	4	0	3	2
	Total-PeCDF (pg/g)	2.67	<0.21 ^[U]	<0.034 ^[U]	0.274	1.14
	Total PeCDF # Homologues	1	0	0	1	1
	Total-HxCDF (pg/g)	0.55	0.43	<0.059 ^[U]	0.078	0.163
	Total HxCDF # Homologues	1	2	0	1	1
	Total-HpCDF (pg/g)	<0.41 ^[U]	<0.76 ^[U]	<0.048 ^[U]	<0.022 ^[U]	<0.063 ^[U]
	Total HpCDF # Homologues	0	0	0	0	0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	36.0	81.0	75.0	79.0	29.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	60.0	81.0	80.0	68.0	50.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	67.0	86.0	61.0	70.0	57.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	88.0	96.0	82.0	90.0	87.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	79.0	95.0	78.0	78.0	97.0
	Surrogate: 13C12-OCDD (%)	67.0	96.0	75.0	76.0	103.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	30.0	75.0	71.0	77.0	26.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	60.0	78.0	78.0	70.0	50.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	54.0	76.0	78.0	67.0	47.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	72.0	80.0	65.0	77.0	66.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	92.0	109.0	97.0	102.0	96.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	85.0	96.0	75.0	83.0	95.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	70.0	81.0	65.0	71.0	79.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	91.0	106.0	87.0	90.0	104.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	66.0	77.0	73.0	74.0	92.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	35.0	79.0	71.0	76.0	28.0 ^G
Toxic Equivalency Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)		0.0280	0.132	0.0000669	0.0000438	0.000132

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-46 Soil 31-JUL-14 08:50 14-DDR-24-S-02	L1497000-52 Soil 31-JUL-14 10:25 14-DDR-26-S-01	L1497000-59 Soil 31-JUL-14 12:15 14-DDR-30A-S-01	L1497000-75 Soil 31-JUL-14 12:40 14-DDR-30B-S-01	L1497000-78 Soil 31-JUL-14 13:49 14-DDR-23-S-01
Grouping	Analyte					
SOIL						
Dioxins and Furans	Total HpCDD # Homologues	2				0
	2,3,7,8-TCDF (pg/g)	<0.032 ^[U]				<0.040 ^[U]
	1,2,3,7,8-PeCDF (pg/g)	<0.020 ^[U]				<0.027 ^[U]
	2,3,4,7,8-PeCDF (pg/g)	<0.018 ^[U]				<0.025 ^[U]
	1,2,3,4,7,8-HxCDF (pg/g)	<0.013 ^[U]				<0.020 ^[U]
	1,2,3,6,7,8-HxCDF (pg/g)	<0.011 ^[U]				<0.017 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g)	0.035 ^{J,R}				<0.040 ^[U]
	2,3,4,6,7,8-HxCDF (pg/g)	<0.013 ^[U]				<0.021 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g)	<0.018 ^[U]				<0.018 ^[U]
	1,2,3,4,7,8,9-HpCDF (pg/g)	<0.033 ^[U]				<0.045 ^[U]
	OCDF (pg/g)	<0.036 ^[U]				<0.050 ^[U]
	Total-TCDF (pg/g)	0.121				0.149
	Total TCDF # Homologues	1				1
	Total-PeCDF (pg/g)	0.333				0.381
	Total PeCDF # Homologues	1				1
	Total-HxCDF (pg/g)	0.082				0.068
	Total HxCDF # Homologues	1				1
	Total-HpCDF (pg/g)	<0.033 ^[U]				<0.045 ^[U]
	Total HpCDF # Homologues	0				0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	81.0				69.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	80.0				66.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	69.0				66.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	93.0				97.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	83.0				76.0
	Surrogate: 13C12-OCDD (%)	82.0				69.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	76.0				63.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	81.0				69.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	78.0				64.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	77.0				77.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	107.0				117.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	85.0				86.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	71.0				66.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	95.0				95.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	80.0				67.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	70.0				64.0
Toxic Equivalency Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)		0.000903				0.00

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-84 Soil 01-AUG-14 08:12 14-DDR-10A-S-01	L1497000-88 Soil 01-AUG-14 08:40 14-DDR-10B-S-01	L1497000-91 Soil 01-AUG-14 09:36 14-DDR-02A-S-01	L1497000-96 Soil 01-AUG-14 10:15 14-DDR-02B-S-01	L1497000-110 Soil 01-AUG-14 11:15 14-DDR-03-S-01
Grouping	Analyte					
SOIL						
Dioxins and Furans	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g)					
	1,2,3,7,8-PeCDF (pg/g)					
	2,3,4,7,8-PeCDF (pg/g)					
	1,2,3,4,7,8-HxCDF (pg/g)					
	1,2,3,6,7,8-HxCDF (pg/g)					
	1,2,3,7,8,9-HxCDF (pg/g)					
	2,3,4,6,7,8-HxCDF (pg/g)					
	1,2,3,4,6,7,8-HpCDF (pg/g)					
	1,2,3,4,7,8,9-HpCDF (pg/g)					
	OCDF (pg/g)					
	Total-TCDF (pg/g)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-111	L1497000-117	L1497000-123	L1497000-129	L1497000-134
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	01-AUG-14	01-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14
		Sampled Time	11:15	13:03	08:20	08:20	10:30
		Client ID	14-DDR-03-S-02	14-DDR-09-S-01	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-16A-S-01
Grouping	Analyte						
SOIL							
Dioxins and Furans	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g)						
	1,2,3,7,8-PeCDF (pg/g)						
	2,3,4,7,8-PeCDF (pg/g)						
	1,2,3,4,7,8-HxCDF (pg/g)						
	1,2,3,6,7,8-HxCDF (pg/g)						
	1,2,3,7,8,9-HxCDF (pg/g)						
	2,3,4,6,7,8-HxCDF (pg/g)						
	1,2,3,4,6,7,8-HpCDF (pg/g)						
	1,2,3,4,7,8,9-HpCDF (pg/g)						
	OCDF (pg/g)						
	Total-TCDF (pg/g)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)						
	Surrogate: 13C12-OCDD (%)						
	Surrogate: 13C12-2,3,7,8-TCDF (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)						
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)						
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)						
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)						
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)						
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)						
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)						
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-139	L1497000-142			
		Description	Soil	Soil			
		Sampled Date	02-AUG-14	02-AUG-14			
		Sampled Time	11:00	12:30			
		Client ID	14-DDR-16B-S-01	14-DDR-28-S-01			
Grouping	Analyte						
SOIL							
Dioxins and Furans	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g)						
	1,2,3,7,8-PeCDF (pg/g)						
	2,3,4,7,8-PeCDF (pg/g)						
	1,2,3,4,7,8-HxCDF (pg/g)						
	1,2,3,6,7,8-HxCDF (pg/g)						
	1,2,3,7,8,9-HxCDF (pg/g)						
	2,3,4,6,7,8-HxCDF (pg/g)						
	1,2,3,4,6,7,8-HpCDF (pg/g)						
	1,2,3,4,7,8,9-HpCDF (pg/g)						
	OCDF (pg/g)						
	Total-TCDF (pg/g)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)						
	Surrogate: 13C12-OCDD (%)						
	Surrogate: 13C12-2,3,7,8-TCDF (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)						
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)						
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)						
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)						
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)						
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)						
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)						
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-1	L1497000-7	L1497000-13	L1497000-19	L1497000-24
		Description	Soil	Soil	Soil	Soil	Soil
		Sampled Date	29-JUL-14	29-JUL-14	29-JUL-14	29-JUL-14	29-JUL-14
		Sampled Time	10:39	13:10	13:10	15:13	15:13
		Client ID	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-11A-S-01	14-DDR-11B-S-01
Grouping	Analyte						
SOIL							
Toxic Equivalency							
		Mid Point PCDD/F TEQ (WHO 2005) (pg/g)					
		Upper Bound PCDD/F TEQ (WHO 2005) (pg/g)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-26 Soil 30-JUL-14 09:00 14-DDR-19-S-01	L1497000-32 Soil 30-JUL-14 12:15 14-DDR-14A-S-01	L1497000-36 Soil 30-JUL-14 12:45 14-DDR-14B-S-01	L1497000-39 Soil 30-JUL-14 13:54 14-DDR-12-S-01	L1497000-45 Soil 31-JUL-14 08:50 14-DDR-24-S-01
Grouping	Analyte					
SOIL						
Toxic Equivalency	Mid Point PCDD/F TEQ (WHO 2005) (pg/g)	0.398	0.481	0.0910	0.0343	0.103
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g)	0.743	0.803	0.182	0.0683	0.205

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-46 Soil 31-JUL-14 08:50 14-DDR-24-S-02	L1497000-52 Soil 31-JUL-14 10:25 14-DDR-26-S-01	L1497000-59 Soil 31-JUL-14 12:15 14-DDR-30A-S-01	L1497000-75 Soil 31-JUL-14 12:40 14-DDR-30B-S-01	L1497000-78 Soil 31-JUL-14 13:49 14-DDR-23-S-01
Grouping	Analyte					
SOIL						
Toxic Equivalency	Mid Point PCDD/F TEQ (WHO 2005) (pg/g)	0.0380				0.0610
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g)	0.0715				0.122

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-84 Soil 01-AUG-14 08:12 14-DDR-10A-S-01	L1497000-88 Soil 01-AUG-14 08:40 14-DDR-10B-S-01	L1497000-91 Soil 01-AUG-14 09:36 14-DDR-02A-S-01	L1497000-96 Soil 01-AUG-14 10:15 14-DDR-02B-S-01	L1497000-110 Soil 01-AUG-14 11:15 14-DDR-03-S-01
Grouping	Analyte					
SOIL						
Toxic Equivalency Mid Point PCDD/F TEQ (WHO 2005) (pg/g)						
Upper Bound PCDD/F TEQ (WHO 2005) (pg/g)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-111 Soil 01-AUG-14 11:15 14-DDR-03-S-02	L1497000-117 Soil 01-AUG-14 13:03 14-DDR-09-S-01	L1497000-123 Soil 02-AUG-14 08:20 14-DDR-05-S-01	L1497000-129 Soil 02-AUG-14 08:20 14-DDR-05-S-01-DUP	L1497000-134 Soil 02-AUG-14 10:30 14-DDR-16A-S-01
Grouping	Analyte					
SOIL						
Toxic Equivalency Mid Point PCDD/F TEQ (WHO 2005) (pg/g)						
Upper Bound PCDD/F TEQ (WHO 2005) (pg/g)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-2 Tissue 29-JUL-14 10:39 14-DDR-06-BERRY-01	L1497000-3 Tissue 29-JUL-14 10:39 14-DDR-06-BR-01	L1497000-4 Tissue 29-JUL-14 10:39 14-DDR-06-WL-01	L1497000-5 Tissue 29-JUL-14 10:39 14-DDR-06-LI-01	L1497000-6 Tissue 29-JUL-14 10:39 14-DDR-06-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	84.6	58.9	64.4	21.6	61.5
Metals	Aluminum (Al)-Total (mg/kg)	12.5	27.9	154	445	27.0
	Aluminum (Al)-Total (mg/kg ww)	1.92	11.5	55.0	349	10.4
	Antimony (Sb)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg ww)	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0054 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.040 ^{DLHM}	<0.020	<0.020	0.340	0.030
	Arsenic (As)-Total (mg/kg ww)	<0.0040	0.0053	0.0047	0.267	0.0115
	Barium (Ba)-Total (mg/kg)	6.59	21.5	41.8	26.8	42.6
	Barium (Ba)-Total (mg/kg ww)	1.02	8.84	14.9	21.0	16.4
	Beryllium (Be)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	0.029	0.020	<0.010
	Beryllium (Be)-Total (mg/kg ww)	<0.0020 ^{DLHM}	<0.0020	0.0105	0.0158	0.0022
	Bismuth (Bi)-Total (mg/kg)	<0.020 ^{DLHM}	0.011	<0.010	0.010	<0.010
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	0.0047	<0.0020	0.0081	<0.0020
	Boron (B)-Total (mg/kg)	4.7	2.5	5.8	1.3	5.4
	Boron (B)-Total (mg/kg ww)	0.72	1.01	2.08	1.01	2.09
	Cadmium (Cd)-Total (mg/kg)	0.016	0.0292	0.641	0.0482	0.0165
	Cadmium (Cd)-Total (mg/kg ww)	0.0025	0.0120	0.229	0.0378	0.0064
	Calcium (Ca)-Total (mg/kg)	765	2120	8910	714	2490
	Calcium (Ca)-Total (mg/kg ww)	118	870	3180	560	960
	Cesium (Cs)-Total (mg/kg)	0.074	0.0446	0.124	0.280	0.232
	Cesium (Cs)-Total (mg/kg ww)	0.0113	0.0183	0.0442	0.219	0.0894
	Chromium (Cr)-Total (mg/kg)	<0.10 ^{DLHM}	0.112	0.164	1.41	0.091
	Chromium (Cr)-Total (mg/kg ww)	0.013	0.046	0.059	1.11	0.035
	Cobalt (Co)-Total (mg/kg)	<0.040 ^{DLHM}	0.848	7.22	0.489	0.088
	Cobalt (Co)-Total (mg/kg ww)	0.0049	0.348	2.57	0.384	0.0337
	Copper (Cu)-Total (mg/kg)	4.26	3.97	3.47	3.02	4.85
	Copper (Cu)-Total (mg/kg ww)	0.657	1.63	1.23	2.37	1.87
	Iron (Fe)-Total (mg/kg)	16.3	58.7	69.8	522	55.9
	Iron (Fe)-Total (mg/kg ww)	2.51	24.1	24.9	409	21.5
	Lead (Pb)-Total (mg/kg)	<0.040 ^{DLHM}	0.021	0.030	0.253	0.041
	Lead (Pb)-Total (mg/kg ww)	<0.0040 ^{DLHM}	0.0086	0.0105	0.198	0.0157
	Lithium (Li)-Total (mg/kg)	<1.0	0.88	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	<0.10	0.36	<0.10	0.33	<0.10
	Magnesium (Mg)-Total (mg/kg)	512	2070	5420	553	1320
	Magnesium (Mg)-Total (mg/kg ww)	78.9	850	1930	434	507
	Manganese (Mn)-Total (mg/kg)	26.2	129	100	31.5	155
	Manganese (Mn)-Total (mg/kg ww)	4.04	52.9	35.8	24.7	59.7

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-8 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01	L1497000-9 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01	L1497000-10 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01	L1497000-11 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01	L1497000-12 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	86.8	60.4	44.7	15.9	61.1
Metals	Aluminum (Al)-Total (mg/kg)	10.4	58.4	52.0	439	7.9
	Aluminum (Al)-Total (mg/kg wwt)	1.38	23.2	28.8	370	3.07
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0059 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.020	<0.020	<0.020	0.341	<0.020
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	0.0052	0.0070	0.287	0.0055
	Barium (Ba)-Total (mg/kg)	12.8	12.0	66.0	21.4	28.2
	Barium (Ba)-Total (mg/kg wwt)	1.70	4.74	36.5	18.0	11.0
	Beryllium (Be)-Total (mg/kg)	<0.010	0.030	<0.010	0.033	<0.010
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	0.0121	<0.0020	0.0277	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.012	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	0.0027	0.0041	0.0097	<0.0020
	Boron (B)-Total (mg/kg)	3.9	4.8	9.8	1.0	4.1
	Boron (B)-Total (mg/kg wwt)	0.52	1.89	5.43	0.87	1.60
	Cadmium (Cd)-Total (mg/kg)	0.158	0.621	<0.0050	0.0258	0.0467
	Cadmium (Cd)-Total (mg/kg wwt)	0.0209	0.246	0.0028	0.0217	0.0182
	Calcium (Ca)-Total (mg/kg)	1200	5820	5070	809	2400
	Calcium (Ca)-Total (mg/kg wwt)	158	2310	2800	681	935
	Cesium (Cs)-Total (mg/kg)	0.114	0.0532	0.172	0.157	0.312
	Cesium (Cs)-Total (mg/kg wwt)	0.0151	0.0211	0.0951	0.132	0.122
	Chromium (Cr)-Total (mg/kg)	<0.050	0.057	<0.050	0.693	<0.050
	Chromium (Cr)-Total (mg/kg wwt)	<0.010	0.023	0.019	0.583	<0.010
	Cobalt (Co)-Total (mg/kg)	0.096	5.93	0.100	0.510	0.097
	Cobalt (Co)-Total (mg/kg wwt)	0.0127	2.35	0.0552	0.429	0.0377
	Copper (Cu)-Total (mg/kg)	4.54	3.74	2.48	2.62	6.23
	Copper (Cu)-Total (mg/kg wwt)	0.600	1.48	1.37	2.21	2.43
	Iron (Fe)-Total (mg/kg)	14.8	99.3	26.9	664	45.4
	Iron (Fe)-Total (mg/kg wwt)	1.96	39.4	14.9	558	17.7
	Lead (Pb)-Total (mg/kg)	<0.020	<0.020	0.025	0.285	0.022
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0074	0.0138	0.240	0.0087
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	0.11	<0.10	0.21	<0.10
	Magnesium (Mg)-Total (mg/kg)	650	3170	967	395	952
	Magnesium (Mg)-Total (mg/kg wwt)	85.9	1260	535	333	371
	Manganese (Mn)-Total (mg/kg)	106	439	970	50.7	352
	Manganese (Mn)-Total (mg/kg wwt)	14.0	174	536	42.6	137

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-14 Tissue 29-JUL-14 13:10 14-DDR-07- BERRY-01-DUP	L1497000-15 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01- DUP	L1497000-16 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01- DUP	L1497000-17 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01- DUP	L1497000-18 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01- DUP
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	86.6	59.9	14.9	45.4	58.1
Metals	Aluminum (Al)-Total (mg/kg)	12.4	96.0	256	48.8	9.7
	Aluminum (Al)-Total (mg/kg ww)	1.67	38.5	218	26.6	4.08
	Antimony (Sb)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	<0.010	0.075	<0.010
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020	0.0047 ^{RRU}	0.0409	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.040 ^{DLHM}	<0.020	0.253	<0.020	<0.020
	Arsenic (As)-Total (mg/kg ww)	<0.0040	0.0047	0.216	0.0077	0.0064
	Barium (Ba)-Total (mg/kg)	15.5	18.6	20.2	72.2	26.8
	Barium (Ba)-Total (mg/kg ww)	2.08	7.45	17.2	39.4	11.2
	Beryllium (Be)-Total (mg/kg)	<0.020 ^{DLHM}	0.050	0.022	<0.010	<0.010
	Beryllium (Be)-Total (mg/kg ww)	<0.0020	0.0199	0.0190	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	0.0062	<0.0020	<0.0020
	Boron (B)-Total (mg/kg)	4.7	6.2	1.1	7.3	3.3
	Boron (B)-Total (mg/kg ww)	0.63	2.50	0.93	4.00	1.38
	Cadmium (Cd)-Total (mg/kg)	0.167	0.723	0.0242	<0.0050	0.0156
	Cadmium (Cd)-Total (mg/kg ww)	0.0224	0.290	0.0206	0.0024	0.0065
	Calcium (Ca)-Total (mg/kg)	1350	6080	616	4530	2150
	Calcium (Ca)-Total (mg/kg ww)	181	2440	524	2470	902
	Cesium (Cs)-Total (mg/kg)	0.220	0.112	0.198	0.336	0.241
	Cesium (Cs)-Total (mg/kg ww)	0.0296	0.0451	0.169	0.184	0.101
	Chromium (Cr)-Total (mg/kg)	<0.10 ^{DLHM}	0.055	0.578	0.050	<0.050
	Chromium (Cr)-Total (mg/kg ww)	<0.010	0.022	0.492	0.027	0.020
	Cobalt (Co)-Total (mg/kg)	0.120	4.27	0.465	0.142	0.054
	Cobalt (Co)-Total (mg/kg ww)	0.0161	1.71	0.396	0.0773	0.0227
	Copper (Cu)-Total (mg/kg)	5.13	3.02	2.67	3.58	6.20
	Copper (Cu)-Total (mg/kg ww)	0.690	1.21	2.27	1.96	2.60
	Iron (Fe)-Total (mg/kg)	15.5	135	537	35.4	41.9
	Iron (Fe)-Total (mg/kg ww)	2.09	54.3	457	19.3	17.5
	Lead (Pb)-Total (mg/kg)	<0.040 ^{DLHM}	0.020	0.147	0.045	<0.020
	Lead (Pb)-Total (mg/kg ww)	<0.0040	0.0082	0.125	0.0244	0.0047
	Lithium (Li)-Total (mg/kg)	<1.0 ^{DLHM}	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	0.20	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg)	667	3160	351	1120	1090
	Magnesium (Mg)-Total (mg/kg ww)	89.6	1270	299	609	458
	Manganese (Mn)-Total (mg/kg)	113	464	24.3	483	275
	Manganese (Mn)-Total (mg/kg ww)	15.2	186	20.7	264	115

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-20 Tissue 29-JUL-14 15:13 14-DDR-11A-BERRY-01	L1497000-21 Tissue 29-JUL-14 15:13 14-DDR-11A-BR-01	L1497000-22 Tissue 29-JUL-14 15:13 14-DDR-11A-LI-01	L1497000-23 Tissue 29-JUL-14 15:13 14-DDR-11A-GR-01	L1497000-25 Tissue 29-JUL-14 15:13 14-DDR-11B-WL-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	83.5	52.6	3.16	58.0	58.2
Metals	Aluminum (Al)-Total (mg/kg)	10.7	49.5	599	31.1	89.8
	Aluminum (Al)-Total (mg/kg wwt)	1.76	23.5	580	13.1	37.5
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	0.016	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	0.0157	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.020	<0.020	0.373	0.031	0.033
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	0.0044	0.362	0.0130	0.0140
	Barium (Ba)-Total (mg/kg)	1.46	47.6	75.5	38.2	20.7
	Barium (Ba)-Total (mg/kg wwt)	0.240	22.6	73.1	16.1	8.66
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	0.031	<0.010	0.021
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	0.0295	<0.0020	0.0086
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	0.033	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	0.0321	<0.0020	<0.0020
	Boron (B)-Total (mg/kg)	5.4	6.9	1.6	3.9	17.1
	Boron (B)-Total (mg/kg wwt)	0.88	3.27	1.58	1.62	7.14
	Cadmium (Cd)-Total (mg/kg)	0.515	0.0717	0.121	0.0427	2.02
	Cadmium (Cd)-Total (mg/kg wwt)	0.0849	0.0340	0.117	0.0180	0.845
	Calcium (Ca)-Total (mg/kg)	731	3670	2410	2080	6790
	Calcium (Ca)-Total (mg/kg wwt)	120	1740	2330	873	2830
	Cesium (Cs)-Total (mg/kg)	0.879	0.115	0.433	0.325	0.0218
	Cesium (Cs)-Total (mg/kg wwt)	0.145	0.0547	0.419	0.137	0.0091
	Chromium (Cr)-Total (mg/kg)	<0.050	0.222	2.13	0.301	0.302
	Chromium (Cr)-Total (mg/kg wwt)	<0.010	0.105	2.07	0.126	0.126
	Cobalt (Co)-Total (mg/kg)	0.393	1.15	0.864	0.117	10.2
	Cobalt (Co)-Total (mg/kg wwt)	0.0647	0.544	0.837	0.0494	4.24
	Copper (Cu)-Total (mg/kg)	11.8	5.13	5.72	6.50	4.28
	Copper (Cu)-Total (mg/kg wwt)	1.94	2.43	5.54	2.73	1.79
	Iron (Fe)-Total (mg/kg)	30.0	86.9	833	83.3	152
	Iron (Fe)-Total (mg/kg wwt)	4.95	41.2	806	35.0	63.6
	Lead (Pb)-Total (mg/kg)	<0.020	0.021	0.787	0.026	0.025
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0101	0.762	0.0108	0.0105
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	0.48	0.18	<0.10
	Magnesium (Mg)-Total (mg/kg)	2120	3540	1210	2190	7360
	Magnesium (Mg)-Total (mg/kg wwt)	350	1680	1170	920	3080
	Manganese (Mn)-Total (mg/kg)	30.0	184	56.2	70.7	552
	Manganese (Mn)-Total (mg/kg wwt)	4.94	87.1	54.4	29.7	231

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-27 Tissue 30-JUL-14 09:00 14-DDR-19-BERRY-01	L1497000-28 Tissue 30-JUL-14 09:00 14-DDR-19-WL-01	L1497000-29 Tissue 30-JUL-14 09:00 14-DDR-19-BR-01	L1497000-30 Tissue 30-JUL-14 09:00 14-DDR-19-LI-01	L1497000-31 Tissue 30-JUL-14 09:00 14-DDR-19-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	81.7	64.2	57.9	11.9	58.5
Metals	Aluminum (Al)-Total (mg/kg)	10.0	147	35.8	378	16.1
	Aluminum (Al)-Total (mg/kg wwt)	1.83	52.6	15.1	333	6.70
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0064 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	0.024	0.025	<0.020	0.310	0.041
	Arsenic (As)-Total (mg/kg wwt)	0.0043	0.0090	0.0072	0.273	0.0171
	Barium (Ba)-Total (mg/kg)	4.73	42.2	62.6	37.6	32.9
	Barium (Ba)-Total (mg/kg wwt)	0.864	15.1	26.3	33.1	13.7
	Beryllium (Be)-Total (mg/kg)	<0.010	0.031	<0.010	0.018	<0.010
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	0.0112	0.0030	0.0157	0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.021	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0185	<0.0020
	Boron (B)-Total (mg/kg)	6.5	16.6	8.0	1.5	4.7
	Boron (B)-Total (mg/kg wwt)	1.19	5.96	3.37	1.32	1.96
	Cadmium (Cd)-Total (mg/kg)	<0.0050	0.668	0.0521	0.0806	0.0220
	Cadmium (Cd)-Total (mg/kg wwt)	<0.0010	0.239	0.0219	0.0711	0.0091
	Calcium (Ca)-Total (mg/kg)	688	9230	3470	2640	1990
	Calcium (Ca)-Total (mg/kg wwt)	126	3300	1460	2330	827
	Cesium (Cs)-Total (mg/kg)	0.0347	0.0207	0.0430	0.154	0.132
	Cesium (Cs)-Total (mg/kg wwt)	0.0063	0.0074	0.0181	0.135	0.0547
	Chromium (Cr)-Total (mg/kg)	0.095	0.174	0.104	1.07	0.100
	Chromium (Cr)-Total (mg/kg wwt)	0.017	0.062	0.044	0.945	0.041
	Cobalt (Co)-Total (mg/kg)	0.029	8.91	1.35	0.701	0.356
	Cobalt (Co)-Total (mg/kg wwt)	0.0054	3.19	0.566	0.618	0.148
	Copper (Cu)-Total (mg/kg)	4.93	3.12	3.63	2.03	3.16
	Copper (Cu)-Total (mg/kg wwt)	0.899	1.12	1.52	1.79	1.31
	Iron (Fe)-Total (mg/kg)	16.1	77.1	63.9	348	37.1
	Iron (Fe)-Total (mg/kg wwt)	2.93	27.6	26.9	307	15.4
	Lead (Pb)-Total (mg/kg)	<0.020	0.037	0.023	0.516	<0.020
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0134	0.0099	0.455	0.0079
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	0.53	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	0.15	<0.10	0.46	<0.10
	Magnesium (Mg)-Total (mg/kg)	471	6320	2990	720	1350
	Magnesium (Mg)-Total (mg/kg wwt)	85.9	2260	1260	634	562
	Manganese (Mn)-Total (mg/kg)	49.7	249	444	372	569
	Manganese (Mn)-Total (mg/kg wwt)	9.07	89.1	187	328	236

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-33 Tissue 30-JUL-14 12:15 14-DDR-14A-WL-01	L1497000-34 Tissue 30-JUL-14 12:15 14-DDR-14A-BR-01	L1497000-35 Tissue 30-JUL-14 12:15 14-DDR-14A-GR-01	L1497000-37 Tissue 30-JUL-14 12:45 14-DDR-14B-BERRY-01	L1497000-38 Tissue 30-JUL-14 12:45 14-DDR-14B-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	57.7	55.4	61.1	85.5	4.75
Metals	Aluminum (Al)-Total (mg/kg)	109	38.0	9.1	19.7	587
	Aluminum (Al)-Total (mg/kg ww)	46.2	16.9	3.52	2.85	559
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	0.011
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	<0.0020	0.0103
	Arsenic (As)-Total (mg/kg)	<0.020	0.047	<0.020	<0.020	0.428
	Arsenic (As)-Total (mg/kg ww)	0.0042	0.0212	<0.0040	<0.0040	0.408
	Barium (Ba)-Total (mg/kg)	30.0	27.8	29.3	18.6	32.9
	Barium (Ba)-Total (mg/kg ww)	12.7	12.4	11.4	2.70	31.4
	Beryllium (Be)-Total (mg/kg)	0.031	<0.010	<0.010	<0.010	0.028
	Beryllium (Be)-Total (mg/kg ww)	0.0132	<0.0020	<0.0020	<0.0020	0.0268
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	0.020
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	<0.0020	0.0192
	Boron (B)-Total (mg/kg)	3.0	4.6	1.7	5.1	1.8
	Boron (B)-Total (mg/kg ww)	1.26	2.07	0.66	0.74	1.75
	Cadmium (Cd)-Total (mg/kg)	1.28	0.0382	0.0143	0.0715	0.0719
	Cadmium (Cd)-Total (mg/kg ww)	0.543	0.0170	0.0056	0.0104	0.0685
	Calcium (Ca)-Total (mg/kg)	6840	3490	1190	1710	2120
	Calcium (Ca)-Total (mg/kg ww)	2890	1560	465	249	2020
	Cesium (Cs)-Total (mg/kg)	0.154	0.0736	0.189	0.166	0.183
	Cesium (Cs)-Total (mg/kg ww)	0.0651	0.0328	0.0735	0.0241	0.175
	Chromium (Cr)-Total (mg/kg)	0.126	0.123	<0.050	0.068	1.47
	Chromium (Cr)-Total (mg/kg ww)	0.053	0.055	0.017	<0.010	1.40
	Cobalt (Co)-Total (mg/kg)	7.99	0.446	0.040	0.110	0.785
	Cobalt (Co)-Total (mg/kg ww)	3.38	0.199	0.0155	0.0160	0.748
	Copper (Cu)-Total (mg/kg)	3.81	3.57	4.85	4.90	3.13
	Copper (Cu)-Total (mg/kg ww)	1.61	1.59	1.89	0.711	2.98
	Iron (Fe)-Total (mg/kg)	99.8	89.5	39.5	22.2	652
	Iron (Fe)-Total (mg/kg ww)	42.2	39.9	15.4	3.22	621
	Lead (Pb)-Total (mg/kg)	0.030	0.025	<0.020	<0.020	0.749
	Lead (Pb)-Total (mg/kg ww)	0.0126	0.0111	0.0045	<0.0040	0.713
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	0.65
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	<0.10	<0.10	0.62
	Magnesium (Mg)-Total (mg/kg)	4240	2360	980	729	693
	Magnesium (Mg)-Total (mg/kg ww)	1790	1050	382	106	660
	Manganese (Mn)-Total (mg/kg)	177	554	96.8	126	158
	Manganese (Mn)-Total (mg/kg ww)	75.0	247	37.7	18.3	150

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-40 Tissue 30-JUL-14 13:54 14-DDR-12-BERRY-01	L1497000-41 Tissue 30-JUL-14 13:54 14-DDR-12-WL-01	L1497000-42 Tissue 30-JUL-14 13:54 14-DDR-12-LT-01	L1497000-43 Tissue 30-JUL-14 13:54 14-DDR-12-LI-01	L1497000-44 Tissue 30-JUL-14 13:54 14-DDR-12-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	86.1	56.7	47.3	5.80	58.1
Metals	Aluminum (Al)-Total (mg/kg)	14.6	68.9	60.9	1640	19.5
	Aluminum (Al)-Total (mg/kg wwt)	2.02	29.8	32.1	1540	8.17
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	0.019	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0180	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.020	<0.020	<0.020	0.844	0.032
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	0.0061	0.0071	0.795	0.0136
	Barium (Ba)-Total (mg/kg)	10.4	16.0	83.7	46.2	24.2
	Barium (Ba)-Total (mg/kg wwt)	1.44	6.93	44.1	43.6	10.1
	Beryllium (Be)-Total (mg/kg)	<0.010	0.017	<0.010	0.074	<0.010
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	0.0074	<0.0020	0.0701	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.035	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	0.0026	<0.0020	0.0326	<0.0020
	Boron (B)-Total (mg/kg)	4.7	3.6	11.6	2.4	3.8
	Boron (B)-Total (mg/kg wwt)	0.66	1.56	6.13	2.26	1.61
	Cadmium (Cd)-Total (mg/kg)	0.0765	1.27	0.0052	0.102	0.0259
	Cadmium (Cd)-Total (mg/kg wwt)	0.0106	0.547	0.0028	0.0958	0.0108
	Calcium (Ca)-Total (mg/kg)	1230	5220	4840	3240	2870
	Calcium (Ca)-Total (mg/kg wwt)	171	2260	2550	3050	1200
	Cesium (Cs)-Total (mg/kg)	0.0202	0.0151	0.0516	0.349	0.0155
	Cesium (Cs)-Total (mg/kg wwt)	0.0028	0.0065	0.0272	0.329	0.0065
	Chromium (Cr)-Total (mg/kg)	0.110	0.126	0.187	4.36	0.061
	Chromium (Cr)-Total (mg/kg wwt)	0.015	0.055	0.099	4.11	0.026
	Cobalt (Co)-Total (mg/kg)	0.046	9.33	0.119	1.63	0.119
	Cobalt (Co)-Total (mg/kg wwt)	0.0064	4.04	0.0625	1.53	0.0499
	Copper (Cu)-Total (mg/kg)	3.98	3.04	2.67	4.76	5.44
	Copper (Cu)-Total (mg/kg wwt)	0.554	1.31	1.40	4.48	2.28
	Iron (Fe)-Total (mg/kg)	14.4	76.6	37.7	1780	51.8
	Iron (Fe)-Total (mg/kg wwt)	2.00	33.1	19.9	1670	21.7
	Lead (Pb)-Total (mg/kg)	<0.020	0.024	0.035	1.18	<0.020
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0104	0.0183	1.11	0.0075
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	2.27	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	0.12	0.17	2.14	0.12
	Magnesium (Mg)-Total (mg/kg)	590	4030	1200	1310	1460
	Magnesium (Mg)-Total (mg/kg wwt)	82.0	1740	631	1230	610
	Manganese (Mn)-Total (mg/kg)	271	551	1510	361	624
	Manganese (Mn)-Total (mg/kg wwt)	37.7	238	796	340	261

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-47 Tissue 31-JUL-14 08:50 14-DDR-24-BERRY-01	L1497000-48 Tissue 31-JUL-14 08:50 14-DDR-24-WL-01	L1497000-49 Tissue 31-JUL-14 08:50 14-DDR-24-BR-01	L1497000-50 Tissue 31-JUL-14 08:50 14-DDR-24-LI-01	L1497000-51 Tissue 31-JUL-14 08:50 14-DDR-24-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	79.7	60.8	58.5	12.0	56.1
Metals	Aluminum (Al)-Total (mg/kg)	3.6	66.1	26.5	237	12.5
	Aluminum (Al)-Total (mg/kg wwt)	0.72	25.9	11.0	209	5.47
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0073 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.020	0.024	<0.020	0.215	0.040
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	0.0093	0.0069	0.189	0.0175
	Barium (Ba)-Total (mg/kg)	4.44	15.3	64.4	26.1	20.7
	Barium (Ba)-Total (mg/kg wwt)	0.901	6.02	26.7	23.0	9.11
	Beryllium (Be)-Total (mg/kg)	<0.010	0.010	<0.010	0.011	<0.010
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	0.0040	<0.0020	0.0093	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.022	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0191	<0.0020
	Boron (B)-Total (mg/kg)	4.1	16.6	6.9	1.1	6.5
	Boron (B)-Total (mg/kg wwt)	0.83	6.50	2.85	1.01	2.87
	Cadmium (Cd)-Total (mg/kg)	<0.0050	0.877	0.0401	0.0795	0.0154
	Cadmium (Cd)-Total (mg/kg wwt)	<0.0010	0.344	0.0166	0.0700	0.0068
	Calcium (Ca)-Total (mg/kg)	488	6540	4790	2490	1990
	Calcium (Ca)-Total (mg/kg wwt)	99.2	2570	1990	2190	876
	Cesium (Cs)-Total (mg/kg)	0.0059	0.0212	0.0120	0.0987	0.0464
	Cesium (Cs)-Total (mg/kg wwt)	0.0012	0.0083	0.0050	0.0869	0.0204
	Chromium (Cr)-Total (mg/kg)	<0.050	0.077	0.062	0.666	0.055
	Chromium (Cr)-Total (mg/kg wwt)	<0.010	0.030	0.026	0.586	0.024
	Cobalt (Co)-Total (mg/kg)	0.025	7.76	1.04	0.634	0.285
	Cobalt (Co)-Total (mg/kg wwt)	0.0050	3.04	0.431	0.558	0.125
	Copper (Cu)-Total (mg/kg)	3.11	3.26	4.72	1.95	2.19
	Copper (Cu)-Total (mg/kg wwt)	0.631	1.28	1.96	1.72	0.964
	Iron (Fe)-Total (mg/kg)	10.2	47.6	61.5	259	35.5
	Iron (Fe)-Total (mg/kg wwt)	2.07	18.7	25.5	228	15.6
	Lead (Pb)-Total (mg/kg)	<0.020	0.022	<0.020	0.325	<0.020
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0085	0.0061	0.286	0.0079
	Lithium (Li)-Total (mg/kg)	0.56	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg wwt)	0.11	<0.10	<0.10	0.25	<0.10
	Magnesium (Mg)-Total (mg/kg)	381	5350	3620	871	1230
	Magnesium (Mg)-Total (mg/kg wwt)	77.4	2100	1500	767	540
	Manganese (Mn)-Total (mg/kg)	22.2	208	337	207	386
	Manganese (Mn)-Total (mg/kg wwt)	4.51	81.5	140	182	169

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-53 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-01	L1497000-54 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-02	L1497000-55 Tissue 31-JUL-14 10:25 14-DDR-26-WL-01	L1497000-56 Tissue 31-JUL-14 10:25 14-DDR-26-LT-01	L1497000-57 Tissue 31-JUL-14 10:25 14-DDR-26-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	82.5	84.5	61.9	50.5	18.0
Metals	Aluminum (Al)-Total (mg/kg)	6.5	9.0	62.5	56.5	338
	Aluminum (Al)-Total (mg/kg wwt)	1.13	0.68	23.8	28.0	277
	Antimony (Sb)-Total (mg/kg)	<0.020 ^{DLHM}	0.107	<0.010	<0.010	<0.010 ^{RRU}
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020 ^{DLHM}	0.0081 ^{DLHM}	<0.0020	<0.0020	0.0071
	Arsenic (As)-Total (mg/kg)	<0.040 ^{DLHM}	<0.040 ^{DLHM}	0.040	<0.020	0.194
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	<0.0040	0.0151	0.0081	0.159
	Barium (Ba)-Total (mg/kg)	7.30	10.4	12.7	63.4	23.0
	Barium (Ba)-Total (mg/kg wwt)	1.27 ^{DLHM}	0.783 ^{DLHM}	4.86	31.4	18.9
	Beryllium (Be)-Total (mg/kg)	<0.020 ^{DLHM}	<0.020 ^{DLHM}	0.019	<0.010	0.014
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020 ^{DLHM}	<0.0020 ^{DLHM}	0.0074	<0.0020	0.0117
	Bismuth (Bi)-Total (mg/kg)	<0.020 ^{DLHM}	<0.020 ^{DLHM}	<0.010	<0.010	0.035
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	0.0286
	Boron (B)-Total (mg/kg)	6.1	7.7	13.6	15.5	1.7
	Boron (B)-Total (mg/kg wwt)	1.06 ^{DLHM}	0.58	5.19	7.67	1.36
	Cadmium (Cd)-Total (mg/kg)	<0.010 ^{DLHM}	0.135	1.06	<0.0050	0.104
	Cadmium (Cd)-Total (mg/kg wwt)	<0.0010	0.0102	0.404	0.0018	0.0856
	Calcium (Ca)-Total (mg/kg)	739	1270	7610	5630	3070
	Calcium (Ca)-Total (mg/kg wwt)	129 ^{DLHM}	95.9 ^{DLHM}	2900	2790	2520
	Cesium (Cs)-Total (mg/kg)	<0.010 ^{DLHM}	<0.010 ^{DLHM}	0.0119	0.0340	0.152
	Cesium (Cs)-Total (mg/kg wwt)	0.0012 ^{DLHM}	<0.0010 ^{DLHM}	0.0045	0.0169	0.125
	Chromium (Cr)-Total (mg/kg)	<0.10 ^{DLHM}	0.15	0.103	0.056	1.16
	Chromium (Cr)-Total (mg/kg wwt)	<0.010	0.012	0.039	0.028	0.954
	Cobalt (Co)-Total (mg/kg)	0.049	0.158	6.89	0.276	0.747
	Cobalt (Co)-Total (mg/kg wwt)	0.0085	0.0119	2.63	0.137	0.612
	Copper (Cu)-Total (mg/kg)	4.52	3.18	3.38	2.37	2.27
	Copper (Cu)-Total (mg/kg wwt)	0.789	0.240	1.29	1.17	1.86
	Iron (Fe)-Total (mg/kg)	12.8	23.7	50.3	29.0	337
	Iron (Fe)-Total (mg/kg wwt)	2.23 ^{DLHM}	1.79 ^{DLHM}	19.2	14.4	276
	Lead (Pb)-Total (mg/kg)	<0.040 ^{DLHM}	<0.040 ^{DLHM}	0.031	0.028	0.441
	Lead (Pb)-Total (mg/kg wwt)	<0.0040 ^{DLHM}	<0.0040 ^{DLHM}	0.0118	0.0136	0.361
	Lithium (Li)-Total (mg/kg)	<1.0 ^{DLHM}	<1.0 ^{DLHM}	<0.50	<0.50	0.54
	Lithium (Li)-Total (mg/kg wwt)	0.12	<0.10	<0.10	0.17	0.44
	Magnesium (Mg)-Total (mg/kg)	553	757	5740	1360	973
	Magnesium (Mg)-Total (mg/kg wwt)	96.6	57.3	2190	674	798
	Manganese (Mn)-Total (mg/kg)	50.1	82.0	344	631	186
	Manganese (Mn)-Total (mg/kg wwt)	8.75	6.21	131	313	153

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-58 Tissue 31-JUL-14 10:25 14-DDR-26-GR-01	L1497000-60 Tissue 31-JUL-14 12:15 14-DDR-30A-BERRY-01	L1497000-73 Tissue 31-JUL-14 12:15 14-DDR-30A-BR-01	L1497000-74 Tissue 31-JUL-14 12:15 14-DDR-30A-GR-01	L1497000-76 Tissue 31-JUL-14 12:40 14-DDR-30B-WL-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	64.0	84.0	60.1	65.1	57.8
Metals	Aluminum (Al)-Total (mg/kg)	16.1	3.3	19.3	10.1	229
	Aluminum (Al)-Total (mg/kg ww)	5.80	0.52	7.69	3.53	96.8
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg)	0.037	<0.020	<0.020	0.021	<0.020
	Arsenic (As)-Total (mg/kg ww)	0.0133	<0.0040	0.0074	0.0075	0.0066
	Barium (Ba)-Total (mg/kg)	10.8	0.593	78.2	22.4	15.2
	Barium (Ba)-Total (mg/kg ww)	3.87	0.095	31.2	7.80	6.41
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	0.055
	Beryllium (Be)-Total (mg/kg ww)	<0.0020	<0.0020	0.0024	0.0021	0.0234
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg)	2.1	15.7	14.2	9.1	3.8
	Boron (B)-Total (mg/kg ww)	0.76	2.51	5.68	3.16	1.62
	Cadmium (Cd)-Total (mg/kg)	0.0073	0.394	0.112	0.0412	2.42
	Cadmium (Cd)-Total (mg/kg ww)	0.0026	0.0628	0.0446	0.0144	1.02
	Calcium (Ca)-Total (mg/kg)	1410	1070	4460	2190	3900
	Calcium (Ca)-Total (mg/kg ww)	507	170	1780	765	1650
	Cesium (Cs)-Total (mg/kg)	0.0206	0.302	0.0346	0.0325	0.538
	Cesium (Cs)-Total (mg/kg ww)	0.0074	0.0482	0.0138	0.0114	0.227
	Chromium (Cr)-Total (mg/kg)	0.100	<0.050	<0.050	<0.050	<0.050
	Chromium (Cr)-Total (mg/kg ww)	0.036	<0.010	0.020	<0.010	0.015
	Cobalt (Co)-Total (mg/kg)	0.166	0.452	0.958	0.083	6.20
	Cobalt (Co)-Total (mg/kg ww)	0.0595	0.0720	0.382	0.0289	2.62
	Copper (Cu)-Total (mg/kg)	1.67	6.61	4.52	3.90	4.16
	Copper (Cu)-Total (mg/kg ww)	0.600	1.05	1.80	1.36	1.76
	Iron (Fe)-Total (mg/kg)	38.6	25.5	49.2	45.5	129
	Iron (Fe)-Total (mg/kg ww)	13.9	4.07	19.6	15.9	54.3
	Lead (Pb)-Total (mg/kg)	0.028	<0.020	<0.020	0.031	0.170
	Lead (Pb)-Total (mg/kg ww)	0.0102	<0.0040	0.0067	0.0107	0.0716
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	<0.10	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg)	754	2320	3250	987	2050
	Magnesium (Mg)-Total (mg/kg ww)	271	371	1300	344	864
	Manganese (Mn)-Total (mg/kg)	197	110	771	495	85.0
	Manganese (Mn)-Total (mg/kg ww)	70.8	17.6	307	173	35.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-77 Tissue 31-JUL-14 12:40 14-DDR-30B-LI-01	L1497000-79 Tissue 31-JUL-14 13:49 14-DDR-23-BERRY-01	L1497000-80 Tissue 31-JUL-14 13:49 14-DDR-23-WL-01	L1497000-81 Tissue 31-JUL-14 13:49 14-DDR-23-LT-01	L1497000-82 Tissue 31-JUL-14 13:49 14-DDR-23-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	18.1	86.3	61.8	46.5	8.64
Metals	Aluminum (Al)-Total (mg/kg)	596	5.3	90.6	68.6	880
	Aluminum (Al)-Total (mg/kg ww)	488	0.72	34.6	36.7	804
	Antimony (Sb)-Total (mg/kg)	0.015	<0.020 ^{DLHM}	<0.010	<0.010	0.014
	Antimony (Sb)-Total (mg/kg ww)	0.0127	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0124
	Arsenic (As)-Total (mg/kg)	0.407	<0.040 ^{DLHM}	0.023	<0.020	0.408
	Arsenic (As)-Total (mg/kg ww)	0.333	<0.0040	0.0088	0.0098	0.373
	Barium (Ba)-Total (mg/kg)	32.5	3.51	17.1	69.4	37.4
	Barium (Ba)-Total (mg/kg ww)	26.6	0.483 ^{DLHM}	6.52	37.1	34.1
	Beryllium (Be)-Total (mg/kg)	0.031	<0.020 ^{DLHM}	0.011	<0.010	0.032
	Beryllium (Be)-Total (mg/kg ww)	0.0252	<0.0020 ^{DLHM}	0.0043	<0.0020	0.0290
	Bismuth (Bi)-Total (mg/kg)	0.037	<0.020 ^{DLHM}	<0.010	<0.010	0.069
	Bismuth (Bi)-Total (mg/kg ww)	0.0303	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0628
	Boron (B)-Total (mg/kg)	1.6	<2.0 ^{DLHM}	7.5	12.5	2.6
	Boron (B)-Total (mg/kg ww)	1.33	<0.20	2.85	6.67	2.34
	Cadmium (Cd)-Total (mg/kg)	0.0422	0.014	1.39	<0.0050	0.0774
	Cadmium (Cd)-Total (mg/kg ww)	0.0345	0.0019	0.530	0.0018	0.0708
	Calcium (Ca)-Total (mg/kg)	1170	323	5440	4460	1790
	Calcium (Ca)-Total (mg/kg ww)	958	44.3	2080	2380	1640
	Cesium (Cs)-Total (mg/kg)	0.435	0.027	0.0363	0.155	0.444
	Cesium (Cs)-Total (mg/kg ww)	0.356	0.0037 ^{DLHM}	0.0139	0.0829	0.406
	Chromium (Cr)-Total (mg/kg)	1.24	<0.10 ^{DLHM}	0.124	0.120	2.51
	Chromium (Cr)-Total (mg/kg ww)	1.02	<0.010 ^{DLHM}	0.048	0.064	2.30
	Cobalt (Co)-Total (mg/kg)	0.352	<0.040 ^{DLHM}	8.39	0.113	0.911
	Cobalt (Co)-Total (mg/kg ww)	0.288	0.0041	3.21	0.0603	0.832
	Copper (Cu)-Total (mg/kg)	2.53	0.92	2.97	2.23	3.51
	Copper (Cu)-Total (mg/kg ww)	2.08	0.126 ^{DLHM}	1.14	1.19	3.20
	Iron (Fe)-Total (mg/kg)	554	<6.0 ^{DLHM}	66.9	45.0	900
	Iron (Fe)-Total (mg/kg ww)	454	0.77 ^{DLHM}	25.6	24.1	822
	Lead (Pb)-Total (mg/kg)	0.756	<0.040 ^{DLHM}	0.027	0.041	0.922
	Lead (Pb)-Total (mg/kg ww)	0.619	<0.0040 ^{DLHM}	0.0105	0.0220	0.842
	Lithium (Li)-Total (mg/kg)	0.55	<1.0 ^{DLHM}	<0.50	<0.50	1.29
	Lithium (Li)-Total (mg/kg ww)	0.45	<0.10	0.13	0.13	1.17
	Magnesium (Mg)-Total (mg/kg)	433	134	3300	1040	799
	Magnesium (Mg)-Total (mg/kg ww)	355	18.4	1260	555	730
	Manganese (Mn)-Total (mg/kg)	54.5	7.07	308	372	97.4
	Manganese (Mn)-Total (mg/kg ww)	44.7	0.972	118	199	89.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-83 Tissue 31-JUL-14 13:49 14-DDR-23-GR-01	L1497000-85 Tissue 01-AUG-14 08:12 14-DDR-10A-WL-01	L1497000-86 Tissue 01-AUG-14 08:12 14-DDR-10A-LT-01	L1497000-87 Tissue 01-AUG-14 08:12 14-DDR-10A-LI-01	L1497000-89 Tissue 01-AUG-14 08:40 14-DDR-10B-BERRY-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	57.7	64.2	51.1	23.3	84.8
Metals	Aluminum (Al)-Total (mg/kg)	62.5	149	45.4	748	6.4
	Aluminum (Al)-Total (mg/kg ww)	26.5	53.1	22.2	573	0.98
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLHM}
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	0.0066 ^{RRU}	<0.0020 ^{DLHM}
	Arsenic (As)-Total (mg/kg)	0.052	0.032	0.022	0.563	<0.040
	Arsenic (As)-Total (mg/kg ww)	0.0220	0.0114	0.0107	0.432	<0.0040
	Barium (Ba)-Total (mg/kg)	51.4	50.2	70.6	44.6	6.15
	Barium (Ba)-Total (mg/kg ww)	21.8	17.9	34.6	34.2	0.937 ^{DLHM}
	Beryllium (Be)-Total (mg/kg)	<0.010	0.025	<0.010	0.023	<0.020
	Beryllium (Be)-Total (mg/kg ww)	0.0034	0.0089	<0.0020	0.0179	<0.0020 ^{DLHM}
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	0.010	<0.020
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	0.0079	<0.0020
	Boron (B)-Total (mg/kg)	8.6	7.1	8.6	1.6	3.3
	Boron (B)-Total (mg/kg ww)	3.65	2.54	4.18	1.22	0.50
	Cadmium (Cd)-Total (mg/kg)	0.0487	0.936	0.0058	0.101	0.013
	Cadmium (Cd)-Total (mg/kg ww)	0.0206	0.335	0.0028	0.0771	0.0020
	Calcium (Ca)-Total (mg/kg)	3740	9890	4240	1860	787
	Calcium (Ca)-Total (mg/kg ww)	1580	3540	2080	1430	120
	Cesium (Cs)-Total (mg/kg)	0.0876	0.0469	0.0964	0.200	0.194
	Cesium (Cs)-Total (mg/kg ww)	0.0371	0.0168	0.0472	0.154	0.0295 ^{DLHM}
	Chromium (Cr)-Total (mg/kg)	0.173	0.108	0.077	2.46	<0.10
	Chromium (Cr)-Total (mg/kg ww)	0.073	0.038	0.037	1.89	<0.010 ^{DLHM}
	Cobalt (Co)-Total (mg/kg)	0.305	5.77	0.141	0.815	<0.040 ^{DLHM}
	Cobalt (Co)-Total (mg/kg ww)	0.129	2.06	0.0691	0.625	0.0050
	Copper (Cu)-Total (mg/kg)	7.51	3.33	3.04	3.11	3.34
	Copper (Cu)-Total (mg/kg ww)	3.18	1.19	1.49	2.39	0.508
	Iron (Fe)-Total (mg/kg)	85.9	74.6	33.1	857	10.4
	Iron (Fe)-Total (mg/kg ww)	36.4	26.7	16.2	657	1.59 ^{DLHM}
	Lead (Pb)-Total (mg/kg)	0.050	0.032	0.030	0.390	<0.040
	Lead (Pb)-Total (mg/kg ww)	0.0213	0.0115	0.0145	0.299	<0.0040 ^{DLHM}
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	0.72	<1.0
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	0.16	0.55	<0.10
	Magnesium (Mg)-Total (mg/kg)	1880	7860	962	773	483
	Magnesium (Mg)-Total (mg/kg ww)	794	2810	471	593	73.5
	Manganese (Mn)-Total (mg/kg)	316	192	464	68.4	49.1
	Manganese (Mn)-Total (mg/kg ww)	134	68.6	227	52.5	7.48

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-90 Tissue 01-AUG-14 08:40 14-DDR-10B-GR-01	L1497000-92 Tissue 01-AUG-14 09:36 14-DDR-02A-BERRY-01	L1497000-93 Tissue 01-AUG-14 09:36 14-DDR-02A-LT-01	L1497000-94 Tissue 01-AUG-14 09:36 14-DDR-02A-LI-01	L1497000-95 Tissue 01-AUG-14 09:36 14-DDR-02A-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	65.5	84.8	46.0	26.2	65.8
Metals	Aluminum (Al)-Total (mg/kg)	14.5	3.8	71.4	339	9.3
	Aluminum (Al)-Total (mg/kg ww)	5.01	0.58	38.5	250	3.17
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	0.0058 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	0.178	<0.020	<0.020	0.227	0.022
	Arsenic (As)-Total (mg/kg ww)	0.0616	<0.0040	0.0056	0.168	0.0076
	Barium (Ba)-Total (mg/kg)	29.8	0.745	65.8	33.1	35.8
	Barium (Ba)-Total (mg/kg ww)	10.3	0.113	35.5	24.4	12.2
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.010	<0.010	0.019	<0.010
	Beryllium (Be)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	0.0137	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	0.0059	<0.0020
	Boron (B)-Total (mg/kg)	3.7	8.7	12.8	1.2	4.1
	Boron (B)-Total (mg/kg ww)	1.29	1.32	6.90	0.85	1.39
	Cadmium (Cd)-Total (mg/kg)	0.0206	0.572	<0.0050	0.0466	0.0157
	Cadmium (Cd)-Total (mg/kg ww)	0.0071	0.0871	0.0026	0.0344	0.0054
	Calcium (Ca)-Total (mg/kg)	1770	1090	5260	1840	1500
	Calcium (Ca)-Total (mg/kg ww)	609	166	2840	1360	513
	Cesium (Cs)-Total (mg/kg)	0.186	0.303	0.314	0.256	0.125
	Cesium (Cs)-Total (mg/kg ww)	0.0641	0.0462	0.169	0.189	0.0427
	Chromium (Cr)-Total (mg/kg)	<0.050	0.070	0.061	1.09	<0.050
	Chromium (Cr)-Total (mg/kg ww)	0.016	0.011	0.033	0.801	0.010
	Cobalt (Co)-Total (mg/kg)	0.258	0.838	0.232	0.889	0.089
	Cobalt (Co)-Total (mg/kg ww)	0.0890	0.127	0.125	0.656	0.0304
	Copper (Cu)-Total (mg/kg)	7.55	6.09	2.35	1.99	4.27
	Copper (Cu)-Total (mg/kg ww)	2.60	0.927	1.27	1.47	1.46
	Iron (Fe)-Total (mg/kg)	93.9	25.6	30.8	380	46.5
	Iron (Fe)-Total (mg/kg ww)	32.4	3.89	16.6	280	15.9
	Lead (Pb)-Total (mg/kg)	0.030	<0.020	0.030	0.426	<0.020
	Lead (Pb)-Total (mg/kg ww)	0.0103	<0.0040	0.0162	0.314	0.0059
	Lithium (Li)-Total (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	0.10	<0.10	<0.10	0.21	<0.10
	Magnesium (Mg)-Total (mg/kg)	1340	2480	1060	600	1180
	Magnesium (Mg)-Total (mg/kg ww)	462	378	575	443	404
	Manganese (Mn)-Total (mg/kg)	98.8	56.2	512	121	155
	Manganese (Mn)-Total (mg/kg ww)	34.1	8.55	277	89.4	52.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-97 Tissue 01-AUG-14 10:15 14-DDR-02B-WL-01	L1497000-112 Tissue 01-AUG-14 11:15 14-DDR-03-BERRY-01	L1497000-113 Tissue 01-AUG-14 11:15 14-DDR-03-WL-01	L1497000-114 Tissue 01-AUG-14 11:15 14-DDR-03-LT-01	L1497000-115 Tissue 01-AUG-14 11:15 14-DDR-03-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	62.8	86.8	59.8	48.8	30.8
Metals	Aluminum (Al)-Total (mg/kg)	227	<4.0 ^{DLHM}	65.6	54.4	437
	Aluminum (Al)-Total (mg/kg ww)	84.2	<0.40 ^{DLHM}	26.4	27.8	302
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010 ^{RRU}
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0054
	Arsenic (As)-Total (mg/kg)	0.043	<0.040 ^{DLHM}	0.033	0.021	0.454
	Arsenic (As)-Total (mg/kg ww)	0.0160	<0.0040	0.0131	0.0106	0.314
	Barium (Ba)-Total (mg/kg)	42.7	1.97	32.7	77.7	29.3
	Barium (Ba)-Total (mg/kg ww)	15.8	0.259 ^{DLHM}	13.2	39.8	20.3
	Beryllium (Be)-Total (mg/kg)	0.052	<0.020 ^{DLHM}	0.026	<0.010	0.029
	Beryllium (Be)-Total (mg/kg ww)	0.0193	<0.0020 ^{DLHM}	0.0104	0.0022	0.0198
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0059
	Boron (B)-Total (mg/kg)	16.3	<2.0 ^{DLHM}	5.4	8.9	1.1
	Boron (B)-Total (mg/kg ww)	6.06	0.21 ^{DLHM}	2.16	4.55	0.78
	Cadmium (Cd)-Total (mg/kg)	1.44	<0.010 ^{DLHM}	1.05	<0.0050	0.0448
	Cadmium (Cd)-Total (mg/kg ww)	0.535	<0.0010	0.423	0.0025	0.0310
	Calcium (Ca)-Total (mg/kg)	7880	528	7780	5750	1650
	Calcium (Ca)-Total (mg/kg ww)	2930	69.6	3130	2940	1140
	Cesium (Cs)-Total (mg/kg)	0.0948	0.016	0.0143	0.0883	0.118
	Cesium (Cs)-Total (mg/kg ww)	0.0352	0.0021 ^{DLHM}	0.0058	0.0452	0.0816
	Chromium (Cr)-Total (mg/kg)	0.121	<0.10 ^{DLHM}	0.056	0.054	0.841
	Chromium (Cr)-Total (mg/kg ww)	0.045	<0.010 ^{DLHM}	0.022	0.028	0.582
	Cobalt (Co)-Total (mg/kg)	15.4	<0.040 ^{DLHM}	13.3	0.256	0.964
	Cobalt (Co)-Total (mg/kg ww)	5.74	<0.0040	5.33	0.131	0.667
	Copper (Cu)-Total (mg/kg)	4.09	1.80	4.31	2.82	3.84
	Copper (Cu)-Total (mg/kg ww)	1.52	0.237 ^{DLHM}	1.73	1.44	2.66
	Iron (Fe)-Total (mg/kg)	58.0	<6.0 ^{DLHM}	67.7	24.4	437
	Iron (Fe)-Total (mg/kg ww)	21.5	<0.60 ^{DLHM}	27.2	12.5	302
	Lead (Pb)-Total (mg/kg)	0.032	<0.040 ^{DLHM}	0.477	0.027	0.304
	Lead (Pb)-Total (mg/kg ww)	0.0117	<0.0040 ^{DLHM}	0.192	0.0138	0.211
	Lithium (Li)-Total (mg/kg)	<0.50	<1.0 ^{DLHM}	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	0.20	<0.10	0.32
	Magnesium (Mg)-Total (mg/kg)	5300	467	4820	1280	592
	Magnesium (Mg)-Total (mg/kg ww)	1970	61.5	1940	653	410
	Manganese (Mn)-Total (mg/kg)	450	36.4	431	893	91.0
	Manganese (Mn)-Total (mg/kg ww)	167	4.80	173	457	62.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-116 Tissue 01-AUG-14 11:15 14-DDR-03-GR-01	L1497000-118 Tissue 01-AUG-14 13:03 14-DDR-09-BERRY-01	L1497000-119 Tissue 01-AUG-14 13:03 14-DDR-09-WL-01	L1497000-120 Tissue 01-AUG-14 13:03 14-DDR-09-LT-01	L1497000-121 Tissue 01-AUG-14 13:03 14-DDR-09-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	57.9	83.9	56.4	50.0	11.8
Metals	Aluminum (Al)-Total (mg/kg)	10.1	5.3	79.6	51.3	333
	Aluminum (Al)-Total (mg/kg wwt)	4.26	0.86	34.7	25.7	294
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	0.0035 ^{RRU}	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0060 ^{RRU}
	Arsenic (As)-Total (mg/kg)	0.091	<0.040	0.024	<0.020	0.418
	Arsenic (As)-Total (mg/kg wwt)	0.0385	0.0040	0.0105	<0.0040	0.369
	Barium (Ba)-Total (mg/kg)	30.3	5.58	18.8	85.6	25.4
	Barium (Ba)-Total (mg/kg wwt)	12.8	0.899	8.19	42.8	22.4
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	0.031	<0.010	0.034
	Beryllium (Be)-Total (mg/kg wwt)	0.0022	<0.0020 ^{DLHM}	0.0134	<0.0020	0.0298
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	0.0082
	Boron (B)-Total (mg/kg)	3.4	5.9	6.1	9.3	1.1
	Boron (B)-Total (mg/kg wwt)	1.42	0.95	2.67	4.67	1.01
	Cadmium (Cd)-Total (mg/kg)	0.0209	<0.010 ^{DLHM}	1.43	0.0054	0.0577
	Cadmium (Cd)-Total (mg/kg wwt)	0.0088	<0.0010	0.624	0.0027	0.0509
	Calcium (Ca)-Total (mg/kg)	2520	605	5880	5050	1720
	Calcium (Ca)-Total (mg/kg wwt)	1060	97.5	2560	2530	1510
	Cesium (Cs)-Total (mg/kg)	0.0451	<0.010 ^{DLHM}	0.0147	0.0559	0.138
	Cesium (Cs)-Total (mg/kg wwt)	0.0190	0.0016 ^{DLHM}	0.0064	0.0279	0.122
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	0.467
	Chromium (Cr)-Total (mg/kg wwt)	0.017	<0.010 ^{DLHM}	0.021	0.019	0.412
	Cobalt (Co)-Total (mg/kg)	0.420	<0.040 ^{DLHM}	10.4	0.184	1.06
	Cobalt (Co)-Total (mg/kg wwt)	0.177	0.0045	4.52	0.0919	0.938
	Copper (Cu)-Total (mg/kg)	2.39	4.40	2.76	2.28	2.93
	Copper (Cu)-Total (mg/kg wwt)	1.01	0.709	1.20	1.14	2.58
	Iron (Fe)-Total (mg/kg)	60.1	11.5	80.1	22.6	353
	Iron (Fe)-Total (mg/kg wwt)	25.3	1.86	34.9	11.3	311
	Lead (Pb)-Total (mg/kg)	0.034	<0.040 ^{DLHM}	0.023	0.023	0.243
	Lead (Pb)-Total (mg/kg wwt)	0.0142	<0.0040 ^{DLHM}	0.0102	0.0115	0.214
	Lithium (Li)-Total (mg/kg)	<0.50	<1.0 ^{DLHM}	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	0.19
	Magnesium (Mg)-Total (mg/kg)	1360	514	4660	1220	623
	Magnesium (Mg)-Total (mg/kg wwt)	573	82.8	2030	609	550
	Manganese (Mn)-Total (mg/kg)	814	90.4	554	1740	130
	Manganese (Mn)-Total (mg/kg wwt)	343	14.6	241	870	115

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-122 Tissue 01-AUG-14 13:03 14-DDR-09-GR-01	L1497000-124 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01	L1497000-125 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01	L1497000-126 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01	L1497000-127 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	56.5	81.7	65.2	55.7	62.7
Metals	Aluminum (Al)-Total (mg/kg)	10.9	7.5	93.9	91.4	741
	Aluminum (Al)-Total (mg/kg ww)	4.76	1.37 ^{DLHM}	32.7	40.5	277
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	0.011
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0042
	Arsenic (As)-Total (mg/kg)	0.045	<0.040 ^{DLHM}	0.039	<0.020	1.30
	Arsenic (As)-Total (mg/kg ww)	0.0196	<0.0040	0.0135	0.0080	0.485
	Barium (Ba)-Total (mg/kg)	30.2	6.74	10.8	114	44.4
	Barium (Ba)-Total (mg/kg ww)	13.1	1.24 ^{DLHM}	3.75	50.5	16.6
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	0.052	<0.010	0.038
	Beryllium (Be)-Total (mg/kg ww)	<0.0020	<0.0020 ^{DLHM}	0.0183	0.0040	0.0144
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	0.019
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	0.0023	<0.0020	<0.0020	0.0072
	Boron (B)-Total (mg/kg)	2.0	2.8	5.4	8.2	1.7
	Boron (B)-Total (mg/kg ww)	0.86	0.50 ^{DLHM}	1.89	3.65	0.65
	Cadmium (Cd)-Total (mg/kg)	0.0139	<0.010 ^{DLHM}	1.02	<0.0050	0.0830
	Cadmium (Cd)-Total (mg/kg ww)	0.0061	<0.0010	0.353	0.0019	0.0309
	Calcium (Ca)-Total (mg/kg)	2030	601	4280	4960	2510
	Calcium (Ca)-Total (mg/kg ww)	883	110	1490	2200	937
	Cesium (Cs)-Total (mg/kg)	0.0325	0.044	0.138	0.777	0.262
	Cesium (Cs)-Total (mg/kg ww)	0.0141	0.0081 ^{DLHM}	0.0479	0.344	0.0976
	Chromium (Cr)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	0.063	2.06
	Chromium (Cr)-Total (mg/kg ww)	0.017	<0.010 ^{DLHM}	0.011	0.028	0.769
	Cobalt (Co)-Total (mg/kg)	0.297	<0.040 ^{DLHM}	7.52	0.173	0.794
	Cobalt (Co)-Total (mg/kg ww)	0.129	<0.0040	2.62	0.0764	0.296
	Copper (Cu)-Total (mg/kg)	1.75	3.96	3.16	3.18	2.75
	Copper (Cu)-Total (mg/kg ww)	0.760	0.726	1.10	1.41	1.03
	Iron (Fe)-Total (mg/kg)	37.9	12.5	76.0	28.9	838
	Iron (Fe)-Total (mg/kg ww)	16.5	2.29 ^{DLHM}	26.5	12.8	313
	Lead (Pb)-Total (mg/kg)	0.021	<0.040 ^{DLHM}	<0.020	0.026	0.704
	Lead (Pb)-Total (mg/kg ww)	0.0092	<0.0040 ^{DLHM}	0.0050	0.0116	0.263
	Lithium (Li)-Total (mg/kg)	<0.50	<1.0 ^{DLHM}	<0.50	<0.50	1.08
	Lithium (Li)-Total (mg/kg ww)	<0.10	0.10	<0.10	0.14	0.40
	Magnesium (Mg)-Total (mg/kg)	1270	454	3220	1280	724
	Magnesium (Mg)-Total (mg/kg ww)	551	83.2	1120	566	270
	Manganese (Mn)-Total (mg/kg)	853	18.6	217	250	105
	Manganese (Mn)-Total (mg/kg ww)	371	3.41	75.5	111	39.1

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-128 Tissue 02-AUG-14 08:20 14-DDR-05-GR-01	L1497000-130 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01-DUP	L1497000-131 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01-DUP	L1497000-132 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01-DUP	L1497000-133 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01-DUP
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	64.7	82.3	64.6	54.3	66.7
Metals	Aluminum (Al)-Total (mg/kg)	18.8	7.4	149	68.1	295
	Aluminum (Al)-Total (mg/kg ww)	6.65	1.32	52.8	31.1	98.2
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg ww)	<0.0020	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0028
	Arsenic (As)-Total (mg/kg)	0.066	<0.040 ^{DLHM}	0.045	<0.020	0.567
	Arsenic (As)-Total (mg/kg ww)	0.0234	<0.0040	0.0158	0.0082	0.189
	Barium (Ba)-Total (mg/kg)	35.6	6.11	13.9	96.7	50.5
	Barium (Ba)-Total (mg/kg ww)	12.6	1.08	4.94	44.2	16.8
	Beryllium (Be)-Total (mg/kg)	0.015	<0.020 ^{DLHM}	0.077	<0.010	0.024
	Beryllium (Be)-Total (mg/kg ww)	0.0051	<0.0020 ^{DLHM}	0.0273	0.0032	0.0079
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	0.013
	Bismuth (Bi)-Total (mg/kg ww)	<0.0020	<0.0020	<0.0020	<0.0020	0.0042
	Boron (B)-Total (mg/kg)	4.9	2.9	6.5	10.3	1.2
	Boron (B)-Total (mg/kg ww)	1.74	0.51 ^{DLHM}	2.30	4.69	0.40
	Cadmium (Cd)-Total (mg/kg)	0.0471	<0.010 ^{DLHM}	1.28	<0.0050	0.0777
	Cadmium (Cd)-Total (mg/kg ww)	0.0166	<0.0010	0.454	0.0017	0.0258
	Calcium (Ca)-Total (mg/kg)	2420	573	5430	5260	2920
	Calcium (Ca)-Total (mg/kg ww)	854	101	1920	2410	970
	Cesium (Cs)-Total (mg/kg)	0.560	0.052	0.172	0.582	0.220
	Cesium (Cs)-Total (mg/kg ww)	0.198	0.0092	0.0609	0.266	0.0733
	Chromium (Cr)-Total (mg/kg)	<0.050	0.32	<0.050	<0.050	0.573
	Chromium (Cr)-Total (mg/kg ww)	0.016	0.056 ^{DLHM}	0.010	0.015	0.191
	Cobalt (Co)-Total (mg/kg)	0.186	<0.040 ^{DLHM}	7.06	0.112	0.548
	Cobalt (Co)-Total (mg/kg ww)	0.0656	<0.0040	2.50	0.0514	0.182
	Copper (Cu)-Total (mg/kg)	5.89	4.59	3.76	2.40	2.12
	Copper (Cu)-Total (mg/kg ww)	2.08	0.812	1.33	1.10	0.706
	Iron (Fe)-Total (mg/kg)	41.6	12.5	83.9	24.7	274
	Iron (Fe)-Total (mg/kg ww)	14.7	2.22 ^{DLHM}	29.7	11.3	91.0
	Lead (Pb)-Total (mg/kg)	0.054	<0.040 ^{DLHM}	0.027	0.029	0.534
	Lead (Pb)-Total (mg/kg ww)	0.0192	<0.0040 ^{DLHM}	0.0094	0.0135	0.178
	Lithium (Li)-Total (mg/kg)	<0.50	<1.0 ^{DLHM}	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg ww)	<0.10	<0.10	<0.10	<0.10	0.11
	Magnesium (Mg)-Total (mg/kg)	1410	459	3430	1060	608
	Magnesium (Mg)-Total (mg/kg ww)	497	81.4	1210	485	202
	Manganese (Mn)-Total (mg/kg)	326	20.9	244	219	133
	Manganese (Mn)-Total (mg/kg ww)	115	3.71	86.4	100	44.4

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-135 Tissue 02-AUG-14 10:30 14-DDR-16A-BERRY-01	L1497000-136 Tissue 02-AUG-14 10:30 14-DDR-16A-WL-01	L1497000-137 Tissue 02-AUG-14 10:30 14-DDR-16A-BR-01	L1497000-138 Tissue 02-AUG-14 10:30 14-DDR-16A-LI-01	L1497000-140 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	86.9	63.6	56.8	40.1	65.6
Metals	Aluminum (Al)-Total (mg/kg)	14.6	151	32.4	700	10.1
	Aluminum (Al)-Total (mg/kg wwt)	1.91	55.1	14.0	420	3.47
	Antimony (Sb)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0040 ^{RRU}	<0.0020
	Arsenic (As)-Total (mg/kg)	<0.040 ^{DLHM}	0.036	<0.020	0.578	0.021
	Arsenic (As)-Total (mg/kg wwt)	<0.0040	0.0132	0.0075	0.346	0.0073
	Barium (Ba)-Total (mg/kg)	16.0	51.2	72.4	31.4	22.6
	Barium (Ba)-Total (mg/kg wwt)	2.10	18.7	31.3	18.8	7.77
	Beryllium (Be)-Total (mg/kg)	<0.020 ^{DLHM}	0.028	<0.010	0.033	<0.010
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	0.0101	0.0040	0.0198	<0.0020
	Bismuth (Bi)-Total (mg/kg)	<0.020 ^{DLHM}	<0.010	<0.010	0.010	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	0.0062	<0.0020
	Boron (B)-Total (mg/kg)	4.0	4.3	4.8	1.7	3.5
	Boron (B)-Total (mg/kg wwt)	0.52	1.57	2.08	1.04	1.19
	Cadmium (Cd)-Total (mg/kg)	0.231	0.553	0.0628	0.0339	0.0669
	Cadmium (Cd)-Total (mg/kg wwt)	0.0302	0.202	0.0272	0.0203	0.0230
	Calcium (Ca)-Total (mg/kg)	1650	9090	4390	1120	1390
	Calcium (Ca)-Total (mg/kg wwt)	216	3310	1900	671	478
	Cesium (Cs)-Total (mg/kg)	0.255	0.0573	0.0210	0.193	0.0323
	Cesium (Cs)-Total (mg/kg wwt)	0.0334	0.0209	0.0091	0.115	0.0111
	Chromium (Cr)-Total (mg/kg)	<0.10 ^{DLHM}	0.191	0.057	1.90	<0.050
	Chromium (Cr)-Total (mg/kg wwt)	<0.010	0.070	0.025	1.14	<0.010
	Cobalt (Co)-Total (mg/kg)	0.070	4.93	0.918	0.620	0.126
	Cobalt (Co)-Total (mg/kg wwt)	0.0092	1.80	0.397	0.372	0.0432
	Copper (Cu)-Total (mg/kg)	4.89	3.58	3.84	2.89	4.29
	Copper (Cu)-Total (mg/kg wwt)	0.639	1.30	1.66	1.73	1.48
	Iron (Fe)-Total (mg/kg)	19.5	87.4	63.6	746	35.5
	Iron (Fe)-Total (mg/kg wwt)	2.55	31.8	27.5	447	12.2
	Lead (Pb)-Total (mg/kg)	<0.040 ^{DLHM}	0.031	0.034	0.335	<0.020
	Lead (Pb)-Total (mg/kg wwt)	<0.0040	0.0114	0.0145	0.201	0.0043
	Lithium (Li)-Total (mg/kg)	<1.0 ^{DLHM}	<0.50	1.03	1.04	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.10	0.11	0.45	0.62	<0.10
	Magnesium (Mg)-Total (mg/kg)	747	6100	3330	575	1190
	Magnesium (Mg)-Total (mg/kg wwt)	97.8	2220	1440	345	411
	Manganese (Mn)-Total (mg/kg)	34.5	100	180	53.3	292
	Manganese (Mn)-Total (mg/kg wwt)	4.51	36.5	77.8	31.9	101

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-141 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01-DUP	L1497000-143 Tissue 02-AUG-14 12:30 14-DDR-28-BERRY-01	L1497000-144 Tissue 02-AUG-14 12:30 14-DDR-28-WL-01	L1497000-145 Tissue 02-AUG-14 12:30 14-DDR-28-BR-01	L1497000-146 Tissue 02-AUG-14 12:30 14-DDR-28-LI-01
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	62.0	83.3	60.0	57.8	12.4
Metals	Aluminum (Al)-Total (mg/kg)	7.9	8.6	59.2	13.2	341
	Aluminum (Al)-Total (mg/kg wwt)	3.00	1.44	23.7	5.57	299
	Antimony (Sb)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Antimony (Sb)-Total (mg/kg wwt)	<0.0040 ^{DLIS}	<0.0020 ^{DLHM}	<0.0020	<0.0020	0.0077 ^{RRU}
	Arsenic (As)-Total (mg/kg)	0.025	<0.040	0.029	<0.020	0.362
	Arsenic (As)-Total (mg/kg wwt)	0.0096	0.0040	0.0116	0.0048	0.317
	Barium (Ba)-Total (mg/kg)	25.0	5.32	15.6	51.7	31.2
	Barium (Ba)-Total (mg/kg wwt)	9.47	0.889	6.24	21.8	27.4
	Beryllium (Be)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	0.020	<0.010	0.036
	Beryllium (Be)-Total (mg/kg wwt)	<0.0040 ^{DLIS}	<0.0020 ^{DLHM}	0.0080	<0.0020	0.0318
	Bismuth (Bi)-Total (mg/kg)	<0.010	<0.020 ^{DLHM}	<0.010	<0.010	<0.010
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0040 ^{DLIS}	<0.0020	<0.0020	<0.0020	0.0055
	Boron (B)-Total (mg/kg)	3.6	3.7	8.3	5.1	1.5
	Boron (B)-Total (mg/kg wwt)	1.38	0.62 ^{DLHM}	3.33	2.15	1.30
	Cadmium (Cd)-Total (mg/kg)	0.0376	<0.010 ^{DLHM}	0.842	0.0855	0.0668
	Cadmium (Cd)-Total (mg/kg wwt)	0.0143	<0.0010	0.337	0.0361	0.0585
	Calcium (Ca)-Total (mg/kg)	1430	990	5720	3520	1580
	Calcium (Ca)-Total (mg/kg wwt)	543	166	2290	1490	1390
	Cesium (Cs)-Total (mg/kg)	0.0228	0.024	0.0218	0.158	0.187
	Cesium (Cs)-Total (mg/kg wwt)	0.0087	0.0041 ^{DLHM}	0.0087	0.0666	0.164
	Chromium (Cr)-Total (mg/kg)	0.079	<0.10 ^{DLHM}	<0.050	<0.050	0.489
	Chromium (Cr)-Total (mg/kg wwt)	0.030	<0.010 ^{DLHM}	0.018	0.018	0.428
	Cobalt (Co)-Total (mg/kg)	0.110	<0.040 ^{DLHM}	8.74	1.07	1.16
	Cobalt (Co)-Total (mg/kg wwt)	0.0416	0.0051	3.50	0.451	1.02
	Copper (Cu)-Total (mg/kg)	3.98	3.90	3.48	4.19	3.71
	Copper (Cu)-Total (mg/kg wwt)	1.51	0.652	1.39	1.77	3.25
	Iron (Fe)-Total (mg/kg)	31.6	13.0	39.3	45.4	368
	Iron (Fe)-Total (mg/kg wwt)	12.0	2.17 ^{DLHM}	15.7	19.2	322
	Lead (Pb)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	0.020	<0.020	0.211
	Lead (Pb)-Total (mg/kg wwt)	<0.0080 ^{DLIS}	<0.0040 ^{DLHM}	0.0082	0.0068	0.185
	Lithium (Li)-Total (mg/kg)	<0.50	<1.0 ^{DLHM}	<0.50	<0.50	<0.50
	Lithium (Li)-Total (mg/kg wwt)	<0.20 ^{DLIS}	<0.10	<0.10	<0.10	0.14
	Magnesium (Mg)-Total (mg/kg)	1150	454	3390	2350	501
	Magnesium (Mg)-Total (mg/kg wwt)	437	75.9	1350	994	439
	Manganese (Mn)-Total (mg/kg)	251	37.2	276	379	76.4
	Manganese (Mn)-Total (mg/kg wwt)	95.2	6.21	110	160	67.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1497000-147 Tissue 02-AUG-14 12:30 14-DDR-28-GR-01				
Grouping	Analyte						
TISSUE							
Physical Tests	% Moisture (%)	56.8					
Metals	Aluminum (Al)-Total (mg/kg)	7.3					
	Aluminum (Al)-Total (mg/kg wwt)	3.15					
	Antimony (Sb)-Total (mg/kg)	<0.010					
	Antimony (Sb)-Total (mg/kg wwt)	<0.0040 ^{RRR}					
	Arsenic (As)-Total (mg/kg)	0.047					
	Arsenic (As)-Total (mg/kg wwt)	0.0202					
	Barium (Ba)-Total (mg/kg)	38.9					
	Barium (Ba)-Total (mg/kg wwt)	16.8					
	Beryllium (Be)-Total (mg/kg)	<0.010					
	Beryllium (Be)-Total (mg/kg wwt)	<0.0040 ^{RRR}					
	Bismuth (Bi)-Total (mg/kg)	<0.010					
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0040 ^{RRR}					
	Boron (B)-Total (mg/kg)	4.6					
	Boron (B)-Total (mg/kg wwt)	1.98					
	Cadmium (Cd)-Total (mg/kg)	0.0222					
	Cadmium (Cd)-Total (mg/kg wwt)	0.0096					
	Calcium (Ca)-Total (mg/kg)	1940					
	Calcium (Ca)-Total (mg/kg wwt)	837					
	Cesium (Cs)-Total (mg/kg)	0.103					
	Cesium (Cs)-Total (mg/kg wwt)	0.0445					
	Chromium (Cr)-Total (mg/kg)	<0.050					
	Chromium (Cr)-Total (mg/kg wwt)	<0.020 ^{RRR}					
	Cobalt (Co)-Total (mg/kg)	0.337					
	Cobalt (Co)-Total (mg/kg wwt)	0.146					
	Copper (Cu)-Total (mg/kg)	2.61					
	Copper (Cu)-Total (mg/kg wwt)	1.13					
	Iron (Fe)-Total (mg/kg)	31.6					
	Iron (Fe)-Total (mg/kg wwt)	13.6					
	Lead (Pb)-Total (mg/kg)	0.029					
	Lead (Pb)-Total (mg/kg wwt)	0.0127					
	Lithium (Li)-Total (mg/kg)	<0.50					
	Lithium (Li)-Total (mg/kg wwt)	<0.20 ^{RRR}					
	Magnesium (Mg)-Total (mg/kg)	943					
	Magnesium (Mg)-Total (mg/kg wwt)	407					
	Manganese (Mn)-Total (mg/kg)	386					
	Manganese (Mn)-Total (mg/kg wwt)	167					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-2 Tissue 29-JUL-14 10:39 14-DDR-06-BERRY-01	L1497000-3 Tissue 29-JUL-14 10:39 14-DDR-06-BR-01	L1497000-4 Tissue 29-JUL-14 10:39 14-DDR-06-WL-01	L1497000-5 Tissue 29-JUL-14 10:39 14-DDR-06-LI-01	L1497000-6 Tissue 29-JUL-14 10:39 14-DDR-06-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0087	0.0103	0.0533	0.0060
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0036	0.0037	0.0418	0.0023
	Molybdenum (Mo)-Total (mg/kg)	0.116	0.030	0.278	0.159	0.331
	Molybdenum (Mo)-Total (mg/kg ww)	0.0180	0.0123	0.0989	0.125	0.127
	Nickel (Ni)-Total (mg/kg)	1.01	4.12	18.6	2.43	9.60
	Nickel (Ni)-Total (mg/kg ww)	0.155	1.69	6.62	1.90	3.70
	Phosphorus (P)-Total (mg/kg)	1070	2200	3900	776	1450
	Phosphorus (P)-Total (mg/kg ww)	165	902	1390	608	557
	Potassium (K)-Total (mg/kg)	8150	4940	12800	1990	12700
	Potassium (K)-Total (mg/kg ww)	1260	2030	4540	1560	4890
	Rubidium (Rb)-Total (mg/kg)	25.4	7.69	28.6	10.3	26.8
	Rubidium (Rb)-Total (mg/kg ww)	3.92	3.16	10.2	8.10	10.3
	Selenium (Se)-Total (mg/kg)	<0.10 ^{DLHM}	<0.050	<0.050	0.059	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	0.047	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	0.0161	0.0091	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010 ^{DLHM}	0.0015	0.0057	0.0071	0.0014
	Sodium (Na)-Total (mg/kg)	<40 ^{DLHM}	<20	<20	35	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	<4.0	27.3	<4.0
	Strontium (Sr)-Total (mg/kg)	1.80	10.9	84.8	8.30	18.9
	Strontium (Sr)-Total (mg/kg ww)	0.277 ^{DLHM}	4.46	30.2	6.51	7.26
	Tellurium (Te)-Total (mg/kg)	<0.040 ^{DLHM}	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0040 ^{DLHM}	0.0041	0.0068	0.0205	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00168	0.00242	0.0161	0.00051
	Tin (Sn)-Total (mg/kg)	0.27	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	0.041 ^{DLHM}	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0040 ^{DLHM}	0.0031	0.0038	0.107	0.0027
	Uranium (U)-Total (mg/kg ww)	<0.00040 ^{DLHM}	0.00129	0.00135	0.0840	0.00104
	Vanadium (V)-Total (mg/kg)	<0.20 ^{DLHM}	<0.10	<0.10	1.08	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	0.023	0.034	0.845	<0.020
	Zinc (Zn)-Total (mg/kg)	7.1	61.8	56.3	36.3	25.8
	Zinc (Zn)-Total (mg/kg ww)	1.10 ^{DLHM}	25.4	20.1	28.5	9.92
	Zirconium (Zr)-Total (mg/kg)	<0.40 ^{DLHM}	<0.20	<0.20	0.36	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	0.279	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.020	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-8 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01	L1497000-9 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01	L1497000-10 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01	L1497000-11 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01	L1497000-12 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0088	0.0143	0.0549	0.0053
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0035	0.0079	0.0462	0.0021
	Molybdenum (Mo)-Total (mg/kg)	0.831	0.819	0.569	0.346	1.89
	Molybdenum (Mo)-Total (mg/kg ww)	0.110	0.324	0.314	0.291	0.735
	Nickel (Ni)-Total (mg/kg)	1.33	3.77	0.65	1.78	3.34
	Nickel (Ni)-Total (mg/kg ww)	0.175	1.49	0.362	1.49	1.30
	Phosphorus (P)-Total (mg/kg)	1410	1680	1030	597	1500
	Phosphorus (P)-Total (mg/kg ww)	186	666	569	502	582
	Potassium (K)-Total (mg/kg)	9200	10300	4630	1510	16700
	Potassium (K)-Total (mg/kg ww)	1220	4090	2560	1270	6510
	Rubidium (Rb)-Total (mg/kg)	31.4	15.9	17.5	8.01	32.7
	Rubidium (Rb)-Total (mg/kg ww)	4.15	6.30	9.69	6.74	12.7
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	0.039	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	0.0080	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	<0.0010	0.0068	0.0012
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	38	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	<4.0	32.3	<4.0
	Strontium (Sr)-Total (mg/kg)	1.98	40.3	7.28	6.45	12.8
	Strontium (Sr)-Total (mg/kg ww)	0.262	16.0	4.02	5.42	4.99
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0020	0.0020	0.257	0.0152	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00081	0.142	0.0128	0.00051
	Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	0.0030	0.0024	0.199	<0.0020
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00119	0.00134	0.168	0.00058
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	0.89	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	0.745	<0.020
	Zinc (Zn)-Total (mg/kg)	20.9	70.1	21.5	21.0	28.5
	Zinc (Zn)-Total (mg/kg ww)	2.76	27.8	11.9	17.7	11.1
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.36	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040 ^{DLM}	0.300	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.080 ^{DLM}	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.020 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-14 Tissue 29-JUL-14 13:10 14-DDR-07- BERRY-01-DUP	L1497000-15 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01- DUP	L1497000-16 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01- DUP	L1497000-17 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01- DUP	L1497000-18 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01- DUP
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0111	0.0851	0.0110	<0.0050
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0044	0.0724	0.0060	0.0017
	Molybdenum (Mo)-Total (mg/kg)	1.35	0.745	0.438	0.723	1.15
	Molybdenum (Mo)-Total (mg/kg ww)	0.181	0.299	0.373	0.395	0.481
	Nickel (Ni)-Total (mg/kg)	1.32	4.77	1.67	1.10	4.57
	Nickel (Ni)-Total (mg/kg ww)	0.177	1.91	1.42	0.602	1.91
	Phosphorus (P)-Total (mg/kg)	1470	1930	564	1110	1470
	Phosphorus (P)-Total (mg/kg ww)	198	774	480	605	616
	Potassium (K)-Total (mg/kg)	7730	9160	1650	4140	19100
	Potassium (K)-Total (mg/kg ww)	1040	3680	1400	2260	8020
	Rubidium (Rb)-Total (mg/kg)	27.9	16.2	9.32	20.0	34.4
	Rubidium (Rb)-Total (mg/kg ww)	3.75	6.52	7.93	10.9	14.4
	Selenium (Se)-Total (mg/kg)	<0.10 ^{DLHM}	<0.050	0.051	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	0.044	<0.010	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	0.0091	<0.0050	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010 ^{DLHM}	<0.0010	0.0077	<0.0010	<0.0010
	Sodium (Na)-Total (mg/kg)	<40	<20	28	<20	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	23.6	<4.0	<4.0
	Strontium (Sr)-Total (mg/kg)	2.83	44.0	7.45	7.96	12.9
	Strontium (Sr)-Total (mg/kg ww)	0.380	17.7	6.34	4.35	5.41
	Tellurium (Te)-Total (mg/kg)	<0.040 ^{DLHM}	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0040 ^{DLHM}	<0.0020	0.0122	0.125	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040 ^{DLHM}	0.00069	0.0103	0.0682	<0.00040
	Tin (Sn)-Total (mg/kg)	<0.20 ^{DLHM}	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020 ^{DLHM}	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0040 ^{DLHM}	0.0023	0.183	0.0036	<0.0020
	Uranium (U)-Total (mg/kg ww)	<0.00040 ^{DLHM}	0.00092	0.156	0.00199	0.00066
	Vanadium (V)-Total (mg/kg)	<0.20 ^{DLHM}	<0.10	0.67	<0.10	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	0.572	0.035	<0.020
	Zinc (Zn)-Total (mg/kg)	18.2	41.4	20.4	20.2	25.0
	Zinc (Zn)-Total (mg/kg ww)	2.44 ^{DLHM}	16.6	17.3	11.0	10.5
	Zirconium (Zr)-Total (mg/kg)	<0.40 ^{DLHM}	<0.20	0.32	<0.20	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	0.268	<0.040	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.030 ^{DLM}	<0.030 ^{DLM}	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-20 Tissue 29-JUL-14 15:13 14-DDR-11A-BERRY-01	L1497000-21 Tissue 29-JUL-14 15:13 14-DDR-11A-BR-01	L1497000-22 Tissue 29-JUL-14 15:13 14-DDR-11A-LI-01	L1497000-23 Tissue 29-JUL-14 15:13 14-DDR-11A-GR-01	L1497000-25 Tissue 29-JUL-14 15:13 14-DDR-11B-WL-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0083	0.102	0.0069	0.0092
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0039	0.0991	0.0029	0.0038
	Molybdenum (Mo)-Total (mg/kg)	0.427	0.022	0.390	1.50	1.24
	Molybdenum (Mo)-Total (mg/kg ww)	0.0703	0.0104	0.378	0.629	0.517
	Nickel (Ni)-Total (mg/kg)	7.99	4.07	5.40	3.30	40.9
	Nickel (Ni)-Total (mg/kg ww)	1.32	1.93	5.23	1.39	17.1
	Phosphorus (P)-Total (mg/kg)	2360	1560	612	1080	4760
	Phosphorus (P)-Total (mg/kg ww)	388	738	592	455	1990
	Potassium (K)-Total (mg/kg)	7070	3820	1050	5500	8770
	Potassium (K)-Total (mg/kg ww)	1160	1810	1020	2310	3660
	Rubidium (Rb)-Total (mg/kg)	31.2	7.22	5.13	11.1	2.87
	Rubidium (Rb)-Total (mg/kg ww)	5.15	3.42	4.97	4.66	1.20
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	0.074	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	0.071	<0.010	<0.010
	Silver (Ag)-Total (mg/kg)	0.0114	<0.0050	0.0189	<0.0050	<0.0050
	Silver (Ag)-Total (mg/kg ww)	0.0019	0.0021	0.0183	<0.0010	<0.0010
	Sodium (Na)-Total (mg/kg)	441	<20	80	22	<20
	Sodium (Na)-Total (mg/kg ww)	72.7	<4.0	77.4	9.4	<4.0
	Strontium (Sr)-Total (mg/kg)	4.52	24.1	20.4	18.6	61.8
	Strontium (Sr)-Total (mg/kg ww)	0.745	11.4	19.7	7.82	25.8
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0039	0.0123	0.0568	0.0108	0.0031
	Thallium (Tl)-Total (mg/kg ww)	0.00064	0.00582	0.0550	0.00454	0.00128
	Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	0.023	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	0.0060	0.303	0.0043	0.0095
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00284	0.294	0.00181	0.00399
	Vanadium (V)-Total (mg/kg)	<0.10	0.15	1.88	0.12	0.22
	Vanadium (V)-Total (mg/kg ww)	<0.020	0.073	1.82	0.052	0.090
	Zinc (Zn)-Total (mg/kg)	29.2	126	21.8	26.0	125
	Zinc (Zn)-Total (mg/kg ww)	4.81	60.0	21.1	10.9	52.4
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	0.89	<0.20	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	0.864	<0.040	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-27 Tissue 30-JUL-14 09:00 14-DDR-19-BERRY-01	L1497000-28 Tissue 30-JUL-14 09:00 14-DDR-19-WL-01	L1497000-29 Tissue 30-JUL-14 09:00 14-DDR-19-BR-01	L1497000-30 Tissue 30-JUL-14 09:00 14-DDR-19-LI-01	L1497000-31 Tissue 30-JUL-14 09:00 14-DDR-19-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0063	0.0070	0.0582	<0.0050
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0023	0.0030	0.0513	0.0017
	Molybdenum (Mo)-Total (mg/kg)	<0.020	0.278	<0.020	0.121	0.305
	Molybdenum (Mo)-Total (mg/kg ww)	<0.0040	0.0994	0.0082	0.106	0.127
	Nickel (Ni)-Total (mg/kg)	1.12	27.2	6.11	2.84	6.70
	Nickel (Ni)-Total (mg/kg ww)	0.205	9.74	2.57	2.50	2.78
	Phosphorus (P)-Total (mg/kg)	924	1900	1980	610	1380
	Phosphorus (P)-Total (mg/kg ww)	169	680	833	537	572
	Potassium (K)-Total (mg/kg)	8300	10700	5080	1230	14400
	Potassium (K)-Total (mg/kg ww)	1520	3840	2140	1080	5980
	Rubidium (Rb)-Total (mg/kg)	16.9	9.86	7.10	2.95	18.4
	Rubidium (Rb)-Total (mg/kg ww)	3.08	3.53	2.99	2.60	7.62
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	0.017	0.031	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	0.0114	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	0.0014	0.0100	<0.0010
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	54	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	5.2	<4.0	47.3	<4.0
	Strontium (Sr)-Total (mg/kg)	1.24	66.4	16.5	8.19	11.7
	Strontium (Sr)-Total (mg/kg ww)	0.226	23.8	6.95	7.22	4.87
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0020	0.0029	0.0022	0.0364	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00105	0.00093	0.0321	0.00061
	Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	0.0106	0.0065	0.117	0.0038
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00380	0.00274	0.103	0.00156
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	0.80	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	0.030	0.024	0.707	<0.020
	Zinc (Zn)-Total (mg/kg)	5.95	48.5	111	27.2	23.6
	Zinc (Zn)-Total (mg/kg ww)	1.09	17.4	46.7	24.0	9.78
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.51	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	0.445	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-33 Tissue 30-JUL-14 12:15 14-DDR-14A-WL-01	L1497000-34 Tissue 30-JUL-14 12:15 14-DDR-14A-BR-01	L1497000-35 Tissue 30-JUL-14 12:15 14-DDR-14A-GR-01	L1497000-37 Tissue 30-JUL-14 12:45 14-DDR-14B-BERRY-01	L1497000-38 Tissue 30-JUL-14 12:45 14-DDR-14B-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0090	0.0084	<0.0050	<0.0050	0.0823
	Mercury (Hg)-Total (mg/kg ww)	0.0038	0.0037	0.0018	<0.0010	0.0784
	Molybdenum (Mo)-Total (mg/kg)	0.119	0.050	0.292	0.533	0.338
	Molybdenum (Mo)-Total (mg/kg ww)	0.0505	0.0223	0.114	0.0773	0.322
	Nickel (Ni)-Total (mg/kg)	13.3	4.74	1.46	1.97	3.13
	Nickel (Ni)-Total (mg/kg ww)	5.64	2.12	0.570	0.286	2.98
	Phosphorus (P)-Total (mg/kg)	2590	2050	1580	1620	628
	Phosphorus (P)-Total (mg/kg ww)	1100	913	613	234	598
	Potassium (K)-Total (mg/kg)	6950	5140	8020	6770	1640
	Potassium (K)-Total (mg/kg ww)	2940	2290	3120	983	1570
	Rubidium (Rb)-Total (mg/kg)	11.4	6.62	20.0	19.8	4.42
	Rubidium (Rb)-Total (mg/kg ww)	4.84	2.95	7.80	2.87	4.21
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	0.048
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0107
	Silver (Ag)-Total (mg/kg ww)	<0.0010	0.0011	<0.0010	<0.0010	0.0102
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	<20	42
	Sodium (Na)-Total (mg/kg ww)	<4.0	5.4	<4.0	<4.0	40.3
	Strontium (Sr)-Total (mg/kg)	47.0	11.1	7.35	5.03	9.27
	Strontium (Sr)-Total (mg/kg ww)	19.9	4.93	2.86	0.730	8.83
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0021	0.0039	0.0035	<0.0020	0.0282
	Thallium (Tl)-Total (mg/kg ww)	0.00087	0.00174	0.00135	<0.00040	0.0268
	Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	0.11	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.024
	Uranium (U)-Total (mg/kg)	0.0085	0.0087	0.0023	<0.0020	0.205
	Uranium (U)-Total (mg/kg ww)	0.00360	0.00389	0.00088	<0.00040	0.195
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	1.37
	Vanadium (V)-Total (mg/kg ww)	0.035	0.032	<0.020	<0.020	1.31
	Zinc (Zn)-Total (mg/kg)	34.5	91.0	21.7	20.6	27.6
	Zinc (Zn)-Total (mg/kg ww)	14.6	40.6	8.45	2.99	26.2
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	0.71
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.679
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.020 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-40 Tissue 30-JUL-14 13:54 14-DDR-12-BERRY-01	L1497000-41 Tissue 30-JUL-14 13:54 14-DDR-12-WL-01	L1497000-42 Tissue 30-JUL-14 13:54 14-DDR-12-LT-01	L1497000-43 Tissue 30-JUL-14 13:54 14-DDR-12-LI-01	L1497000-44 Tissue 30-JUL-14 13:54 14-DDR-12-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0076	0.0123	0.0819	0.0053
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0033	0.0065	0.0772	0.0022
	Molybdenum (Mo)-Total (mg/kg)	0.616	0.329	0.438	0.275	0.376
	Molybdenum (Mo)-Total (mg/kg ww)	0.0856	0.142	0.231	0.259	0.157
	Nickel (Ni)-Total (mg/kg)	1.29	7.87	1.07	5.15	2.31
	Nickel (Ni)-Total (mg/kg ww)	0.179	3.40	0.562	4.85	0.970
	Phosphorus (P)-Total (mg/kg)	1030	1480	878	647	1340
	Phosphorus (P)-Total (mg/kg ww)	143	638	462	610	560
	Potassium (K)-Total (mg/kg)	7130	7220	4350	1740	14500
	Potassium (K)-Total (mg/kg ww)	991	3120	2290	1640	6090
	Rubidium (Rb)-Total (mg/kg)	9.16	4.45	5.71	5.36	5.43
	Rubidium (Rb)-Total (mg/kg ww)	1.27	1.93	3.01	5.05	2.27
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	0.067	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	0.063	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	0.0206	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	<0.0010	0.0194	<0.0010
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	181	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	5.7	4.6	170	8.1
	Strontium (Sr)-Total (mg/kg)	2.52	37.3	8.94	14.5	17.3
	Strontium (Sr)-Total (mg/kg ww)	0.350	16.1	4.71	13.7	7.26
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0020	<0.0020	0.0442	0.0317	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00051	0.0233	0.0299	<0.00040
	Tin (Sn)-Total (mg/kg)	0.15	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	0.020	<0.020	<0.020	0.058	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	0.0083	0.0063	0.458	0.0053
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00357	0.00330	0.432	0.00221
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	3.54	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	0.039	0.029	3.33	<0.020
	Zinc (Zn)-Total (mg/kg)	14.4	95.7	21.7	29.8	15.2
	Zinc (Zn)-Total (mg/kg ww)	2.00	41.4	11.4	28.0	6.38
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	1.88	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	1.77	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.090 ^{DLM}	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.050 ^{DLM}	<0.010	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-47 Tissue 31-JUL-14 08:50 14-DDR-24-BERRY-01	L1497000-48 Tissue 31-JUL-14 08:50 14-DDR-24-WL-01	L1497000-49 Tissue 31-JUL-14 08:50 14-DDR-24-BR-01	L1497000-50 Tissue 31-JUL-14 08:50 14-DDR-24-LI-01	L1497000-51 Tissue 31-JUL-14 08:50 14-DDR-24-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0096	0.0082	0.0609	<0.0050
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0038	0.0034	0.0536	0.0021
	Molybdenum (Mo)-Total (mg/kg)	<0.020	0.200	<0.020	0.062	0.205
	Molybdenum (Mo)-Total (mg/kg ww)	<0.0040	0.0784	0.0068	0.0544	0.0902
	Nickel (Ni)-Total (mg/kg)	0.71	10.9	5.11	1.48	1.68
	Nickel (Ni)-Total (mg/kg ww)	0.145	4.28	2.12	1.30	0.740
	Phosphorus (P)-Total (mg/kg)	832	2650	3240	846	1430
	Phosphorus (P)-Total (mg/kg ww)	169	1040	1340	745	628
	Potassium (K)-Total (mg/kg)	6700	12900	6190	1820	13700
	Potassium (K)-Total (mg/kg ww)	1360	5050	2570	1600	6020
	Rubidium (Rb)-Total (mg/kg)	10.3	8.14	4.96	4.00	17.6
	Rubidium (Rb)-Total (mg/kg ww)	2.09	3.19	2.06	3.52	7.72
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	0.065	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	0.027	0.030	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	0.0085	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	0.0018	0.0075	<0.0010
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	191	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	4.2	<4.0	168	6.4
	Strontium (Sr)-Total (mg/kg)	0.832	32.4	15.2	7.56	6.82
	Strontium (Sr)-Total (mg/kg ww)	0.169	12.7	6.32	6.65	3.00
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0020	0.0033	<0.0020	0.0199	0.0026
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00130	0.00073	0.0176	0.00115
	Tin (Sn)-Total (mg/kg)	0.10	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	0.021	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	0.0061	0.0056	0.0555	0.0037
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00240	0.00233	0.0488	0.00161
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	0.52	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	0.457	<0.020
	Zinc (Zn)-Total (mg/kg)	4.50	43.5	86.5	30.2	17.2
	Zinc (Zn)-Total (mg/kg ww)	0.91	17.1	35.9	26.6	7.57
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.35	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	0.305	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-53 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-01	L1497000-54 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-02	L1497000-55 Tissue 31-JUL-14 10:25 14-DDR-26-WL-01	L1497000-56 Tissue 31-JUL-14 10:25 14-DDR-26-LT-01	L1497000-57 Tissue 31-JUL-14 10:25 14-DDR-26-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	<0.0050	0.0126	0.0177	0.0910
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	<0.0010	0.0048	0.0088	0.0747
	Molybdenum (Mo)-Total (mg/kg)	<0.040 ^{DLHM}	0.072	0.354	0.065	0.130
	Molybdenum (Mo)-Total (mg/kg ww)	0.0053	0.0055	0.135	0.0323	0.107
	Nickel (Ni)-Total (mg/kg)	0.99	1.74	14.8	1.53	2.44
	Nickel (Ni)-Total (mg/kg ww)	0.173	0.131	5.64	0.758	2.00
	Phosphorus (P)-Total (mg/kg)	1090	1270	2470	1120	995
	Phosphorus (P)-Total (mg/kg ww)	190	96.1	940	555	816
	Potassium (K)-Total (mg/kg)	9200	7950	9500	4690	2360
	Potassium (K)-Total (mg/kg ww)	1610	602	3620	2320	1940
	Rubidium (Rb)-Total (mg/kg)	12.8	8.16	4.95	7.26	4.54
	Rubidium (Rb)-Total (mg/kg ww)	2.23	0.617	1.89	3.60	3.72
	Selenium (Se)-Total (mg/kg)	<0.10 ^{DLHM}	<0.10 ^{DLHM}	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	0.011	<0.010	0.029
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0141
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	<0.0010	<0.0010	0.0116
	Sodium (Na)-Total (mg/kg)	<40 ^{DLHM}	<40 ^{DLHM}	<20	<20	178
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	<4.0	5.4	146
	Strontium (Sr)-Total (mg/kg)	0.86	1.49	31.2	5.39	7.18
	Strontium (Sr)-Total (mg/kg ww)	0.151	0.113	11.9	2.67	5.89
	Tellurium (Te)-Total (mg/kg)	<0.040 ^{DLHM}	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0040 ^{DLHM}	<0.0040 ^{DLHM}	0.0045	0.429	0.0135
	Thallium (Tl)-Total (mg/kg ww)	<0.00040 ^{DLHM}	<0.00040 ^{DLHM}	0.00172	0.212	0.0111
	Tin (Sn)-Total (mg/kg)	<0.20 ^{DLHM}	<0.20 ^{DLHM}	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020 ^{DLHM}	<0.020 ^{DLHM}	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0040 ^{DLHM}	<0.0040 ^{DLHM}	0.0078	0.0069	0.182
	Uranium (U)-Total (mg/kg ww)	<0.00040 ^{DLHM}	<0.00040 ^{DLHM}	0.00298	0.00344	0.149
	Vanadium (V)-Total (mg/kg)	<0.20 ^{DLHM}	<0.20 ^{DLHM}	<0.10	<0.10	0.63
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.513
	Zinc (Zn)-Total (mg/kg)	6.8	12.3	70.8	20.7	34.4
	Zinc (Zn)-Total (mg/kg ww)	1.20	0.93	27.0	10.3	28.2
	Zirconium (Zr)-Total (mg/kg)	<0.40 ^{DLHM}	<0.40 ^{DLHM}	<0.20	<0.20	0.59
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.484
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.90 ^{DLM}	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.50 ^{DLM}	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-58 Tissue 31-JUL-14 10:25 14-DDR-26-GR-01	L1497000-60 Tissue 31-JUL-14 12:15 14-DDR-30A-BERRY-01	L1497000-73 Tissue 31-JUL-14 12:15 14-DDR-30A-BR-01	L1497000-74 Tissue 31-JUL-14 12:15 14-DDR-30A-GR-01	L1497000-76 Tissue 31-JUL-14 12:40 14-DDR-30B-WL-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0094	<0.0050	0.0113	0.0054	0.0085
	Mercury (Hg)-Total (mg/kg ww)	0.0034	<0.0010	0.0045	0.0019	0.0036
	Molybdenum (Mo)-Total (mg/kg)	0.452	1.38	0.049	0.388	0.197
	Molybdenum (Mo)-Total (mg/kg ww)	0.163	0.220	0.0194	0.135	0.0832
	Nickel (Ni)-Total (mg/kg)	5.94	4.47	3.84	0.95	4.68
	Nickel (Ni)-Total (mg/kg ww)	2.14	0.714	1.53	0.332	1.98
	Phosphorus (P)-Total (mg/kg)	2030	2590	2270	1290	1340
	Phosphorus (P)-Total (mg/kg ww)	730	414	905	449	566
	Potassium (K)-Total (mg/kg)	9960	13300	6170	9140	4750
	Potassium (K)-Total (mg/kg ww)	3580	2120	2460	3190	2010
	Rubidium (Rb)-Total (mg/kg)	9.94	53.2	7.00	6.86	12.3
	Rubidium (Rb)-Total (mg/kg ww)	3.57	8.49	2.79	2.39	5.19
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	0.0133	<0.0050	<0.0050	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	0.0021	0.0017	<0.0010	<0.0010
	Sodium (Na)-Total (mg/kg)	<20	95	<20	<20	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	15.2	<4.0	<4.0	<4.0
	Strontium (Sr)-Total (mg/kg)	4.06	2.93	22.8	12.2	33.9
	Strontium (Sr)-Total (mg/kg ww)	1.46	0.467	9.10	4.26	14.3
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0031	<0.0020	<0.0020	<0.0020	0.0045
	Thallium (Tl)-Total (mg/kg ww)	0.00110	<0.00040	0.00056	0.00055	0.00191
	Tin (Sn)-Total (mg/kg)	<0.10	0.43	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	0.069	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0056	<0.0020	0.0032	0.0040	0.0029
	Uranium (U)-Total (mg/kg ww)	0.00202	<0.00040	0.00127	0.00140	0.00123
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg)	14.2	31.7	172	57.6	32.3
	Zinc (Zn)-Total (mg/kg ww)	5.12	5.06	68.6	20.1	13.6
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-77 Tissue 31-JUL-14 12:40 14-DDR-30B-LI-01	L1497000-79 Tissue 31-JUL-14 13:49 14-DDR-23-BERRY-01	L1497000-80 Tissue 31-JUL-14 13:49 14-DDR-23-WL-01	L1497000-81 Tissue 31-JUL-14 13:49 14-DDR-23-LT-01	L1497000-82 Tissue 31-JUL-14 13:49 14-DDR-23-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0466	<0.0050	0.0081	0.0119	0.0732
	Mercury (Hg)-Total (mg/kg ww)	0.0382	<0.0010	0.0031	0.0063	0.0669
	Molybdenum (Mo)-Total (mg/kg)	0.167	0.059	0.527	0.300	0.332
	Molybdenum (Mo)-Total (mg/kg ww)	0.137	0.0082	0.201	0.160	0.303
	Nickel (Ni)-Total (mg/kg)	2.08	<0.40 ^{DLHM}	15.0	1.46	4.09
	Nickel (Ni)-Total (mg/kg ww)	1.70	0.051	5.73	0.780	3.74
	Phosphorus (P)-Total (mg/kg)	585	319	3810	1060	922
	Phosphorus (P)-Total (mg/kg ww)	480	43.8	1450	566	843
	Potassium (K)-Total (mg/kg)	1570	1430	12000	4790	1890
	Potassium (K)-Total (mg/kg ww)	1290	196	4600	2560	1730
	Rubidium (Rb)-Total (mg/kg)	7.52	3.76	17.7	13.7	7.83
	Rubidium (Rb)-Total (mg/kg ww)	6.16	0.516 ^{DLHM}	6.75	7.34	7.15
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	0.053
	Selenium (Se)-Total (mg/kg ww)	0.041	<0.010 ^{DLHM}	<0.010	<0.010	0.049
	Silver (Ag)-Total (mg/kg)	0.0111	<0.010 ^{DLHM}	<0.0050	<0.0050	0.0154
	Silver (Ag)-Total (mg/kg ww)	0.0091	<0.0010 ^{DLHM}	<0.0010	<0.0010	0.0140
	Sodium (Na)-Total (mg/kg)	37	<40 ^{DLHM}	<20	<20	60
	Sodium (Na)-Total (mg/kg ww)	30.4	<4.0	<4.0	<4.0	54.4
	Strontium (Sr)-Total (mg/kg)	10.5	0.88	44.2	7.86	9.93
	Strontium (Sr)-Total (mg/kg ww)	8.63	0.120 ^{DLHM}	16.9	4.20	9.07
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0189	<0.0040 ^{DLHM}	0.0023	0.211	0.0341
	Thallium (Tl)-Total (mg/kg ww)	0.0155	<0.00040	0.00087	0.113	0.0311
	Tin (Sn)-Total (mg/kg)	<0.10	0.26	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	0.034	0.035 ^{DLHM}	<0.020	<0.020	0.049
	Uranium (U)-Total (mg/kg)	0.331	<0.0040 ^{DLHM}	0.0167	0.0164	0.379
	Uranium (U)-Total (mg/kg ww)	0.271	<0.00040 ^{DLHM}	0.00640	0.00877	0.346
	Vanadium (V)-Total (mg/kg)	0.97	<0.20 ^{DLHM}	<0.10	<0.10	1.75
	Vanadium (V)-Total (mg/kg ww)	0.791	<0.020	0.022	0.035	1.60
	Zinc (Zn)-Total (mg/kg)	23.5	3.4	73.4	18.3	27.5
	Zinc (Zn)-Total (mg/kg ww)	19.3	0.46 ^{DLHM}	28.1	9.80	25.1
	Zirconium (Zr)-Total (mg/kg)	0.57	<0.40 ^{DLHM}	<0.20	<0.20	1.09
	Zirconium (Zr)-Total (mg/kg ww)	0.465 ^{DLM}	<0.040	<0.040	<0.040	0.993
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.060 ^{DLM}	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.050 ^{DLM}	<0.010	<0.010	<0.010	<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-83 Tissue 31-JUL-14 13:49 14-DDR-23-GR-01	L1497000-85 Tissue 01-AUG-14 08:12 14-DDR-10A-WL-01	L1497000-86 Tissue 01-AUG-14 08:12 14-DDR-10A-LT-01	L1497000-87 Tissue 01-AUG-14 08:12 14-DDR-10A-LI-01	L1497000-89 Tissue 01-AUG-14 08:40 14-DDR-10B-BERRY-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0052	0.0107	0.0123	0.0610	<0.0050
	Mercury (Hg)-Total (mg/kg ww)	0.0022	0.0038	0.0060	0.0468	<0.0010
	Molybdenum (Mo)-Total (mg/kg)	0.794	0.347	0.032	0.113	0.224
	Molybdenum (Mo)-Total (mg/kg ww)	0.336	0.124	0.0158	0.0869	0.0341
	Nickel (Ni)-Total (mg/kg)	9.19	19.6	2.33	2.94	1.21
	Nickel (Ni)-Total (mg/kg ww)	3.89	7.00	1.14	2.26	0.184
	Phosphorus (P)-Total (mg/kg)	1450	2710	1200	1090	652
	Phosphorus (P)-Total (mg/kg ww)	612	970	586	835	99.3
	Potassium (K)-Total (mg/kg)	12800	8690	5070	2350	6170
	Potassium (K)-Total (mg/kg ww)	5430	3110	2480	1810	939
	Rubidium (Rb)-Total (mg/kg)	12.2	12.1	16.1	8.88	19.0
	Rubidium (Rb)-Total (mg/kg ww)	5.15	4.31	7.88	6.81	2.89
	Selenium (Se)-Total (mg/kg)	<0.050	0.054	<0.050	0.055	<0.10 ^{DLHM}
	Selenium (Se)-Total (mg/kg ww)	<0.010	0.019	<0.010	0.042	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	0.0201	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	<0.0010	0.0154	<0.0010 ^{DLHM}
	Sodium (Na)-Total (mg/kg)	<20	<20	<20	58	<40
	Sodium (Na)-Total (mg/kg ww)	4.8	<4.0	<4.0	44.3	<4.0
	Strontium (Sr)-Total (mg/kg)	30.4	99.8	7.06	15.0	1.55
	Strontium (Sr)-Total (mg/kg ww)	12.9	35.7	3.46	11.5	0.236 ^{DLHM}
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.040 ^{DLHM}
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040 ^{DLHM}
	Thallium (Tl)-Total (mg/kg)	0.0024	0.0124	0.164	0.0258	<0.0040 ^{DLHM}
	Thallium (Tl)-Total (mg/kg ww)	0.00100	0.00442	0.0803	0.0198	<0.00040 ^{DLHM}
	Tin (Sn)-Total (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.20 ^{DLHM}
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020 ^{DLHM}
	Uranium (U)-Total (mg/kg)	0.0187	0.0028	0.0024	0.0729	<0.0040 ^{DLHM}
	Uranium (U)-Total (mg/kg ww)	0.00790	0.00099	0.00116	0.0559	<0.00040 ^{DLHM}
	Vanadium (V)-Total (mg/kg)	0.10	0.11	<0.10	1.92	<0.20 ^{DLHM}
	Vanadium (V)-Total (mg/kg ww)	0.044	0.041	<0.020	1.47	<0.020
	Zinc (Zn)-Total (mg/kg)	21.5	32.1	23.6	33.9	11.0
	Zinc (Zn)-Total (mg/kg ww)	9.10	11.5	11.6	26.0	1.68 ^{DLHM}
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.38	<0.40 ^{DLHM}
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040 ^{DLM}	0.291 ^{DLM}	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.060 ^{DLM}	<0.10 ^{DLM}	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.030 ^{DLM}	<0.070 ^{DLM}	<0.010

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-90 Tissue 01-AUG-14 08:40 14-DDR-10B-GR-01	L1497000-92 Tissue 01-AUG-14 09:36 14-DDR-02A-BERRY-01	L1497000-93 Tissue 01-AUG-14 09:36 14-DDR-02A-LT-01	L1497000-94 Tissue 01-AUG-14 09:36 14-DDR-02A-LI-01	L1497000-95 Tissue 01-AUG-14 09:36 14-DDR-02A-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0066	<0.0050	0.0101	0.0922	<0.0050
	Mercury (Hg)-Total (mg/kg ww)	0.0023	<0.0010	0.0055	0.0680	0.0015
	Molybdenum (Mo)-Total (mg/kg)	1.23	0.863	<0.020	0.112	0.449
	Molybdenum (Mo)-Total (mg/kg ww)	0.425	0.131	0.0101	0.0825	0.154
	Nickel (Ni)-Total (mg/kg)	3.08	7.19	2.70	3.59	2.66
	Nickel (Ni)-Total (mg/kg ww)	1.06	1.09	1.46	2.65	0.908
	Phosphorus (P)-Total (mg/kg)	809	2810	901	550	1590
	Phosphorus (P)-Total (mg/kg ww)	279	427	486	406	543
	Potassium (K)-Total (mg/kg)	6620	13700	4420	1290	10200
	Potassium (K)-Total (mg/kg ww)	2280	2080	2390	953	3480
	Rubidium (Rb)-Total (mg/kg)	15.3	63.9	16.9	5.86	12.2
	Rubidium (Rb)-Total (mg/kg ww)	5.28	9.72	9.11	4.32	4.17
	Selenium (Se)-Total (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	0.028	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	0.0151	<0.0050	0.0100	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	0.0023	<0.0010	0.0074	<0.0010
	Sodium (Na)-Total (mg/kg)	36	65	<20	67	<20
	Sodium (Na)-Total (mg/kg ww)	12.5	9.9	<4.0	49.1	<4.0
	Strontium (Sr)-Total (mg/kg)	11.4	3.30	9.62	9.43	10.5
	Strontium (Sr)-Total (mg/kg ww)	3.92	0.502	5.19	6.96	3.60
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0047	<0.0020	0.212	0.0235	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	0.00163	<0.00040	0.114	0.0174	<0.00040
	Tin (Sn)-Total (mg/kg)	<0.10	0.30	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	0.046	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0021	<0.0020	<0.0020	0.0394	<0.0020
	Uranium (U)-Total (mg/kg ww)	0.00071	<0.00040	0.00096	0.0290	<0.00040
	Vanadium (V)-Total (mg/kg)	<0.10	<0.10	<0.10	0.82	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	0.028	0.607	<0.020
	Zinc (Zn)-Total (mg/kg)	38.4	31.4	19.1	20.9	34.2
	Zinc (Zn)-Total (mg/kg ww)	13.3	4.79	10.3	15.4	11.7
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.20	<0.20	0.29	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	0.214	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.080 ^{DLM}	<0.050	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-97 Tissue 01-AUG-14 10:15 14-DDR-02B-WL-01	L1497000-112 Tissue 01-AUG-14 11:15 14-DDR-03-BERRY-01	L1497000-113 Tissue 01-AUG-14 11:15 14-DDR-03-WL-01	L1497000-114 Tissue 01-AUG-14 11:15 14-DDR-03-LT-01	L1497000-115 Tissue 01-AUG-14 11:15 14-DDR-03-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0100	<0.0050	0.0106	0.0128	0.0684
	Mercury (Hg)-Total (mg/kg ww)	0.0037	<0.0010 ^{DLHM}	0.0043	0.0066	0.0473
	Molybdenum (Mo)-Total (mg/kg)	0.314	<0.040	0.297	0.049	0.123
	Molybdenum (Mo)-Total (mg/kg ww)	0.117	<0.0040	0.119	0.0251	0.0853
	Nickel (Ni)-Total (mg/kg)	54.4	0.55	9.30	1.44	2.97
	Nickel (Ni)-Total (mg/kg ww)	20.2	0.073	3.74	0.736	2.05
	Phosphorus (P)-Total (mg/kg)	2040	492	1940	981	651
	Phosphorus (P)-Total (mg/kg ww)	756	64.9	781	502	451
	Potassium (K)-Total (mg/kg)	12400	8470	7080	4720	2030
	Potassium (K)-Total (mg/kg ww)	4620	1120	2850	2410	1410
	Rubidium (Rb)-Total (mg/kg)	29.9	16.8	7.50	10.6	6.67
	Rubidium (Rb)-Total (mg/kg ww)	11.1	2.22 ^{DLHM}	3.02	5.41	4.62
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	0.027
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0096
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010 ^{DLHM}	<0.0010	0.0013	0.0067
	Sodium (Na)-Total (mg/kg)	<20	<40 ^{DLHM}	<20	<20	110
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	<4.0	<4.0	75.8
	Strontium (Sr)-Total (mg/kg)	55.8	0.65	57.7	14.7	12.5
	Strontium (Sr)-Total (mg/kg ww)	20.7	0.086 ^{DLHM}	23.2	7.50	8.68
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0140	<0.0040 ^{DLHM}	0.0024	0.0285	0.0131
	Thallium (Tl)-Total (mg/kg ww)	0.00519	<0.00040 ^{DLHM}	0.00095	0.0146	0.00904
	Tin (Sn)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020 ^{DLHM}	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0027	<0.0040 ^{DLHM}	0.0029	0.0030	0.404
	Uranium (U)-Total (mg/kg ww)	0.00100	<0.00040 ^{DLHM}	0.00117	0.00155	0.279
	Vanadium (V)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	0.82
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.566
	Zinc (Zn)-Total (mg/kg)	116	4.1	206	22.3	22.5
	Zinc (Zn)-Total (mg/kg ww)	43.0	0.55 ^{DLHM}	82.7	11.4	15.6
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.40 ^{DLHM}	<0.20	<0.20	0.58
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.403 ^{DLM}
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.070 ^{DLM}
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.050 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-116 Tissue 01-AUG-14 11:15 14-DDR-03-GR-01	L1497000-118 Tissue 01-AUG-14 13:03 14-DDR-09-BERRY-01	L1497000-119 Tissue 01-AUG-14 13:03 14-DDR-09-WL-01	L1497000-120 Tissue 01-AUG-14 13:03 14-DDR-09-LT-01	L1497000-121 Tissue 01-AUG-14 13:03 14-DDR-09-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0064	<0.0050	0.0104	0.0131	0.0413
	Mercury (Hg)-Total (mg/kg ww)	0.0027	<0.0010	0.0045	0.0066	0.0364
	Molybdenum (Mo)-Total (mg/kg)	0.875	<0.040 ^{DLHM}	0.321	0.037	0.115
	Molybdenum (Mo)-Total (mg/kg ww)	0.369	<0.0040	0.140	0.0185	0.102
	Nickel (Ni)-Total (mg/kg)	1.93	0.63	6.83	0.74	2.39
	Nickel (Ni)-Total (mg/kg ww)	0.811	0.102	2.97	0.369	2.11
	Phosphorus (P)-Total (mg/kg)	1420	966	2250	959	718
	Phosphorus (P)-Total (mg/kg ww)	597	156	979	479	633
	Potassium (K)-Total (mg/kg)	13300	9250	7600	4430	2200
	Potassium (K)-Total (mg/kg ww)	5590	1490	3310	2220	1940
	Rubidium (Rb)-Total (mg/kg)	14.9	12.1	6.02	8.21	6.13
	Rubidium (Rb)-Total (mg/kg ww)	6.29	1.94 ^{DLHM}	2.62	4.11	5.41
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	0.012	<0.010	<0.010	<0.010	0.030
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0100
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010 ^{DLHM}	<0.0010	<0.0010	0.0088
	Sodium (Na)-Total (mg/kg)	<20	<40 ^{DLHM}	<20	<20	114
	Sodium (Na)-Total (mg/kg ww)	4.4	<4.0	<4.0	<4.0	100
	Strontium (Sr)-Total (mg/kg)	15.7	1.03	36.7	8.33	10.7
	Strontium (Sr)-Total (mg/kg ww)	6.63	0.167 ^{DLHM}	16.0	4.17	9.44
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0034	<0.0040 ^{DLHM}	<0.0020	0.127	0.0137
	Thallium (Tl)-Total (mg/kg ww)	0.00144	<0.00040	0.00043	0.0634	0.0121
	Tin (Sn)-Total (mg/kg)	<0.10	0.23	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	0.037 ^{DLHM}	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0051	<0.0040 ^{DLHM}	0.0040	0.0035	0.315
	Uranium (U)-Total (mg/kg ww)	0.00215	<0.00040 ^{DLHM}	0.00174	0.00173	0.278
	Vanadium (V)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	0.60
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.527
	Zinc (Zn)-Total (mg/kg)	18.9	6.2	99.9	22.0	24.6
	Zinc (Zn)-Total (mg/kg ww)	7.96	1.00 ^{DLHM}	43.5	11.0	21.7
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.40 ^{DLHM}	<0.20	<0.20	0.42
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.366 ^{DLM}
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.60 ^{DLM}
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.50 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-122 Tissue 01-AUG-14 13:03 14-DDR-09-GR-01	L1497000-124 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01	L1497000-125 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01	L1497000-126 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01	L1497000-127 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	<0.0050	0.0098	0.0116	0.0904
	Mercury (Hg)-Total (mg/kg ww)	0.0019	<0.0010 ^{DLHM}	0.0034	0.0051	0.0337
	Molybdenum (Mo)-Total (mg/kg)	0.624	<0.040 ^{DLHM}	0.289	0.020	0.076
	Molybdenum (Mo)-Total (mg/kg ww)	0.272	0.0053	0.100	0.0089	0.0284
	Nickel (Ni)-Total (mg/kg)	1.21	1.00	27.0	4.75	3.25
	Nickel (Ni)-Total (mg/kg ww)	0.528	0.183	9.40	2.10	1.21
	Phosphorus (P)-Total (mg/kg)	998	881	1880	1290	837
	Phosphorus (P)-Total (mg/kg ww)	434	161	656	572	312
	Potassium (K)-Total (mg/kg)	11800	7980	8930	4820	1710
	Potassium (K)-Total (mg/kg ww)	5150	1460	3110	2130	638
	Rubidium (Rb)-Total (mg/kg)	11.2	28.4	21.8	27.9	7.30
	Rubidium (Rb)-Total (mg/kg ww)	4.86	5.21 ^{DLHM}	7.58	12.4	2.72
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	0.058
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	0.021
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0137
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010 ^{DLHM}	0.0012	<0.0010	0.0051
	Sodium (Na)-Total (mg/kg)	<20	<40 ^{DLHM}	<20	<20	104
	Sodium (Na)-Total (mg/kg ww)	<4.0	6.2	<4.0	<4.0	38.7
	Strontium (Sr)-Total (mg/kg)	9.21	3.05	34.2	26.7	10.9
	Strontium (Sr)-Total (mg/kg ww)	4.01	0.558 ^{DLHM}	11.9	11.8	4.07
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0035	<0.0040 ^{DLHM}	0.0023	0.195	0.0326
	Thallium (Tl)-Total (mg/kg ww)	0.00153	<0.00040 ^{DLHM}	0.00080	0.0863	0.0121
	Tin (Sn)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020 ^{DLHM}	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0032	<0.0040 ^{DLHM}	<0.0020	0.0023	0.123
	Uranium (U)-Total (mg/kg ww)	0.00139	<0.00040 ^{DLHM}	0.00056	0.00102	0.0460
	Vanadium (V)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	1.76
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.656
	Zinc (Zn)-Total (mg/kg)	17.8	5.9	132	22.7	40.2
	Zinc (Zn)-Total (mg/kg ww)	7.76	1.08 ^{DLHM}	46.0	10.0	15.0
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.40 ^{DLHM}	<0.20	<0.20	0.69
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.257 ^{DLM}
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.10 ^{DLM}
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.040 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-128 Tissue 02-AUG-14 08:20 14-DDR-05-GR-01	L1497000-130 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01-DUP	L1497000-131 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01-DUP	L1497000-132 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01-DUP	L1497000-133 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01-DUP
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	0.0061	<0.0050	0.0093	0.0114	0.0710
	Mercury (Hg)-Total (mg/kg ww)	0.0022	<0.0010	0.0033	0.0052	0.0236
	Molybdenum (Mo)-Total (mg/kg)	0.666	<0.040 ^{DLHM}	0.310	0.020	0.043
	Molybdenum (Mo)-Total (mg/kg ww)	0.235	<0.0040	0.110	0.0093	0.0142
	Nickel (Ni)-Total (mg/kg)	7.91	1.16	35.3	3.15	1.85
	Nickel (Ni)-Total (mg/kg ww)	2.79	0.205	12.5	1.44	0.614
	Phosphorus (P)-Total (mg/kg)	1480	1000	2260	1080	817
	Phosphorus (P)-Total (mg/kg ww)	521	178	799	492	272
	Potassium (K)-Total (mg/kg)	13900	7610	11000	3830	1530
	Potassium (K)-Total (mg/kg ww)	4910	1350	3880	1750	509
	Rubidium (Rb)-Total (mg/kg)	31.4	28.4	26.0	21.2	5.80
	Rubidium (Rb)-Total (mg/kg ww)	11.1	5.03	9.22	9.71	1.93
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	0.015
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	<0.0050	<0.0050	0.0111
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	0.0011	<0.0010	0.0037
	Sodium (Na)-Total (mg/kg)	<20	<40 ^{DLHM}	<20	<20	112
	Sodium (Na)-Total (mg/kg ww)	6.4	<4.0	<4.0	<4.0	37.4
	Strontium (Sr)-Total (mg/kg)	18.6	2.70	46.8	24.6	12.0
	Strontium (Sr)-Total (mg/kg ww)	6.59	0.478	16.6	11.2	3.98
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	0.0022	<0.0040 ^{DLHM}	0.0045	0.212	0.0232
	Thallium (Tl)-Total (mg/kg ww)	0.00079	<0.00040	0.00160	0.0969	0.00772
	Tin (Sn)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	0.0022	<0.0040 ^{DLHM}	0.0026	0.0024	0.0470
	Uranium (U)-Total (mg/kg ww)	0.00079	<0.00040	0.00091	0.00112	0.0156
	Vanadium (V)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	0.61
	Vanadium (V)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	0.204
	Zinc (Zn)-Total (mg/kg)	29.9	6.1	163	18.3	42.1
	Zinc (Zn)-Total (mg/kg ww)	10.6	1.08	57.6	8.36	14.0
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.40 ^{DLHM}	<0.20	<0.20	0.28
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	<0.040	0.095 ^{DLM}
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.060 ^{DLM}
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-135 Tissue 02-AUG-14 10:30 14-DDR-16A-BERRY-01	L1497000-136 Tissue 02-AUG-14 10:30 14-DDR-16A-WL-01	L1497000-137 Tissue 02-AUG-14 10:30 14-DDR-16A-BR-01	L1497000-138 Tissue 02-AUG-14 10:30 14-DDR-16A-LI-01	L1497000-140 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	0.0085	0.0075	0.0569	0.0054
	Mercury (Hg)-Total (mg/kg ww)	<0.0010	0.0031	0.0033	0.0341	0.0018
	Molybdenum (Mo)-Total (mg/kg)	0.101	0.143	<0.020	0.086	1.03
	Molybdenum (Mo)-Total (mg/kg ww)	0.0132	0.0521	0.0067	0.0513	0.356
	Nickel (Ni)-Total (mg/kg)	2.72	10.1	2.85	2.77	1.28
	Nickel (Ni)-Total (mg/kg ww)	0.355	3.66	1.23	1.66	0.440
	Phosphorus (P)-Total (mg/kg)	1810	2560	2750	1130	1550
	Phosphorus (P)-Total (mg/kg ww)	237	934	1190	677	534
	Potassium (K)-Total (mg/kg)	7630	12200	4980	2290	11200
	Potassium (K)-Total (mg/kg ww)	998	4430	2160	1380	3840
	Rubidium (Rb)-Total (mg/kg)	33.0	18.1	6.35	7.45	11.7
	Rubidium (Rb)-Total (mg/kg ww)	4.31	6.61	2.74	4.47	4.02
	Selenium (Se)-Total (mg/kg)	<0.10 ^{DLHM}	<0.050	0.064	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.010	0.014	0.028	0.029	<0.010
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	0.0054	0.0099	<0.0050
	Silver (Ag)-Total (mg/kg ww)	<0.0010	<0.0010	0.0023	0.0060	<0.0010
	Sodium (Na)-Total (mg/kg)	<40 ^{DLHM}	<20	<20	30	<20
	Sodium (Na)-Total (mg/kg ww)	<4.0	<4.0	<4.0	18.2	<4.0
	Strontium (Sr)-Total (mg/kg)	8.96	104	26.0	7.46	8.19
	Strontium (Sr)-Total (mg/kg ww)	1.17	37.9	11.2	4.47	2.82
	Tellurium (Te)-Total (mg/kg)	<0.040 ^{DLHM}	<0.020	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0040 ^{DLHM}	0.0105	<0.0020	0.0247	<0.0020
	Thallium (Tl)-Total (mg/kg ww)	<0.00040	0.00381	0.00074	0.0148	<0.00040
	Tin (Sn)-Total (mg/kg)	<0.20 ^{DLHM}	<0.10	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0040 ^{DLHM}	0.0087	0.0031	0.134	<0.0020
	Uranium (U)-Total (mg/kg ww)	<0.00040	0.00319	0.00134	0.0803	0.00046
	Vanadium (V)-Total (mg/kg)	<0.20 ^{DLHM}	0.12	<0.10	1.63	<0.10
	Vanadium (V)-Total (mg/kg ww)	<0.020	0.045	<0.020	0.978	<0.020
	Zinc (Zn)-Total (mg/kg)	17.6	49.3	119	25.9	28.8
	Zinc (Zn)-Total (mg/kg ww)	2.30	18.0	51.4	15.5	9.91
	Zirconium (Zr)-Total (mg/kg)	<0.40 ^{DLHM}	<0.20	<0.20	0.75	<0.20
	Zirconium (Zr)-Total (mg/kg ww)	<0.040	<0.040	<0.040	0.449	<0.040
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-141 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01-DUP	L1497000-143 Tissue 02-AUG-14 12:30 14-DDR-28-BERRY-01	L1497000-144 Tissue 02-AUG-14 12:30 14-DDR-28-WL-01	L1497000-145 Tissue 02-AUG-14 12:30 14-DDR-28-BR-01	L1497000-146 Tissue 02-AUG-14 12:30 14-DDR-28-LI-01
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050	<0.0050	0.0129	0.0090	0.0408
	Mercury (Hg)-Total (mg/kg ww)	0.0017	<0.0010	0.0052	0.0038	0.0358
	Molybdenum (Mo)-Total (mg/kg)	0.946	0.045	0.287	<0.020	0.143
	Molybdenum (Mo)-Total (mg/kg ww)	0.359	0.0075	0.115	0.0061	0.125
	Nickel (Ni)-Total (mg/kg)	1.30	0.68	11.3	3.68	3.20
	Nickel (Ni)-Total (mg/kg ww)	0.493	0.113	4.51	1.56	2.80
	Phosphorus (P)-Total (mg/kg)	1470	877	1730	1610	754
	Phosphorus (P)-Total (mg/kg ww)	557	147	693	678	661
	Potassium (K)-Total (mg/kg)	10700	8110	9340	6530	2100
	Potassium (K)-Total (mg/kg ww)	4050	1360	3740	2760	1840
	Rubidium (Rb)-Total (mg/kg)	10.2	20.2	8.89	8.11	7.31
	Rubidium (Rb)-Total (mg/kg ww)	3.86	3.38	3.56	3.42	6.40
	Selenium (Se)-Total (mg/kg)	<0.050	<0.10 ^{DLHM}	<0.050	<0.050	<0.050
	Selenium (Se)-Total (mg/kg ww)	<0.020 ^{DLIS}	<0.010	<0.010	<0.010	0.040
	Silver (Ag)-Total (mg/kg)	<0.0050	<0.0050	0.0065	0.0080	0.0162
	Silver (Ag)-Total (mg/kg ww)	<0.0020 ^{DLIS}	<0.0010 ^{DLHM}	0.0026	0.0034	0.0142
	Sodium (Na)-Total (mg/kg)	<20	<40 ^{DLHM}	<20	<20	66
	Sodium (Na)-Total (mg/kg ww)	<8.0 ^{DLIS}	<4.0	<4.0	<4.0	58.2
	Strontium (Sr)-Total (mg/kg)	8.99	1.28	33.6	12.6	10.9
	Strontium (Sr)-Total (mg/kg ww)	3.41	0.214	13.5	5.33	9.53
	Tellurium (Te)-Total (mg/kg)	<0.020	<0.040 ^{DLHM}	<0.020	<0.020	<0.020
	Tellurium (Te)-Total (mg/kg ww)	<0.0080 ^{DLIS}	<0.0040 ^{DLHM}	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg)	<0.0020	<0.0040 ^{DLHM}	<0.0020	0.0022	0.0110
	Thallium (Tl)-Total (mg/kg ww)	<0.00080 ^{DLIS}	<0.00040 ^{DLHM}	0.00076	0.00093	0.00961
	Tin (Sn)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	<0.10
	Tin (Sn)-Total (mg/kg ww)	<0.040 ^{DLIS}	0.031 ^{DLHM}	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg)	<0.0020	<0.0040 ^{DLHM}	0.0032	<0.0020	0.179
	Uranium (U)-Total (mg/kg ww)	<0.00080 ^{DLIS}	<0.00040 ^{DLHM}	0.00129	0.00079	0.157
	Vanadium (V)-Total (mg/kg)	<0.10	<0.20 ^{DLHM}	<0.10	<0.10	0.46
	Vanadium (V)-Total (mg/kg ww)	<0.040 ^{DLIS}	<0.020	<0.020	<0.020	0.405
	Zinc (Zn)-Total (mg/kg)	28.0	9.0	40.2	88.3	28.9
	Zinc (Zn)-Total (mg/kg ww)	10.6	1.51 ^{DLHM}	16.1	37.3	25.3
	Zirconium (Zr)-Total (mg/kg)	<0.20	<0.40 ^{DLHM}	<0.20	<0.20	0.38
	Zirconium (Zr)-Total (mg/kg ww)	<0.080 ^{DLIS}	<0.040	<0.040	<0.040	0.333 ^{DLM}
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.080 ^{DLM}
	Acenaphthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.070 ^{DLM}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-147 Tissue 02-AUG-14 12:30 14-DDR-28-GR-01				
Grouping	Analyte					
TISSUE						
Metals	Mercury (Hg)-Total (mg/kg)	<0.0050				
	Mercury (Hg)-Total (mg/kg ww)	0.0021				
	Molybdenum (Mo)-Total (mg/kg)	0.377				
	Molybdenum (Mo)-Total (mg/kg ww)	0.163				
	Nickel (Ni)-Total (mg/kg)	3.61				
	Nickel (Ni)-Total (mg/kg ww)	1.56				
	Phosphorus (P)-Total (mg/kg)	1100				
	Phosphorus (P)-Total (mg/kg ww)	477				
	Potassium (K)-Total (mg/kg)	11200				
	Potassium (K)-Total (mg/kg ww)	4850				
	Rubidium (Rb)-Total (mg/kg)	17.4				
	Rubidium (Rb)-Total (mg/kg ww)	7.49				
	Selenium (Se)-Total (mg/kg)	<0.050				
	Selenium (Se)-Total (mg/kg ww)	<0.020 ^{RRR}				
	Silver (Ag)-Total (mg/kg)	<0.0050				
	Silver (Ag)-Total (mg/kg ww)	<0.0020 ^{RRR}				
	Sodium (Na)-Total (mg/kg)	<20				
	Sodium (Na)-Total (mg/kg ww)	<8.0 ^{RRR}				
	Strontium (Sr)-Total (mg/kg)	11.3				
	Strontium (Sr)-Total (mg/kg ww)	4.87				
	Tellurium (Te)-Total (mg/kg)	<0.020				
	Tellurium (Te)-Total (mg/kg ww)	<0.0080 ^{RRR}				
	Thallium (Tl)-Total (mg/kg)	0.0020				
	Thallium (Tl)-Total (mg/kg ww)	0.00088				
	Tin (Sn)-Total (mg/kg)	<0.10				
	Tin (Sn)-Total (mg/kg ww)	<0.040 ^{RRR}				
	Uranium (U)-Total (mg/kg)	<0.0020				
	Uranium (U)-Total (mg/kg ww)	<0.00080 ^{RRR}				
	Vanadium (V)-Total (mg/kg)	<0.10				
	Vanadium (V)-Total (mg/kg ww)	<0.040 ^{RRR}				
	Zinc (Zn)-Total (mg/kg)	19.0				
	Zinc (Zn)-Total (mg/kg ww)	8.23				
	Zirconium (Zr)-Total (mg/kg)	<0.20				
	Zirconium (Zr)-Total (mg/kg ww)	<0.080 ^{RRR}				
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/kg)	<0.050				
	Acenaphthene (mg/kg ww)	<0.010				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-2 Tissue 29-JUL-14 10:39 14-DDR-06-BERRY-01	L1497000-3 Tissue 29-JUL-14 10:39 14-DDR-06-BR-01	L1497000-4 Tissue 29-JUL-14 10:39 14-DDR-06-WL-01	L1497000-5 Tissue 29-JUL-14 10:39 14-DDR-06-LI-01	L1497000-6 Tissue 29-JUL-14 10:39 14-DDR-06-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.020 ^{DLM}	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.030 ^{DLM}	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.020	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.30 ^{DLM}	<0.30 ^{DLM}	<0.050	<0.20 ^{DLM}
	Fluorene (mg/kg wwt)	<0.010	<0.090 ^{DLM}	<0.10 ^{DLM}	<0.010	<0.050 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.070 ^{DLM}	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.020	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010 ^{DLM}	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.060 ^{DLM}	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.050 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	101.7	Not Reportable ^{SMI}	119.4	93.0	80.3
	Surrogate: Chrysene d12 (%)	87.3	98.2 ^{SMI}	109.5	85.9	84.5
	Surrogate: Naphthalene d8 (%)	127.7	Not Reportable	112.3	84.4	80.8
	Surrogate: Phenanthrene d10 (%)	83.0	109.0	101.7	79.7	80.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-8 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01	L1497000-9 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01	L1497000-10 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01	L1497000-11 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01	L1497000-12 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.090 ^{DLM}	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.050 ^{DLM}	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.070 ^{DLM}	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.20 ^{DLM}	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.20 ^{DLM}	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.30 ^{DLM}	<0.070 ^{DLM}	<0.050	<0.30 ^{DLM}
	Fluorene (mg/kg wwt)	<0.010	<0.20 ^{DLM}	<0.040 ^{DLM}	<0.010	<0.090 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<4.0 ^{DLM}	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.40 ^{DLM}	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.90 ^{DLM}	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.50 ^{DLM}	<0.010	<0.020 ^{DLM}
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.060 ^{DLM}	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{SMI}	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	101.1	114.6	Not Reportable	103.0	117.0
	Surrogate: Chrysene d12 (%)	90.3	102.9	92.7 ^{SMI}	95.9	115.1
	Surrogate: Naphthalene d8 (%)	86.0	87.9	Not Reportable ^{SMI}	91.4	128.2
	Surrogate: Phenanthrene d10 (%)	79.4	78.5	Not Reportable ^{SMI}	102.8	104.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-14 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01-DUP	L1497000-15 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01-DUP	L1497000-16 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01-DUP	L1497000-17 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01-DUP	L1497000-18 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01-DUP
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.080 ^{DLM}	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.10 ^{DLM}	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.060 ^{DLM}	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.060 ^{DLM}	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.080 ^{DLM}	<0.050	<0.20 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.040 ^{DLM}	<0.010	<0.070 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050 ^{DLM}	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.020 ^{DLM}	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.20 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.010	<0.080 ^{DLM}	<0.010	<0.20 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<2.0 ^{DLM}	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.20 ^{DLM}	<0.010	<0.010	<0.010 ^{DLM}	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.80 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.40 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010 ^{SMI}	<0.010
	Surrogate: Acenaphthene d10 (%)	103.6	122.5	106.9	Not Reportable	118.3
	Surrogate: Chrysene d12 (%)	89.5	102.6	100.3	99.4 ^{SMI}	110.9
	Surrogate: Naphthalene d8 (%)	95.5	103.3	102.2	Not Reportable ^{SMI}	113.3
	Surrogate: Phenanthrene d10 (%)	88.0	96.3	107.3	Not Reportable ^{SMI}	103.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-20 Tissue 29-JUL-14 15:13 14-DDR-11A-BERRY-01	L1497000-21 Tissue 29-JUL-14 15:13 14-DDR-11A-BR-01	L1497000-22 Tissue 29-JUL-14 15:13 14-DDR-11A-LI-01	L1497000-23 Tissue 29-JUL-14 15:13 14-DDR-11A-GR-01	L1497000-25 Tissue 29-JUL-14 15:13 14-DDR-11B-WL-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010 ^{DLM}	<0.20 ^{DLM}	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.020
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.060 ^{DLM}	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.070 ^{DLM}
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.30 ^{DLM}	<0.20 ^{DLM}
	Fluorene (mg/kg wwt)	<0.010	<0.070 ^{DLM}	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.060 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.050	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	104.3	106.1	108.7	117.0	76.3
	Surrogate: Chrysene d12 (%)	94.3	97.8	80.8	104.1	72.5
	Surrogate: Naphthalene d8 (%)	101.1	108.9	95.0	112.3	69.5
	Surrogate: Phenanthrene d10 (%)	85.2	114.0	92.6	108.8	67.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-27 Tissue 30-JUL-14 09:00 14-DDR-19-BERRY-01	L1497000-28 Tissue 30-JUL-14 09:00 14-DDR-19-WL-01	L1497000-29 Tissue 30-JUL-14 09:00 14-DDR-19-BR-01	L1497000-30 Tissue 30-JUL-14 09:00 14-DDR-19-LI-01	L1497000-31 Tissue 30-JUL-14 09:00 14-DDR-19-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.20 ^{DLM}	<0.050	<0.060 ^{DLM}	<0.30 ^{DLM}	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.030 ^{DLM}	<0.30 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.10 ^{DLM}	<0.050 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.050 ^{DLM}	<0.020 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.080 ^{DLM}	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.050 ^{DLM}	<0.070 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050 ^{DLM}	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.050 ^{DLM}	<0.020 ^{DLM}	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.40 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.20 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.50 ^{DLM}	<0.40 ^{DLM}	<0.050	<0.30 ^{DLM}
	Fluorene (mg/kg wwt)	<0.010	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.030 ^{DLM}	<0.20 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.10 ^{DLM}	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.050 ^{DLM}	<0.010	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	102.3	101.0	101.7	118.5	98.2
	Surrogate: Chrysene d12 (%)	109.5	115.4	125.1	82.6	84.8
	Surrogate: Naphthalene d8 (%)	Not Reportable ^{SMI}	108.1	Not Reportable ^{SMI}	Not Reportable ^{SMI}	86.8
	Surrogate: Phenanthrene d10 (%)	90.4	94.3	105.8	95.7	78.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-33 Tissue 30-JUL-14 12:15 14-DDR-14A-WL-01	L1497000-34 Tissue 30-JUL-14 12:15 14-DDR-14A-BR-01	L1497000-35 Tissue 30-JUL-14 12:15 14-DDR-14A-GR-01	L1497000-37 Tissue 30-JUL-14 12:45 14-DDR-14B-BERRY-01	L1497000-38 Tissue 30-JUL-14 12:45 14-DDR-14B-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.080 ^{DLM}	<0.090 ^{DLM}	<0.20 ^{DLM}	<0.050	<0.080 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.040 ^{DLM}	<0.040 ^{DLM}	<0.050 ^{DLM}	<0.010	<0.080 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.090 ^{DLM}	<0.050	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.30 ^{DLM}	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.20 ^{DLM}	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.60 ^{DLM}	<0.60 ^{DLM}	<0.60 ^{DLM}	<0.050	<0.050
	Fluorene (mg/kg wwt)	<0.30 ^{DLM}	<0.30 ^{DLM}	<0.20 ^{DLM}	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.090 ^{DLM}	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.040 ^{DLM}	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.080 ^{DLM}	<0.050	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	103.6	119.3	111.7	108.7	Not Reportable ^{SMI}
	Surrogate: Chrysene d12 (%)	91.3	115.7	86.8	94.5	Not Reportable ^{SMI}
	Surrogate: Naphthalene d8 (%)	108.7	Not Reportable	103.1	96.5	
	Surrogate: Phenanthrene d10 (%)	92.2	105.5	98.9	95.7	Not Reportable ^{SMI}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-40 Tissue 30-JUL-14 13:54 14-DDR-12-BERRY-01	L1497000-41 Tissue 30-JUL-14 13:54 14-DDR-12-WL-01	L1497000-42 Tissue 30-JUL-14 13:54 14-DDR-12-LT-01	L1497000-43 Tissue 30-JUL-14 13:54 14-DDR-12-LI-01	L1497000-44 Tissue 30-JUL-14 13:54 14-DDR-12-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.080 ^{DLM}	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.080 ^{DLM}	<0.010	<0.020 ^{DLM}
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.40 ^{DLM}	<0.30 ^{DLM}	<0.30 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.070 ^{DLM}	<0.20 ^{DLM}	<0.30 ^{DLM}	<0.10 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.30 ^{DLM}	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.20 ^{DLM}	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.20 ^{DLM}	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.030 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.40 ^{DLM}	<0.30 ^{DLM}	<0.050	<0.050
	Fluorene (mg/kg wwt)	<0.010	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.020 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<5.0 ^{DLM}	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<3.0 ^{DLM}	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.20 ^{DLM}	<0.050	<0.050	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.030 ^{DLM}	<0.010	<0.030 ^{DLM}	<0.010	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	114.0	101.2	Not Reportable ^{SMI}	87.6	Not Reportable ^{SMI}
	Surrogate: Chrysene d12 (%)	109.3	109.0	99.3 ^{SMI}	86.8	98.6
	Surrogate: Naphthalene d8 (%)	105.4	92.6	Not Reportable ^{SMI}	90.0	105.4
	Surrogate: Phenanthrene d10 (%)	107.3	92.7	Not Reportable ^{SMI}	80.4	88.5

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-47 Tissue 31-JUL-14 08:50 14-DDR-24-BERRY-01	L1497000-48 Tissue 31-JUL-14 08:50 14-DDR-24-WL-01	L1497000-49 Tissue 31-JUL-14 08:50 14-DDR-24-BR-01	L1497000-50 Tissue 31-JUL-14 08:50 14-DDR-24-LI-01	L1497000-51 Tissue 31-JUL-14 08:50 14-DDR-24-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<1.5 ^{DLM}	<0.050	<0.50 ^{DLM}	<0.50 ^{DLM}	<0.20 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.30 ^{DLM}	<0.010	<0.20 ^{DLM}	<0.40 ^{DLM}	<0.070 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.090 ^{DLM}	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.050 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.070 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.30 ^{DLM}	<0.050	<0.050
	Fluorene (mg/kg wwt)	<0.010	<0.080 ^{DLM}	<0.10 ^{DLM}	<0.020 ^{DLM}	<0.020 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{SMI}	<0.010 ^{SMI}	<0.010 ^{SMI}
	Surrogate: Acenaphthene d10 (%)	111.5	124.8	Not Reportable	Not Reportable	Not Reportable
	Surrogate: Chrysene d12 (%)	106.4	124.4	125.8	122.7	91.0
	Surrogate: Naphthalene d8 (%)	94.1	96.9	126.1	106.4	108.6
	Surrogate: Phenanthrene d10 (%)	92.1	98.9	96.3	95.8	97.8

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-53 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-01	L1497000-54 Tissue 31-JUL-14 10:25 14-DDR-26-BERRY-02	L1497000-55 Tissue 31-JUL-14 10:25 14-DDR-26-WL-01	L1497000-56 Tissue 31-JUL-14 10:25 14-DDR-26-LT-01	L1497000-57 Tissue 31-JUL-14 10:25 14-DDR-26-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.080 ^{DLM}	<0.050
	Acenaphthylene (mg/kg ww)	<0.010	<0.010	<0.010	<0.040 ^{DLM}	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.30 ^{DLM}	<0.050
	Anthracene (mg/kg ww)	<0.010	<0.010	<0.010	<0.20 ^{DLM}	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050 ^{DLM}	<0.20 ^{DLM}	<0.050	<0.050	<0.20 ^{DLM}
	Benzo(a)pyrene (mg/kg ww)	<0.020 ^{DLM}	<0.020 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.30 ^{DLM}	<0.050	<0.070 ^{DLM}	<0.30 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg ww)	<0.040 ^{DLM}	<0.010	<0.030 ^{DLM}	<0.20 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.030 ^{DLM}
	Chrysene (mg/kg)	<0.050	<0.050	<0.30 ^{DLM}	<0.050	<0.050
	Chrysene (mg/kg ww)	<0.010	<0.010	<0.090 ^{DLM}	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.050	<0.30 ^{DLM}	<0.80 ^{DLM}	<0.050 ^{DLM}
	Fluorene (mg/kg ww)	<0.010	<0.010	<0.090 ^{DLM}	<0.40 ^{DLM}	<0.030 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.70 ^{DLM}	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg ww)	<0.010	<0.10 ^{DLM}	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg ww)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Phenanthrene (mg/kg ww)	<0.010	<0.010	<0.010	<0.060 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg ww)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	109.1	106.4	80.8	Not reportable ^{SMI}	94.6
	Surrogate: Chrysene d12 (%)	104.7	92.5	78.4	110.1 ^{SMI}	90.4
	Surrogate: Naphthalene d8 (%)	113.7	90.0	77.4	Not reportable ^{SMI}	94.3
	Surrogate: Phenanthrene d10 (%)	88.6	86.4	75.5	Not reportable ^{SMI}	106.4

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1497000-58 Tissue 31-JUL-14 10:25 14-DDR-26-GR-01	L1497000-60 Tissue 31-JUL-14 12:15 14-DDR-30A-BERRY-01	L1497000-73 Tissue 31-JUL-14 12:15 14-DDR-30A-BR-01	L1497000-74 Tissue 31-JUL-14 12:15 14-DDR-30A-GR-01	L1497000-76 Tissue 31-JUL-14 12:40 14-DDR-30B-WL-01
Grouping	Analyte						
TISSUE							
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.060 ^{DLM}	<0.050	<0.060 ^{DLM}	
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.030 ^{DLM}	
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010 ^{DLM}	
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.080 ^{DLM}	<0.050	<0.060 ^{DLM}	
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.030 ^{DLM}	
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050 ^{DLM}	
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}	
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Fluoranthene (mg/kg wwt)	<0.010 ^{DLM}	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010 ^{DLM}	
	Fluorene (mg/kg)	<0.060 ^{DLM}	<0.050	<0.30 ^{DLM}	<0.40 ^{DLM}	<0.20 ^{DLM}	
	Fluorene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.080 ^{DLM}	
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}	<0.050	
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}	<0.010	
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010	
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.070 ^{DLM}	<0.050	<0.050	
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.010	
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Surrogate: Acenaphthene d10 (%)	104.4	96.8	104.6	115.1	96.8	
	Surrogate: Chrysene d12 (%)	89.0	88.3	96.8	98.9	87.3	
	Surrogate: Naphthalene d8 (%)	83.8	99.9	124.2	111.4	110.9	
	Surrogate: Phenanthrene d10 (%)	88.4	83.0	115.0	109.1	87.2	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-77 Tissue 31-JUL-14 12:40 14-DDR-30B-LI-01	L1497000-79 Tissue 31-JUL-14 13:49 14-DDR-23-BERRY-01	L1497000-80 Tissue 31-JUL-14 13:49 14-DDR-23-WL-01	L1497000-81 Tissue 31-JUL-14 13:49 14-DDR-23-LT-01	L1497000-82 Tissue 31-JUL-14 13:49 14-DDR-23-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.030 ^{DLM}	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Anthracene (mg/kg)	<0.050 ^{DLM}	<0.050	<0.050	<0.060 ^{DLM}	<0.050 ^{DLM}
	Anthracene (mg/kg wwt)	<0.020	<0.010	<0.010	<0.030 ^{DLM}	<0.020 ^{DLM}
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050 ^{DLM}	<0.30 ^{DLM}	<0.30 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.30 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.070 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.040 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.20 ^{DLM}
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.010	<0.010	<0.070 ^{DLM}	<0.030 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.070 ^{DLM}	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Phenanthrene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}	<0.20 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	Not reportable ^{SMI}	Not Reportable ^{SMI}	Not Reportable ^{SMI}	Not Reportable ^{SMI}	Not Reportable ^{SMI}
	Surrogate: Chrysene d12 (%)	107.5	121.2	105.2	81.2 ^{SMI}	107.2
	Surrogate: Naphthalene d8 (%)	95.5	117.0	103.9	Not Reportable ^{SMI}	99.9
	Surrogate: Phenanthrene d10 (%)	82.0	107.7	93.6	Not Reportable ^{SMI}	99.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-83 Tissue 31-JUL-14 13:49 14-DDR-23-GR-01	L1497000-85 Tissue 01-AUG-14 08:12 14-DDR-10A-WL-01	L1497000-86 Tissue 01-AUG-14 08:12 14-DDR-10A-LT-01	L1497000-87 Tissue 01-AUG-14 08:12 14-DDR-10A-LI-01	L1497000-89 Tissue 01-AUG-14 08:40 14-DDR-10B-BERRY-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.070 ^{DLM}	<0.050 ^{DLM}	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.040 ^{DLM}	<0.020 ^{DLM}	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.50 ^{DLM}	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.30 ^{DLM}	<0.010	<0.010 ^{DLM}	<0.020 ^{DLM}	<0.010 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050 ^{DLM}	<0.20 ^{DLM}	<0.050 ^{DLM}	<0.20 ^{DLM}
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.020 ^{DLM}	<0.090 ^{DLM}	<0.020 ^{DLM}	<0.020 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.080 ^{DLM}	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	Fluorene (mg/kg)	<0.20 ^{DLM}	<0.050 ^{DLM}	<0.070 ^{DLM}	<0.050	<0.050
	Fluorene (mg/kg wwt)	<0.050 ^{DLM}	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.40 ^{DLM}	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.20 ^{DLM}	<0.010	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{SMI}	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	Not Reportable	98.3	Not Reportable	103.1	105.1
	Surrogate: Chrysene d12 (%)	112.8	93.4	104.4 ^{SMI}	102.3	93.5 ^{SMI}
	Surrogate: Naphthalene d8 (%)	108.1	97.3	Not Reportable	100.5	Not Reportable
	Surrogate: Phenanthrene d10 (%)	106.5	83.5	126.3	93.4	94.6

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-90 Tissue 01-AUG-14 08:40 14-DDR-10B-GR-01	L1497000-92 Tissue 01-AUG-14 09:36 14-DDR-02A-BERRY-01	L1497000-93 Tissue 01-AUG-14 09:36 14-DDR-02A-LT-01	L1497000-94 Tissue 01-AUG-14 09:36 14-DDR-02A-LI-01	L1497000-95 Tissue 01-AUG-14 09:36 14-DDR-02A-GR-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.070 ^{DLM}	<0.090 ^{DLM}	<0.050
	Acenaphthylene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.040 ^{DLM}	<0.070	<0.010
	Anthracene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.090 ^{DLM}	<0.010	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.060 ^{DLM}	<0.30 ^{DLM}	<0.050	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.20 ^{DLM}	<0.030 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.070 ^{DLM}	<0.050	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.040 ^{DLM}	<0.010	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.30 ^{DLM}	<0.050	<0.60 ^{DLM}	<0.050	<0.20 ^{DLM}
	Fluorene (mg/kg wwt)	<0.090 ^{DLM}	<0.010	<0.40	<0.010	<0.050 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.70 ^{DLM}	<0.050	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.40 ^{DLM}	<0.010	<0.010
	Naphthalene (mg/kg)	<0.30 ^{DLM}	<0.050	<0.050 ^{DLM}	<0.050	<0.20 ^{DLM}
	Naphthalene (mg/kg wwt)	<0.080 ^{DLM}	<0.010	<0.020 ^{DLM}	<0.010	<0.060 ^{DLM}
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.090 ^{DLM}	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.050 ^{DLM}	<0.020 ^{DLM}	<0.010
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{SMI}	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	120.0	101.0	Not reportable	105.8	124.6
	Surrogate: Chrysene d12 (%)	114.0	85.2	100.1 ^{SMI}	103.8	107.2
	Surrogate: Naphthalene d8 (%)	106.2	92.3	Not reportable ^{SMI}	110.4	104.2
	Surrogate: Phenanthrene d10 (%)	105.8	89.2	Not reportable ^{SMI}	105.3	98.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-97 Tissue 01-AUG-14 10:15 14-DDR-02B-WL-01	L1497000-112 Tissue 01-AUG-14 11:15 14-DDR-03-BERRY-01	L1497000-113 Tissue 01-AUG-14 11:15 14-DDR-03-WL-01	L1497000-114 Tissue 01-AUG-14 11:15 14-DDR-03-LT-01	L1497000-115 Tissue 01-AUG-14 11:15 14-DDR-03-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.090 ^{DLM}	<0.060 ^{DLM}
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.050 ^{DLM}	<0.040 ^{DLM}
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050 ^{DLM}
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.070 ^{DLM}	<0.030 ^{DLM}
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050 ^{DLM}	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.20 ^{DLM}	<0.050 ^{DLM}
	Benzo(b)fluoranthene (mg/kg wwt)	<0.020 ^{DLM}	<0.030 ^{DLM}	<0.030 ^{DLM}	<0.081 ^{DLM}	<0.010 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.20 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010 ^{DLM}	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010
	Fluorene (mg/kg)	<0.50 ^{DLM}	<0.050	<0.20 ^{DLM}	<0.50 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.20 ^{DLM}	<0.010	<0.070 ^{DLM}	<0.30 ^{DLM}	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<2.0 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.60 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.090 ^{DLM}	<0.70 ^{DLM}
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.050 ^{DLM}	<0.50 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010 ^{SMI}	<0.010
	Surrogate: Acenaphthene d10 (%)	116.4	125.7	127.8	Not Reportable	103.8
	Surrogate: Chrysene d12 (%)	119.6	85.9	104.1	107.8 ^{SMI}	103.4
	Surrogate: Naphthalene d8 (%)	115.0	114.7	102.2	Not Reportable ^{SMI}	97.0
	Surrogate: Phenanthrene d10 (%)	108.3	80.7	100.0	Not Reportable ^{SMI}	99.4

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-116 Tissue 01-AUG-14 11:15 14-DDR-03-GR-01	L1497000-118 Tissue 01-AUG-14 13:03 14-DDR-09-BERRY-01	L1497000-119 Tissue 01-AUG-14 13:03 14-DDR-09-WL-01	L1497000-120 Tissue 01-AUG-14 13:03 14-DDR-09-LT-01	L1497000-121 Tissue 01-AUG-14 13:03 14-DDR-09-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.070 ^{DLM}
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.10 ^{DLM}	<0.060 ^{DLM}
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.070 ^{DLM}	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.30 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.020 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.080 ^{DLM}	<0.020 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.070 ^{DLM}	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.040 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.080 ^{DLM}	<0.050	<0.20 ^{DLM}	<0.20 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.040 ^{DLM}	<0.010	<0.090 ^{DLM}	<0.070 ^{DLM}	<0.020 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.050 ^{DLM}	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.030 ^{DLM}	<0.010	<0.030 ^{DLM}	<0.030
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.070 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}	<0.030 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	124.9	108.5	113.1	115.2	106.6
	Surrogate: Chrysene d12 (%)	114.0	85.3	95.8	114.0	102.1
	Surrogate: Naphthalene d8 (%)	101.7	121.6	111.1	Not Reportable ^{SMI}	101.6
	Surrogate: Phenanthrene d10 (%)	98.7	87.0	99.2	Not Reportable ^{SMI}	102.8

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-122 Tissue 01-AUG-14 13:03 14-DDR-09-GR-01	L1497000-124 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01	L1497000-125 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01	L1497000-126 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01	L1497000-127 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.080 ^{DLM}	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.040 ^{DLM}	<0.020 ^{DLM}
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.090 ^{DLM}	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.040 ^{DLM}	<0.010
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.060 ^{DLM}	<0.60 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	0.213
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.30 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.040 ^{DLM}	<0.020 ^{DLM}	<0.20 ^{DLM}	<0.020 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.40 ^{DLM}
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.080 ^{DLM}	<0.030 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.060 ^{DLM}	<0.050
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.010
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}
	Fluorene (mg/kg)	<0.050	<0.050	<0.20 ^{DLM}	<0.060 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.020 ^{DLM}	<0.010	<0.040 ^{DLM}	<0.030 ^{DLM}	<0.020 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.030 ^{DLM}	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<2.0 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.50 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.060 ^{DLM}	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.020 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}
	Surrogate: Acenaphthene d10 (%)	125.9	105.2	115.8	113.2	Not reportable ^{SMI}
	Surrogate: Chrysene d12 (%)	107.3	84.2	99.0	107.7 ^{SMI}	101.2
	Surrogate: Naphthalene d8 (%)	103.5	112.9	107.3	Not Reportable ^{SMI}	103.0
	Surrogate: Phenanthrene d10 (%)	99.9	83.1	95.2	Not Reportable ^{SMI}	99.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-128 Tissue 02-AUG-14 08:20 14-DDR-05-GR-01	L1497000-130 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01-DUP	L1497000-131 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01-DUP	L1497000-132 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01-DUP	L1497000-133 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01-DUP
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.040 ^{DLM}
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<2.0 ^{DLM}
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.50 ^{DLM}
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.20 ^{DLM}	<0.050	<0.20 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.040 ^{DLM}	<0.020 ^{DLM}	<0.070 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.20 ^{DLM}
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.040 ^{DLM}
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Fluorene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.060 ^{DLM}
	Fluorene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.30 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.20 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	103.6	104.9	82.7	Not Reportable	Not reportable ^{SMI}
	Surrogate: Chrysene d12 (%)	91.0	80.7	69.4	95.6	117.4
	Surrogate: Naphthalene d8 (%)	94.6	108.7	68.1	Not Reportable	119.9
	Surrogate: Phenanthrene d10 (%)	83.3	79.2	62.7	125.2	108.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-135	L1497000-136	L1497000-137	L1497000-138	L1497000-140
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14
		Sampled Time	10:30	10:30	10:30	10:30	11:00
		Client ID	14-DDR-16A-BERRY-01	14-DDR-16A-WL-01	14-DDR-16A-BR-01	14-DDR-16A-LI-01	14-DDR-16B-GR-01
Grouping	Analyte						
TISSUE							
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<2.0 ^{DLM}	<0.20 ^{DLM}	<0.050	
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010	<0.50 ^{DLM}	<0.20 ^{DLM}	<0.010	
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010	
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.20 ^{DLM}	<0.050	
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.070 ^{DLM}	<0.010	
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Dibenz(a,h)anthracene (mg/kg)	<1.0 ^{DLM}	<0.050	<0.050	<0.050	<0.050	
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.20 ^{DLM}	<0.010	<0.010	<0.010	<0.010	
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Fluorene (mg/kg)	<0.050	<0.050	<0.090 ^{DLM}	<0.050	<0.050	
	Fluorene (mg/kg wwt)	<0.010	<0.020 ^{DLM}	<0.040 ^{DLM}	<0.020 ^{DLM}	<0.020 ^{DLM}	
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<3.0 ^{DLM}	<0.050	<0.050	<0.090 ^{DLM}	<0.050	
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.40 ^{DLM}	<0.010	<0.010	<0.060 ^{DLM}	<0.010	
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050	
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.070	<0.050	
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.050 ^{DLM}	<0.010	
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050	
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010	
	Surrogate: Acenaphthene d10 (%)	103.9	101.3	127.1	107.4	117.5	
	Surrogate: Chrysene d12 (%)	81.1	74.0	100.5	82.6	91.0	
	Surrogate: Naphthalene d8 (%)	98.0	92.2	125.6	87.3	88.3	
	Surrogate: Phenanthrene d10 (%)	85.0	97.5	92.5	96.8	84.0	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-141 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01-DUP	L1497000-143 Tissue 02-AUG-14 12:30 14-DDR-28-BERRY-01	L1497000-144 Tissue 02-AUG-14 12:30 14-DDR-28-WL-01	L1497000-145 Tissue 02-AUG-14 12:30 14-DDR-28-BR-01	L1497000-146 Tissue 02-AUG-14 12:30 14-DDR-28-LI-01
Grouping	Analyte					
TISSUE						
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Acenaphthylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}
	Anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050 ^{DLM}
	Anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.030 ^{DLM}
	Benz(a)anthracene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050 ^{DLM}
	Benz(a)anthracene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}
	Benzo(a)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Benzo(a)pyrene (mg/kg wwt)	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010
	Benzo(b)fluoranthene (mg/kg)	<0.050	<0.30 ^{DLM}	<0.070 ^{DLM}	<0.080 ^{DLM}	<0.050
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010	<0.040 ^{DLM}	<0.030 ^{DLM}	<0.040 ^{DLM}	<0.010
	Benzo(g,h,i)perylene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010 ^{DLM}
	Benzo(k)fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.080 ^{DLM}	<0.20 ^{DLM}
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.030 ^{DLM}	<0.10 ^{DLM}
	Chrysene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chrysene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Dibenz(a,h)anthracene (mg/kg)	<0.050	<0.050	<0.050 ^{DLM}	<0.050	<0.050
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010	<0.010	<0.020 ^{DLM}	<0.010	<0.010
	Fluoranthene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Fluoranthene (mg/kg wwt)	<0.010	<0.010	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.010
	Fluorene (mg/kg)	<0.050	<0.050	<0.060 ^{DLM}	<0.30 ^{DLM}	<0.050
	Fluorene (mg/kg wwt)	<0.010	<0.010	<0.030 ^{DLM}	<0.010	<0.010
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050 ^{DLM}
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.020 ^{DLM}
	2-methylnaphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.050
	2-methylnaphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.010
	Naphthalene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Naphthalene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010 ^{DLM}
	Phenanthrene (mg/kg)	<0.050	<0.050	<0.050	<0.050 ^{DLM}	<0.40 ^{DLM}
	Phenanthrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.020 ^{DLM}	<0.40 ^{DLM}
	Pyrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Pyrene (mg/kg wwt)	<0.010	<0.010	<0.010	<0.010	<0.010
	Surrogate: Acenaphthene d10 (%)	98.6	94.2	94.0	118.6	97.0
	Surrogate: Chrysene d12 (%)	101.1	85.3	76.4	83.6	73.5
	Surrogate: Naphthalene d8 (%)	120.4	112.3	83.7	92.5	76.3
	Surrogate: Phenanthrene d10 (%)	95.8	87.3	79.2	87.0	83.7

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1497000-147 Tissue 02-AUG-14 12:30 14-DDR-28-GR-01				
Grouping	Analyte						
TISSUE							
Polycyclic Aromatic Hydrocarbons	Acenaphthylene (mg/kg)	<0.050					
	Acenaphthylene (mg/kg wwt)	<0.010					
	Anthracene (mg/kg)	<0.050					
	Anthracene (mg/kg wwt)	<0.010					
	Benz(a)anthracene (mg/kg)	<0.050					
	Benz(a)anthracene (mg/kg wwt)	<0.010					
	Benzo(a)pyrene (mg/kg)	<0.050					
	Benzo(a)pyrene (mg/kg wwt)	<0.010					
	Benzo(b)fluoranthene (mg/kg)	<0.050					
	Benzo(b)fluoranthene (mg/kg wwt)	<0.010					
	Benzo(g,h,i)perylene (mg/kg)	<0.050					
	Benzo(g,h,i)perylene (mg/kg wwt)	<0.010					
	Benzo(k)fluoranthene (mg/kg)	<0.050					
	Benzo(k)fluoranthene (mg/kg wwt)	<0.010					
	Chrysene (mg/kg)	<0.050					
	Chrysene (mg/kg wwt)	<0.010					
	Dibenz(a,h)anthracene (mg/kg)	<0.050					
	Dibenz(a,h)anthracene (mg/kg wwt)	<0.010					
	Fluoranthene (mg/kg)	<0.050					
	Fluoranthene (mg/kg wwt)	<0.010					
	Fluorene (mg/kg)	<0.050					
	Fluorene (mg/kg wwt)	<0.020 ^{DLM}					
	Indeno(1,2,3-c,d)pyrene (mg/kg)	<0.30 ^{DLM}					
	Indeno(1,2,3-c,d)pyrene (mg/kg wwt)	<0.20 ^{DLM}					
	2-methylnaphthalene (mg/kg)	<0.050					
	2-methylnaphthalene (mg/kg wwt)	<0.010					
	Naphthalene (mg/kg)	<0.050					
	Naphthalene (mg/kg wwt)	<0.010					
	Phenanthrene (mg/kg)	<0.050					
	Phenanthrene (mg/kg wwt)	<0.010					
	Pyrene (mg/kg)	<0.050					
	Pyrene (mg/kg wwt)	<0.010					
	Surrogate: Acenaphthene d10 (%)	73.8					
	Surrogate: Chrysene d12 (%)	86.6					
	Surrogate: Naphthalene d8 (%)	68.6					
	Surrogate: Phenanthrene d10 (%)	99.0					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-2 Tissue 29-JUL-14 10:39 14-DDR-06-BERRY-01	L1497000-3 Tissue 29-JUL-14 10:39 14-DDR-06-BR-01	L1497000-4 Tissue 29-JUL-14 10:39 14-DDR-06-WL-01	L1497000-5 Tissue 29-JUL-14 10:39 14-DDR-06-LI-01	L1497000-6 Tissue 29-JUL-14 10:39 14-DDR-06-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-8 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01	L1497000-9 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01	L1497000-10 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01	L1497000-11 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01	L1497000-12 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-14 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01-DUP	L1497000-15 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01-DUP	L1497000-16 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01-DUP	L1497000-17 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01-DUP	L1497000-18 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01-DUP
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-20	L1497000-21	L1497000-22	L1497000-23	L1497000-25
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	29-JUL-14	29-JUL-14	29-JUL-14	29-JUL-14	29-JUL-14
		Sampled Time	15:13	15:13	15:13	15:13	15:13
		Client ID	14-DDR-11A-BERRY-01	14-DDR-11A-BR-01	14-DDR-11A-LI-01	14-DDR-11A-GR-01	14-DDR-11B-WL-01
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-27 Tissue 30-JUL-14 09:00 14-DDR-19-BERRY-01	L1497000-28 Tissue 30-JUL-14 09:00 14-DDR-19-WL-01	L1497000-29 Tissue 30-JUL-14 09:00 14-DDR-19-BR-01	L1497000-30 Tissue 30-JUL-14 09:00 14-DDR-19-LI-01	L1497000-31 Tissue 30-JUL-14 09:00 14-DDR-19-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)	<0.039 ^[U]	<0.050 ^[U]	<0.033 ^[U]	<0.10 ^[U]	<0.28 ^[U]
	1,2,3,7,8-PeCDD (pg/g ww)	<0.018 ^[U]	<0.035 ^[U]	<0.022 ^[U]	<0.067 ^[U]	<0.12 ^[U]
	1,2,3,4,7,8-HxCDD (pg/g ww)	<0.014 ^[U]	<0.033 ^[U]	<0.024 ^[U]	<0.066 ^[U]	<0.084 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g ww)	<0.014 ^[U]	<0.033 ^[U]	<0.025 ^[U]	<0.063 ^[U]	<0.084 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g ww)	<0.014 ^[U]	<0.032 ^[U]	<0.024 ^[U]	<0.063 ^[U]	<0.082 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g ww)	0.032 ^{M,J,R}	<0.032 ^[U]	<0.029 ^[U]	<0.057 ^{M,U}	<0.12 ^[U]
	OCDD (pg/g ww)	0.080 ^[J]	0.108 ^{M,J}	0.084 ^{M,J}	0.149 ^{M,J}	<0.12 ^{M,U}
	Total-TCDD (pg/g ww)	0.071	0.145	0.150	0.45	<0.28 ^[U]
	Total TCDD # Homologues	1	1	1	2	0
	Total-PeCDD (pg/g ww)	<0.018 ^[U]	<0.035 ^[U]	<0.022 ^[U]	<0.067 ^[U]	<0.12 ^[U]
	Total PeCDD # Homologues	0	0	0	0	0
	Total-HxCDD (pg/g ww)	<0.014 ^[U]	<0.033 ^[U]	<0.025 ^[U]	<0.066 ^[U]	<0.084 ^[U]
	Total HxCDD # Homologues	0	0	0	0	0
	Total-HpCDD (pg/g ww)	<0.011 ^[U]	<0.032 ^[U]	<0.029 ^[U]	<0.057 ^[U]	<0.12 ^[U]
	Total HpCDD # Homologues	0	0	0	0	0
	2,3,7,8-TCDF (pg/g ww)	0.084 ^{M,J}	<0.046 ^[U]	<0.038 ^[U]	<0.094 ^[U]	<0.26 ^[U]
	1,2,3,7,8-PeCDF (pg/g ww)	0.021 ^{M,J,R}	<0.026 ^[U]	<0.017 ^[U]	<0.060 ^[U]	<0.10 ^[U]
	2,3,4,7,8-PeCDF (pg/g ww)	<0.014 ^[U]	<0.021 ^[U]	<0.015 ^[U]	<0.049 ^[U]	<0.083 ^[U]
	1,2,3,4,7,8-HxCDF (pg/g ww)	<0.0095 ^[U]	<0.020 ^[U]	<0.018 ^[U]	<0.049 ^[U]	<0.078 ^[U]
	1,2,3,6,7,8-HxCDF (pg/g ww)	<0.0089 ^[U]	<0.019 ^[U]	<0.018 ^[U]	<0.048 ^[U]	<0.078 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g ww)	0.044 ^{M,J}	0.028 ^{M,J}	<0.025 ^[U]	<0.066 ^[U]	<0.11 ^[U]
	2,3,4,6,7,8-HxCDF (pg/g ww)	<0.0083 ^[U]	<0.021 ^[U]	<0.020 ^[U]	<0.054 ^[U]	<0.083 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g ww)	<0.016 ^[U]	<0.028 ^[U]	<0.016 ^{M,J,R}	<0.039 ^[U]	<0.074 ^[U]
	1,2,3,4,7,8,9-HpCDF (pg/g ww)	<0.022 ^[U]	<0.039 ^[U]	<0.021 ^[U]	<0.056 ^[U]	<0.096 ^[U]
	OCDF (pg/g ww)	<0.017 ^[U]	<0.063 ^[U]	<0.049 ^[U]	<0.099 ^[U]	<0.17 ^[U]
	Total-TCDF (pg/g ww)	0.084	0.276	0.322	0.472	<0.26 ^[U]
	Total TCDF # Homologues	1	1	2	2	0
	Total-PeCDF (pg/g ww)	<0.017 ^[U]	<0.026 ^[U]	<0.017 ^[U]	<0.060 ^[U]	<0.10 ^[U]
	Total PeCDF # Homologues	0	0	0	0	0
	Total-HxCDF (pg/g ww)	0.044	0.028	<0.025 ^[U]	<0.066 ^[U]	<0.11 ^[U]
	Total HxCDF # Homologues	1	1	0	0	0
	Total-HpCDF (pg/g ww)	<0.022 ^[U]	<0.039 ^[U]	<0.021 ^[U]	<0.056 ^[U]	<0.096 ^[U]
	Total HpCDF # Homologues	0	0	0	0	0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	82.0	113.0	126.0	125.0	113.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	86.0	96.0	116.0	114.0	110.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	87.0	96.0	104.0	115.0	97.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	93.0	112.0	127.0	116.0	118.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-33 Tissue 30-JUL-14 12:15 14-DDR-14A-WL-01	L1497000-34 Tissue 30-JUL-14 12:15 14-DDR-14A-BR-01	L1497000-35 Tissue 30-JUL-14 12:15 14-DDR-14A-GR-01	L1497000-37 Tissue 30-JUL-14 12:45 14-DDR-14B-BERRY-01	L1497000-38 Tissue 30-JUL-14 12:45 14-DDR-14B-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g wwt)	<0.11 ^[U]	<0.078 ^[U]	<0.064 ^[U]	<0.057 ^[U]	<0.11 ^[U]
	1,2,3,7,8-PeCDD (pg/g wwt)	<0.037 ^[U]	<0.055 ^[U]	<0.022 ^[U]	<0.027 ^[U]	<0.035 ^[U]
	1,2,3,4,7,8-HxCDD (pg/g wwt)	<0.040 ^[U]	<0.047 ^[U]	<0.027 ^[U]	<0.026 ^[U]	<0.055 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g wwt)	<0.038 ^[U]	<0.046 ^[U]	<0.026 ^[U]	<0.027 ^[U]	<0.053 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g wwt)	<0.038 ^[U]	<0.045 ^[U]	<0.026 ^[U]	<0.026 ^[U]	<0.052 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g wwt)	<0.032 ^[U]	<0.059 ^[U]	<0.027 ^[U]	<0.027 ^[U]	0.110 ^{M,J,R}
	OCDD (pg/g wwt)	0.036 ^{J,R}	<0.061 ^[U]	0.051 ^{M,J,R}	0.064 ^{M,J,R}	0.473 ^{M,J}
	Total-TCDD (pg/g wwt)	<0.11 ^[U]	<0.078 ^[U]	<0.064 ^[U]	<0.057 ^[U]	1.98
	Total TCDD # Homologues	0	0	0	0	3
	Total-PeCDD (pg/g wwt)	<0.037 ^[U]	<0.055 ^[U]	<0.022 ^[U]	<0.027 ^[U]	<0.035 ^[U]
	Total PeCDD # Homologues	0	0	0	0	0
	Total-HxCDD (pg/g wwt)	<0.040 ^[U]	<0.047 ^[U]	<0.027 ^[U]	<0.027 ^[U]	0.078
	Total HxCDD # Homologues	0	0	0	0	1
	Total-HpCDD (pg/g wwt)	<0.032 ^[U]	<0.059 ^[U]	<0.027 ^[U]	<0.027 ^[U]	0.142
	Total HpCDD # Homologues	0	0	0	0	1
	2,3,7,8-TCDF (pg/g wwt)	<0.11 ^[U]	<0.077 ^[U]	<0.043 ^[U]	0.080 ^{M,J,R}	<0.089 ^[U]
	1,2,3,7,8-PeCDF (pg/g wwt)	<0.045 ^[U]	<0.058 ^[U]	<0.026 ^[U]	<0.031 ^[U]	<0.055 ^[U]
	2,3,4,7,8-PeCDF (pg/g wwt)	<0.040 ^[U]	<0.050 ^[U]	<0.022 ^[U]	<0.027 ^[U]	<0.045 ^[U]
	1,2,3,4,7,8-HxCDF (pg/g wwt)	<0.024 ^[U]	<0.027 ^[U]	<0.015 ^[U]	<0.018 ^[U]	<0.042 ^[U]
	1,2,3,6,7,8-HxCDF (pg/g wwt)	<0.023 ^[U]	<0.028 ^[U]	<0.015 ^[U]	<0.019 ^[U]	<0.038 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g wwt)	<0.031 ^[U]	0.041 ^{M,J,R}	<0.021 ^[U]	<0.026 ^[U]	<0.051 ^{M,U}
	2,3,4,6,7,8-HxCDF (pg/g wwt)	<0.025 ^[U]	<0.029 ^[U]	<0.017 ^[U]	<0.021 ^[U]	<0.043 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g wwt)	<0.020 ^[U]	<0.042 ^[U]	<0.016 ^[U]	<0.022 ^[U]	<0.034 ^[U]
	1,2,3,4,7,8,9-HpCDF (pg/g wwt)	<0.027 ^[U]	<0.056 ^[U]	<0.022 ^[U]	<0.029 ^[U]	<0.049 ^[U]
	OCDF (pg/g wwt)	<0.060 ^[U]	<0.11 ^[U]	<0.043 ^[U]	0.120 ^{J,R}	0.076 ^{M,J,R}
	Total-TCDF (pg/g wwt)	0.31	<0.077 ^[U]	<0.043 ^[U]	0.126	3.15
	Total TCDF # Homologues	1	0	0	1	3
	Total-PeCDF (pg/g wwt)	<0.045 ^[U]	<0.058 ^[U]	<0.026 ^[U]	<0.031 ^[U]	<0.055 ^[U]
	Total PeCDF # Homologues	0	0	0	0	0
	Total-HxCDF (pg/g wwt)	<0.031 ^[U]	<0.039 ^[U]	<0.021 ^[U]	<0.026 ^[U]	<0.051 ^[U]
	Total HxCDF # Homologues	0	0	0	0	0
	Total-HpCDF (pg/g wwt)	<0.027 ^[U]	<0.056 ^[U]	<0.022 ^[U]	<0.029 ^[U]	<0.049 ^[U]
	Total HpCDF # Homologues	0	0	0	0	0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	61.0	110.0	114.0	127.0	115.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	88.0	98.0	112.0	123.0	95.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	90.0	99.0	109.0	114.0	102.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	122.0	122.0	120.0	139.0 ^G	108.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-40 Tissue 30-JUL-14 13:54 14-DDR-12-BERRY-01	L1497000-41 Tissue 30-JUL-14 13:54 14-DDR-12-WL-01	L1497000-42 Tissue 30-JUL-14 13:54 14-DDR-12-LT-01	L1497000-43 Tissue 30-JUL-14 13:54 14-DDR-12-LI-01	L1497000-44 Tissue 30-JUL-14 13:54 14-DDR-12-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)	<0.072 ^[U]	<0.082 ^[U]	0.637 ^M	<0.019 ^{M,U}	<0.019 ^[U]
	1,2,3,7,8-PeCDD (pg/g ww)	<0.035 ^[U]	<0.025 ^[U]	0.0490 ^{M,J,R}	0.018 ^{M,J,R}	<0.0071 ^{M,U}
	1,2,3,4,7,8-HxCDD (pg/g ww)	<0.033 ^[U]	<0.021 ^[U]	<0.0079 ^{M,U}	<0.018 ^[U]	<0.0082 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g ww)	<0.032 ^[U]	<0.020 ^[U]	0.0129 ^{M,J}	<0.017 ^[U]	<0.0078 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g ww)	<0.031 ^[U]	<0.020 ^[U]	<0.0077 ^[U]	0.0150 ^{M,J,R}	<0.0077 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g ww)	0.037 ^{M,J}	<0.017 ^[U]	0.0232 ^{M,J}	0.091 ^{M,J}	0.0276 ^[J]
	OCDD (pg/g ww)	0.051 ^{M,J}	0.031 ^{J,R}	0.0185 ^{M,J}	0.411 ^{J,B}	0.0720 ^{J,R}
	Total-TCDD (pg/g ww)	<0.072 ^[U]	0.296	0.947	0.344	0.189
	Total TCDD # Homologues	0	2	4	1	2
	Total-PeCDD (pg/g ww)	<0.035 ^[U]	<0.025 ^[U]	0.291	0.018	0.0098
	Total PeCDD # Homologues	0	0	3	1	1
	Total-HxCDD (pg/g ww)	<0.033 ^[U]	<0.021 ^[U]	0.200	0.106	<0.0082 ^[U]
	Total HxCDD # Homologues	0	0	4	3	0
	Total-HpCDD (pg/g ww)	0.037	<0.017 ^[U]	0.0511	0.091	0.0276
	Total HpCDD # Homologues	1	0	2	1	1
	2,3,7,8-TCDF (pg/g ww)	<0.057 ^{M,U}	<0.10 ^[U]	<0.015 ^[U]	0.256 ^{M,J}	0.160 ^{M,J}
	1,2,3,7,8-PeCDF (pg/g ww)	<0.037 ^[U]	<0.029 ^[U]	0.0089 ^{M,J}	0.030 ^{M,J}	0.0166 ^{M,J}
	2,3,4,7,8-PeCDF (pg/g ww)	<0.031 ^[U]	<0.027 ^[U]	<0.0048 ^[U]	0.015 ^{M,J,R}	0.0094 ^{M,J}
	1,2,3,4,7,8-HxCDF (pg/g ww)	<0.018 ^[U]	<0.014 ^[U]	<0.0043 ^[U]	0.0096 ^{J,R}	0.0062 ^{J,R}
	1,2,3,6,7,8-HxCDF (pg/g ww)	<0.017 ^[U]	<0.014 ^[U]	<0.0040 ^[U]	0.0134 ^{J,B}	<0.0046 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g ww)	<0.023 ^[U]	<0.019 ^[U]	0.0150 ^{M,J,R}	0.037 ^{M,J}	0.0262 ^[J]
	2,3,4,6,7,8-HxCDF (pg/g ww)	<0.018 ^[U]	<0.015 ^[U]	<0.0042 ^[U]	0.0141 ^{M,J,B}	<0.0051 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g ww)	<0.022 ^[U]	<0.012 ^[U]	<0.0032 ^[U]	0.032 ^[J]	0.0071 ^{J,R}
	1,2,3,4,7,8,9-HpCDF (pg/g ww)	<0.030 ^[U]	<0.016 ^[U]	<0.0042 ^[U]	<0.014 ^[U]	<0.0051 ^[U]
	OCDF (pg/g ww)	0.076 ^{M,J,R}	<0.034 ^[U]	<0.0055 ^[U]	0.061 ^[J]	0.0200 ^{J,R}
	Total-TCDF (pg/g ww)	<0.057 ^[U]	0.50	0.019	1.72	0.540
	Total TCDF # Homologues	0	1	1	9	5
	Total-PeCDF (pg/g ww)	<0.037 ^[U]	<0.029 ^[U]	0.0513	0.034	0.0259
	Total PeCDF # Homologues	0	0	2	2	2
	Total-HxCDF (pg/g ww)	<0.023 ^[U]	<0.019 ^[U]	<0.0046 ^[U]	0.076	0.0262
	Total HxCDF # Homologues	0	0	0	4	1
	Total-HpCDF (pg/g ww)	<0.030 ^[U]	<0.016 ^[U]	<0.0042 ^[U]	0.032	<0.0051 ^[U]
	Total HpCDF # Homologues	0	0	0	1	0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	105.0	48.0	74.0	79.0	79.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	91.0	82.0	83.0	80.0	87.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	99.0	90.0	75.0	79.0	77.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	111.0	110.0	83.0	104.0	105.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-47 Tissue 31-JUL-14 08:50 14-DDR-24- BERRY-01	L1497000-48 Tissue 31-JUL-14 08:50 14-DDR-24-WL-01	L1497000-49 Tissue 31-JUL-14 08:50 14-DDR-24-BR-01	L1497000-50 Tissue 31-JUL-14 08:50 14-DDR-24-LI-01	L1497000-51 Tissue 31-JUL-14 08:50 14-DDR-24-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)	<0.26 ^[U]	<0.011 ^[U]	<0.041 ^[U]	<0.071 ^[U]	<0.025 ^[U]
	1,2,3,7,8-PeCDD (pg/g ww)	<0.071 ^[U]	<0.0088 ^[U]	<0.015 ^[U]	<0.019 ^[U]	<0.012 ^[U]
	1,2,3,4,7,8-HxCDD (pg/g ww)	<0.067 ^[U]	<0.0058 ^[U]	<0.018 ^[U]	<0.021 ^[U]	<0.011 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g ww)	<0.064 ^[U]	<0.0057 ^[U]	<0.017 ^[U]	<0.019 ^[U]	<0.010 ^[U]
	1,2,3,7,8,9-HxCDD (pg/g ww)	<0.063 ^[U]	<0.0056 ^[U]	<0.017 ^[U]	<0.020 ^[U]	<0.010 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g ww)	0.094 ^{M,J}	0.0175 ^{M,J}	<0.018 ^[U]	0.067 ^[J]	0.0250 ^{M,J}
	OCDD (pg/g ww)	0.37 ^{M,J,B}	0.128 ^{M,J,B}	0.046 ^{M,J,B}	0.184 ^{J,B}	0.113 ^{M,J,B}
	Total-TCDD (pg/g ww)	<0.26 ^[U]	0.271	0.149	<0.071 ^[U]	0.314
	Total TCDD # Homologues	0	3	1	0	2
	Total-PeCDD (pg/g ww)	<0.071 ^[U]	0.0174	<0.015 ^[U]	<0.019 ^[U]	<0.012 ^[U]
	Total PeCDD # Homologues	0	2	0	0	0
	Total-HxCDD (pg/g ww)	<0.067 ^[U]	0.0092	<0.018 ^[U]	0.033	<0.011 ^[U]
	Total HxCDD # Homologues	0	1	0	1	0
	Total-HpCDD (pg/g ww)	0.094	0.0388	0.020	0.113	0.0482
	Total HpCDD # Homologues	1	2	1	2	2
	2,3,7,8-TCDF (pg/g ww)	0.63 ^{M,J}	0.0740 ^{M,J}	0.057 ^{M,J}	0.127 ^{M,J}	0.096 ^{M,J}
	1,2,3,7,8-PeCDF (pg/g ww)	<0.11 ^[U]	0.0071 ^{J,R}	<0.017 ^[U]	<0.019 ^{M,U}	0.014 ^{J,R}
	2,3,4,7,8-PeCDF (pg/g ww)	<0.093 ^[U]	<0.0049 ^[U]	<0.015 ^[U]	<0.016 ^[U]	<0.0093 ^[U]
	1,2,3,4,7,8-HxCDF (pg/g ww)	<0.062 ^[U]	0.0044 ^[J]	<0.010 ^[U]	<0.0094 ^[U]	<0.0065 ^[U]
	1,2,3,6,7,8-HxCDF (pg/g ww)	<0.062 ^[U]	0.0036 ^{J,R}	<0.010 ^[U]	<0.0089 ^[U]	<0.0061 ^[U]
	1,2,3,7,8,9-HxCDF (pg/g ww)	<0.087 ^[U]	0.0100 ^{J,R}	<0.015 ^[U]	0.024 ^[J]	0.0210 ^{M,J,R}
	2,3,4,6,7,8-HxCDF (pg/g ww)	<0.067 ^[U]	<0.0028 ^[U]	<0.012 ^[U]	<0.0087 ^[U]	<0.0064 ^[U]
	1,2,3,4,6,7,8-HpCDF (pg/g ww)	<0.061 ^[U]	0.0074 ^{J,R}	<0.010 ^[U]	0.0160 ^{J,R}	<0.0063 ^[U]
	1,2,3,4,7,8,9-HpCDF (pg/g ww)	<0.080 ^[U]	<0.0053 ^[U]	<0.014 ^[U]	<0.012 ^[U]	<0.0083 ^[U]
	OCDF (pg/g ww)	0.26 ^{M,J}	0.0096 ^{M,J,R}	<0.032 ^[U]	0.033 ^{M,J,R}	0.035 ^[J]
	Total-TCDF (pg/g ww)	1.40	0.764	0.482	1.05	0.463
	Total TCDF # Homologues	3	6	3	4	5
	Total-PeCDF (pg/g ww)	<0.11 ^[U]	0.0083	<0.017 ^[U]	<0.019 ^[U]	<0.011 ^[U]
	Total PeCDF # Homologues	0	1	0	0	0
	Total-HxCDF (pg/g ww)	<0.087 ^[U]	0.0072	<0.015 ^[U]	0.043	<0.0077 ^[U]
	Total HxCDF # Homologues	0	2	0	2	0
	Total-HpCDF (pg/g ww)	<0.080 ^[U]	<0.0053 ^[U]	<0.014 ^[U]	<0.012 ^[U]	<0.0083 ^[U]
	Total HpCDF # Homologues	0	0	0	0	0
	Surrogate: 13C12-2,3,7,8-TCDD (%)	71.0	80.0	75.0	33.0	80.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	80.0	86.0	74.0	68.0	91.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	84.0	87.0	78.0	72.0	78.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	110.0	101.0	108.0	89.0	101.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-53 Tissue 31-JUL-14 10:25 14-DDR-26- BERRY-01	L1497000-54 Tissue 31-JUL-14 10:25 14-DDR-26- BERRY-02	L1497000-55 Tissue 31-JUL-14 10:25 14-DDR-26-WL-01	L1497000-56 Tissue 31-JUL-14 10:25 14-DDR-26-LT-01	L1497000-57 Tissue 31-JUL-14 10:25 14-DDR-26-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-58 Tissue 31-JUL-14 10:25 14-DDR-26-GR-01	L1497000-60 Tissue 31-JUL-14 12:15 14-DDR-30A-BERRY-01	L1497000-73 Tissue 31-JUL-14 12:15 14-DDR-30A-BR-01	L1497000-74 Tissue 31-JUL-14 12:15 14-DDR-30A-GR-01	L1497000-76 Tissue 31-JUL-14 12:40 14-DDR-30B-WL-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-77 Tissue 31-JUL-14 12:40 14-DDR-30B-LI-01	L1497000-79 Tissue 31-JUL-14 13:49 14-DDR-23-BERRY-01	L1497000-80 Tissue 31-JUL-14 13:49 14-DDR-23-WL-01	L1497000-81 Tissue 31-JUL-14 13:49 14-DDR-23-LT-01	L1497000-82 Tissue 31-JUL-14 13:49 14-DDR-23-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)		<0.029 ^[U]	0.0100 ^{J,R}	<0.042 ^[U]	<0.0086 ^[U]
	1,2,3,7,8-PeCDD (pg/g ww)		<0.016 ^[U]	<0.0049 ^[U]	<0.016 ^[U]	0.0101 ^[J]
	1,2,3,4,7,8-HxCDD (pg/g ww)		<0.012 ^[U]	<0.0043 ^[U]	<0.020 ^[U]	<0.0046 ^[U]
	1,2,3,6,7,8-HxCDD (pg/g ww)		<0.012 ^[U]	<0.0042 ^[U]	<0.019 ^[U]	0.0054 ^{J,R}
	1,2,3,7,8,9-HxCDD (pg/g ww)		<0.012 ^[U]	<0.0041 ^[U]	<0.019 ^[U]	<0.0044 ^[U]
	1,2,3,4,6,7,8-HpCDD (pg/g ww)		0.058 ^{M,J,R}	0.0183 ^{M,J}	0.019 ^{M,J}	0.0829 ^[J]
	OCDD (pg/g ww)		0.243 ^{M,J,B}	0.0880 ^{M,J,R}	0.090 ^{M,J,B}	0.358 ^{J,B}
	Total-TCDD (pg/g ww)		<0.029 ^[U]	0.276	<0.042 ^[U]	1.05
	Total TCDD # Homologues		0	3	0	4
	Total-PeCDD (pg/g ww)		<0.016 ^[U]	<0.0049 ^[U]	<0.016 ^[U]	0.0961
	Total PeCDD # Homologues		0	0	0	4
	Total-HxCDD (pg/g ww)		<0.012 ^[U]	<0.0043 ^[U]	<0.020 ^[U]	0.0516
	Total HxCDD # Homologues		0	0	0	1
	Total-HpCDD (pg/g ww)		0.047	0.0343	0.019	0.184
	Total HpCDD # Homologues		1	2	1	2
	2,3,7,8-TCDF (pg/g ww)		0.357 ^{M,J}	0.118 ^{M,J}	0.091 ^{M,J,R}	0.0510 ^{M,J,R}
	1,2,3,7,8-PeCDF (pg/g ww)		0.025 ^{J,R}	0.0131 ^{M,J}	<0.022 ^[U]	0.0150 ^{M,J,R}
	2,3,4,7,8-PeCDF (pg/g ww)		<0.012 ^[U]	0.0066 ^{M,J}	<0.020 ^[U]	0.0117 ^{M,J}
	1,2,3,4,7,8-HxCDF (pg/g ww)		<0.0095 ^[U]	<0.0037 ^[U]	<0.0092 ^[U]	0.0064 ^{J,R}
	1,2,3,6,7,8-HxCDF (pg/g ww)		<0.0087 ^[U]	<0.0038 ^[U]	<0.0087 ^[U]	0.0098 ^{M,J,B}
	1,2,3,7,8,9-HxCDF (pg/g ww)		0.050 ^{J,R}	0.0139 ^[J]	0.018 ^{M,J}	0.0150 ^{M,J}
	2,3,4,6,7,8-HxCDF (pg/g ww)		<0.0097 ^[U]	<0.0036 ^[U]	<0.0098 ^[U]	0.0090 ^{M,J,R}
	1,2,3,4,6,7,8-HpCDF (pg/g ww)		0.030 ^{J,R}	0.0051 ^[J]	<0.046 ^[U]	0.0328 ^[J]
	1,2,3,4,7,8,9-HpCDF (pg/g ww)		<0.014 ^[U]	<0.0044 ^[U]	<0.054 ^[U]	<0.0050 ^[U]
	OCDF (pg/g ww)		0.229 ^[J]	<0.0054 ^[U]	<0.017 ^[U]	0.0210 ^{M,J,R}
	Total-TCDF (pg/g ww)		0.890	0.613	<0.049 ^[U]	0.969
	Total TCDF # Homologues		5	10	0	11
	Total-PeCDF (pg/g ww)		<0.014 ^[U]	0.0197	<0.022 ^[U]	0.145
	Total PeCDF # Homologues		0	2	0	6
	Total-HxCDF (pg/g ww)		0.017	0.0139	0.018	0.0620
	Total HxCDF # Homologues		1	1	1	4
	Total-HpCDF (pg/g ww)		<0.014 ^[U]	0.0051	<0.054 ^[U]	0.0372
	Total HpCDF # Homologues		0	1	0	2
	Surrogate: 13C12-2,3,7,8-TCDD (%)		67.0	83.0	72.0	80.0
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)		73.0	88.0	79.0	89.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)		71.0	80.0	78.0	91.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)		92.0	98.0	100.0	94.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-83 Tissue 31-JUL-14 13:49 14-DDR-23-GR-01	L1497000-85 Tissue 01-AUG-14 08:12 14-DDR-10A-WL-01	L1497000-86 Tissue 01-AUG-14 08:12 14-DDR-10A-LT-01	L1497000-87 Tissue 01-AUG-14 08:12 14-DDR-10A-LI-01	L1497000-89 Tissue 01-AUG-14 08:40 14-DDR-10B-BERRY-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)	<0.017 ^[U]				
	1,2,3,7,8-PeCDD (pg/g ww)	<0.0070 ^[U]				
	1,2,3,4,7,8-HxCDD (pg/g ww)	<0.0053 ^[U]				
	1,2,3,6,7,8-HxCDD (pg/g ww)	<0.0052 ^[U]				
	1,2,3,7,8,9-HxCDD (pg/g ww)	<0.0051 ^[U]				
	1,2,3,4,6,7,8-HpCDD (pg/g ww)	0.0466 ^[J]				
	OCDD (pg/g ww)	0.289 ^{J,B}				
	Total-TCDD (pg/g ww)	0.116				
	Total TCDD # Homologues	1				
	Total-PeCDD (pg/g ww)	0.0466				
	Total PeCDD # Homologues	3				
	Total-HxCDD (pg/g ww)	0.0217				
	Total HxCDD # Homologues	2				
	Total-HpCDD (pg/g ww)	0.0863				
	Total HpCDD # Homologues	2				
	2,3,7,8-TCDF (pg/g ww)	0.170 ^{M,J}				
	1,2,3,7,8-PeCDF (pg/g ww)	0.0160 ^{J,R}				
	2,3,4,7,8-PeCDF (pg/g ww)	0.0088 ^{J,R}				
	1,2,3,4,7,8-HxCDF (pg/g ww)	<0.0046 ^{M,U}				
	1,2,3,6,7,8-HxCDF (pg/g ww)	0.0044 ^{M,J,R}				
	1,2,3,7,8,9-HxCDF (pg/g ww)	0.0240 ^{M,J}				
	2,3,4,6,7,8-HxCDF (pg/g ww)	<0.0048 ^{M,U}				
	1,2,3,4,6,7,8-HpCDF (pg/g ww)	0.0127 ^{M,J}				
	1,2,3,4,7,8,9-HpCDF (pg/g ww)	<0.0056 ^[U]				
	OCDF (pg/g ww)	0.060 ^{M,J}				
	Total-TCDF (pg/g ww)	0.543				
	Total TCDF # Homologues	5				
	Total-PeCDF (pg/g ww)	0.0095				
	Total PeCDF # Homologues	1				
	Total-HxCDF (pg/g ww)	0.0294				
	Total HxCDF # Homologues	2				
	Total-HpCDF (pg/g ww)	0.0127				
	Total HpCDF # Homologues	1				
	Surrogate: 13C12-2,3,7,8-TCDD (%)	89.0				
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)	92.0				
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)	93.0				
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)	115.0				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-90 Tissue 01-AUG-14 08:40 14-DDR-10B-GR-01	L1497000-92 Tissue 01-AUG-14 09:36 14-DDR-02A-BERRY-01	L1497000-93 Tissue 01-AUG-14 09:36 14-DDR-02A-LT-01	L1497000-94 Tissue 01-AUG-14 09:36 14-DDR-02A-LI-01	L1497000-95 Tissue 01-AUG-14 09:36 14-DDR-02A-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-97 Tissue 01-AUG-14 10:15 14-DDR-02B-WL-01	L1497000-112 Tissue 01-AUG-14 11:15 14-DDR-03-BERRY-01	L1497000-113 Tissue 01-AUG-14 11:15 14-DDR-03-WL-01	L1497000-114 Tissue 01-AUG-14 11:15 14-DDR-03-LT-01	L1497000-115 Tissue 01-AUG-14 11:15 14-DDR-03-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-116	L1497000-118	L1497000-119	L1497000-120	L1497000-121
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	01-AUG-14	01-AUG-14	01-AUG-14	01-AUG-14	01-AUG-14
		Sampled Time	11:15	13:03	13:03	13:03	13:03
		Client ID	14-DDR-03-GR-01	14-DDR-09-BERRY-01	14-DDR-09-WL-01	14-DDR-09-LT-01	14-DDR-09-LI-01
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-122 Tissue 01-AUG-14 13:03 14-DDR-09-GR-01	L1497000-124 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01	L1497000-125 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01	L1497000-126 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01	L1497000-127 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)					
	1,2,3,7,8-PeCDD (pg/g ww)					
	1,2,3,4,7,8-HxCDD (pg/g ww)					
	1,2,3,6,7,8-HxCDD (pg/g ww)					
	1,2,3,7,8,9-HxCDD (pg/g ww)					
	1,2,3,4,6,7,8-HpCDD (pg/g ww)					
	OCDD (pg/g ww)					
	Total-TCDD (pg/g ww)					
	Total TCDD # Homologues					
	Total-PeCDD (pg/g ww)					
	Total PeCDD # Homologues					
	Total-HxCDD (pg/g ww)					
	Total HxCDD # Homologues					
	Total-HpCDD (pg/g ww)					
	Total HpCDD # Homologues					
	2,3,7,8-TCDF (pg/g ww)					
	1,2,3,7,8-PeCDF (pg/g ww)					
	2,3,4,7,8-PeCDF (pg/g ww)					
	1,2,3,4,7,8-HxCDF (pg/g ww)					
	1,2,3,6,7,8-HxCDF (pg/g ww)					
	1,2,3,7,8,9-HxCDF (pg/g ww)					
	2,3,4,6,7,8-HxCDF (pg/g ww)					
	1,2,3,4,6,7,8-HpCDF (pg/g ww)					
	1,2,3,4,7,8,9-HpCDF (pg/g ww)					
	OCDF (pg/g ww)					
	Total-TCDF (pg/g ww)					
	Total TCDF # Homologues					
	Total-PeCDF (pg/g ww)					
	Total PeCDF # Homologues					
	Total-HxCDF (pg/g ww)					
	Total HxCDF # Homologues					
	Total-HpCDF (pg/g ww)					
	Total HpCDF # Homologues					
	Surrogate: 13C12-2,3,7,8-TCDD (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-128	L1497000-130	L1497000-131	L1497000-132	L1497000-133
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14
		Sampled Time	08:20	08:20	08:20	08:20	08:20
		Client ID	14-DDR-05-GR-01	14-DDR-05-BERRY-01-DUP	14-DDR-05-WL-01-DUP	14-DDR-05-LT-01-DUP	14-DDR-05-LI-01-DUP
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-135	L1497000-136	L1497000-137	L1497000-138	L1497000-140
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14
		Sampled Time	10:30	10:30	10:30	10:30	11:00
		Client ID	14-DDR-16A-BERRY-01	14-DDR-16A-WL-01	14-DDR-16A-BR-01	14-DDR-16A-LI-01	14-DDR-16B-GR-01
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1497000-141	L1497000-143	L1497000-144	L1497000-145	L1497000-146
		Description	Tissue	Tissue	Tissue	Tissue	Tissue
		Sampled Date	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14	02-AUG-14
		Sampled Time	11:00	12:30	12:30	12:30	12:30
		Client ID	14-DDR-16B-GR-01-DUP	14-DDR-28-BERRY-01	14-DDR-28-WL-01	14-DDR-28-BR-01	14-DDR-28-LI-01
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1497000-147 Tissue 02-AUG-14 12:30 14-DDR-28-GR-01				
Grouping	Analyte						
TISSUE							
Dioxins and Furans	2,3,7,8-TCDD (pg/g ww)						
	1,2,3,7,8-PeCDD (pg/g ww)						
	1,2,3,4,7,8-HxCDD (pg/g ww)						
	1,2,3,6,7,8-HxCDD (pg/g ww)						
	1,2,3,7,8,9-HxCDD (pg/g ww)						
	1,2,3,4,6,7,8-HpCDD (pg/g ww)						
	OCDD (pg/g ww)						
	Total-TCDD (pg/g ww)						
	Total TCDD # Homologues						
	Total-PeCDD (pg/g ww)						
	Total PeCDD # Homologues						
	Total-HxCDD (pg/g ww)						
	Total HxCDD # Homologues						
	Total-HpCDD (pg/g ww)						
	Total HpCDD # Homologues						
	2,3,7,8-TCDF (pg/g ww)						
	1,2,3,7,8-PeCDF (pg/g ww)						
	2,3,4,7,8-PeCDF (pg/g ww)						
	1,2,3,4,7,8-HxCDF (pg/g ww)						
	1,2,3,6,7,8-HxCDF (pg/g ww)						
	1,2,3,7,8,9-HxCDF (pg/g ww)						
	2,3,4,6,7,8-HxCDF (pg/g ww)						
	1,2,3,4,6,7,8-HpCDF (pg/g ww)						
	1,2,3,4,7,8,9-HpCDF (pg/g ww)						
	OCDF (pg/g ww)						
	Total-TCDF (pg/g ww)						
	Total TCDF # Homologues						
	Total-PeCDF (pg/g ww)						
	Total PeCDF # Homologues						
	Total-HxCDF (pg/g ww)						
	Total HxCDF # Homologues						
	Total-HpCDF (pg/g ww)						
	Total HpCDF # Homologues						
	Surrogate: 13C12-2,3,7,8-TCDD (%)						
	Surrogate: 13C12-1,2,3,7,8-PeCDD (%)						
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD (%)						
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD (%)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-2 Tissue 29-JUL-14 10:39 14-DDR-06-BERRY-01	L1497000-3 Tissue 29-JUL-14 10:39 14-DDR-06-BR-01	L1497000-4 Tissue 29-JUL-14 10:39 14-DDR-06-WL-01	L1497000-5 Tissue 29-JUL-14 10:39 14-DDR-06-LI-01	L1497000-6 Tissue 29-JUL-14 10:39 14-DDR-06-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-8 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01	L1497000-9 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01	L1497000-10 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01	L1497000-11 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01	L1497000-12 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-14 Tissue 29-JUL-14 13:10 14-DDR-07-BERRY-01-DUP	L1497000-15 Tissue 29-JUL-14 13:10 14-DDR-07-WL-01-DUP	L1497000-16 Tissue 29-JUL-14 13:10 14-DDR-07-LT-01-DUP	L1497000-17 Tissue 29-JUL-14 13:10 14-DDR-07-LI-01-DUP	L1497000-18 Tissue 29-JUL-14 13:10 14-DDR-07-GR-01-DUP
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-20 Tissue 29-JUL-14 15:13 14-DDR-11A-BERRY-01	L1497000-21 Tissue 29-JUL-14 15:13 14-DDR-11A-BR-01	L1497000-22 Tissue 29-JUL-14 15:13 14-DDR-11A-LI-01	L1497000-23 Tissue 29-JUL-14 15:13 14-DDR-11A-GR-01	L1497000-25 Tissue 29-JUL-14 15:13 14-DDR-11B-WL-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-27 Tissue 30-JUL-14 09:00 14-DDR-19-BERRY-01	L1497000-28 Tissue 30-JUL-14 09:00 14-DDR-19-WL-01	L1497000-29 Tissue 30-JUL-14 09:00 14-DDR-19-BR-01	L1497000-30 Tissue 30-JUL-14 09:00 14-DDR-19-LI-01	L1497000-31 Tissue 30-JUL-14 09:00 14-DDR-19-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	86.0	86.0	93.0	97.0	104.0
	Surrogate: 13C12-OCDD (%)	74.0	73.0	79.0	84.0	106.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	82.0	119.0	129.0	129.0	117.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	81.0	96.0	121.0	115.0	109.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	86.0	107.0	125.0	125.0	122.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	77.0	93.0	102.0	106.0	92.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	76.0	99.0	110.0	105.0	103.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	82.0	90.0	94.0	94.0	89.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	84.0	88.0	96.0	95.0	91.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	77.0	85.0	91.0	96.0	100.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	81.0	85.0	92.0	97.0	106.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	80.0	98.0	100.0	99.0	107.0
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0129	0.00283	0.0000253	0.0000447	0.00
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0480	0.0596	0.0400	0.118	0.258
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0823	0.116	0.0799	0.235	0.517

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-33 Tissue 30-JUL-14 12:15 14-DDR-14A-WL-01	L1497000-34 Tissue 30-JUL-14 12:15 14-DDR-14A-BR-01	L1497000-35 Tissue 30-JUL-14 12:15 14-DDR-14A-GR-01	L1497000-37 Tissue 30-JUL-14 12:45 14-DDR-14B-BERRY-01	L1497000-38 Tissue 30-JUL-14 12:45 14-DDR-14B-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	94.0	87.0	90.0	92.0	94.0
	Surrogate: 13C12-OCDD (%)	84.0	75.0	85.0	81.0	85.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	58.0	117.0	119.0	132.0	119.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	91.0	102.0	113.0	124.0	99.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	92.0	110.0	122.0	135.0	106.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	94.0	97.0	103.0	107.0	98.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	108.0	106.0	106.0	114.0	103.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	93.0	93.0	91.0	95.0	93.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	97.0	92.0	94.0	99.0	97.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	94.0	86.0	91.0	93.0	96.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	97.0	89.0	95.0	95.0	96.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	55.0	96.0	111.0	105.0	99.0
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.00	0.00	0.00	0.00	0.000142
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0970	0.0947	0.0565	0.0631	0.103
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.194	0.185	0.113	0.118	0.205

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-40 Tissue 30-JUL-14 13:54 14-DDR-12-BERRY-01	L1497000-41 Tissue 30-JUL-14 13:54 14-DDR-12-WL-01	L1497000-42 Tissue 30-JUL-14 13:54 14-DDR-12-LT-01	L1497000-43 Tissue 30-JUL-14 13:54 14-DDR-12-LI-01	L1497000-44 Tissue 30-JUL-14 13:54 14-DDR-12-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	94.0	92.0	79.0	82.0	84.0
	Surrogate: 13C12-OCDD (%)	84.0	86.0	88.0	76.0	78.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	113.0	43.0	75.0	81.0	86.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	91.0	85.0	81.0	81.0	87.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	100.0	86.0	85.0	86.0	94.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	95.0	92.0	69.0	81.0	86.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	103.0	103.0	72.0	96.0	89.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	93.0	89.0	68.0	84.0	82.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	96.0	92.0	81.0	87.0	89.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	95.0	93.0	76.0	85.0	88.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	97.0	94.0	82.0	85.0	89.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	91.0	40.0	62.0	70.0	74.0
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.000384	0.00	0.639	0.0343	0.0222
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0708	0.0694	0.692	0.0706	0.0377
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.141	0.139	0.695	0.0819	0.0524

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-47 Tissue 31-JUL-14 08:50 14-DDR-24-BERRY-01	L1497000-48 Tissue 31-JUL-14 08:50 14-DDR-24-WL-01	L1497000-49 Tissue 31-JUL-14 08:50 14-DDR-24-BR-01	L1497000-50 Tissue 31-JUL-14 08:50 14-DDR-24-LI-01	L1497000-51 Tissue 31-JUL-14 08:50 14-DDR-24-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	82.0	83.0	73.0	91.0	83.0
	Surrogate: 13C12-OCDD (%)	66.0	72.0	56.0	87.0	69.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)	76.0	80.0	81.0	30.0	87.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	84.0	85.0	76.0	66.0	87.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	88.0	92.0	83.0	70.0	97.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	89.0	89.0	84.0	79.0	81.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	100.0	96.0	101.0	90.0	89.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	86.0	86.0	79.0	86.0	84.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	85.0	89.0	80.0	90.0	89.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	83.0	82.0	76.0	94.0	86.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	88.0	85.0	77.0	95.0	87.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	62.0	69.0	73.0	29.0 ^G	72.0
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0639	0.00806	0.00571	0.0158	0.00985
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.269	0.0214	0.0414	0.0681	0.0348
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.475	0.0330	0.0771	0.120	0.0573

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-53 Tissue 31-JUL-14 10:25 14-DDR-26- BERRY-01	L1497000-54 Tissue 31-JUL-14 10:25 14-DDR-26- BERRY-02	L1497000-55 Tissue 31-JUL-14 10:25 14-DDR-26-WL-01	L1497000-56 Tissue 31-JUL-14 10:25 14-DDR-26-LT-01	L1497000-57 Tissue 31-JUL-14 10:25 14-DDR-26-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-58 Tissue 31-JUL-14 10:25 14-DDR-26-GR-01	L1497000-60 Tissue 31-JUL-14 12:15 14-DDR-30A-BERRY-01	L1497000-73 Tissue 31-JUL-14 12:15 14-DDR-30A-BR-01	L1497000-74 Tissue 31-JUL-14 12:15 14-DDR-30A-GR-01	L1497000-76 Tissue 31-JUL-14 12:40 14-DDR-30B-WL-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-77 Tissue 31-JUL-14 12:40 14-DDR-30B-LI-01	L1497000-79 Tissue 31-JUL-14 13:49 14-DDR-23-BERRY-01	L1497000-80 Tissue 31-JUL-14 13:49 14-DDR-23-WL-01	L1497000-81 Tissue 31-JUL-14 13:49 14-DDR-23-LT-01	L1497000-82 Tissue 31-JUL-14 13:49 14-DDR-23-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)		72.0	82.0	103.0	84.0
	Surrogate: 13C12-OCDD (%)		64.0	73.0	81.0	82.0
	Surrogate: 13C12-2,3,7,8-TCDF (%)		71.0	87.0	72.0	82.0
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)		75.0	89.0	84.0	87.0
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)		78.0	100.0	88.0	95.0
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)		74.0	77.0	81.0	86.0
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)		83.0	86.0	93.0	89.0
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)		73.0	81.0	80.0	82.0
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)		78.0	86.0	83.0	89.0
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)		75.0	83.0	90.0	85.0
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)		75.0	88.0	109.0	88.0
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)		63.0	78.0	65.0	75.0
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)		0.0358	0.0158	0.00202	0.0174
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)		0.0700	0.0295	0.0482	0.0298
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)		0.0976	0.0331	0.0854	0.0345

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-83 Tissue 31-JUL-14 13:49 14-DDR-23-GR-01	L1497000-85 Tissue 01-AUG-14 08:12 14-DDR-10A-WL-01	L1497000-86 Tissue 01-AUG-14 08:12 14-DDR-10A-LT-01	L1497000-87 Tissue 01-AUG-14 08:12 14-DDR-10A-LI-01	L1497000-89 Tissue 01-AUG-14 08:40 14-DDR-10B-BERRY-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)	83.0				
	Surrogate: 13C12-OCDD (%)	59.0				
	Surrogate: 13C12-2,3,7,8-TCDF (%)	93.0				
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)	94.0				
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)	99.0				
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)	94.0				
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)	101.0				
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)	88.0				
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)	95.0				
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)	84.0				
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)	90.0				
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)	77.0				
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0201				
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0369				
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)	0.0502				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-90 Tissue 01-AUG-14 08:40 14-DDR-10B-GR-01	L1497000-92 Tissue 01-AUG-14 09:36 14-DDR-02A-BERRY-01	L1497000-93 Tissue 01-AUG-14 09:36 14-DDR-02A-LT-01	L1497000-94 Tissue 01-AUG-14 09:36 14-DDR-02A-LI-01	L1497000-95 Tissue 01-AUG-14 09:36 14-DDR-02A-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-97 Tissue 01-AUG-14 10:15 14-DDR-02B-WL-01	L1497000-112 Tissue 01-AUG-14 11:15 14-DDR-03-BERRY-01	L1497000-113 Tissue 01-AUG-14 11:15 14-DDR-03-WL-01	L1497000-114 Tissue 01-AUG-14 11:15 14-DDR-03-LT-01	L1497000-115 Tissue 01-AUG-14 11:15 14-DDR-03-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-116 Tissue 01-AUG-14 11:15 14-DDR-03-GR-01	L1497000-118 Tissue 01-AUG-14 13:03 14-DDR-09-BERRY-01	L1497000-119 Tissue 01-AUG-14 13:03 14-DDR-09-WL-01	L1497000-120 Tissue 01-AUG-14 13:03 14-DDR-09-LT-01	L1497000-121 Tissue 01-AUG-14 13:03 14-DDR-09-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-122 Tissue 01-AUG-14 13:03 14-DDR-09-GR-01	L1497000-124 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01	L1497000-125 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01	L1497000-126 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01	L1497000-127 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-128 Tissue 02-AUG-14 08:20 14-DDR-05-GR-01	L1497000-130 Tissue 02-AUG-14 08:20 14-DDR-05-BERRY-01-DUP	L1497000-131 Tissue 02-AUG-14 08:20 14-DDR-05-WL-01-DUP	L1497000-132 Tissue 02-AUG-14 08:20 14-DDR-05-LT-01-DUP	L1497000-133 Tissue 02-AUG-14 08:20 14-DDR-05-LI-01-DUP
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-135 Tissue 02-AUG-14 10:30 14-DDR-16A-BERRY-01	L1497000-136 Tissue 02-AUG-14 10:30 14-DDR-16A-WL-01	L1497000-137 Tissue 02-AUG-14 10:30 14-DDR-16A-BR-01	L1497000-138 Tissue 02-AUG-14 10:30 14-DDR-16A-LI-01	L1497000-140 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-141 Tissue 02-AUG-14 11:00 14-DDR-16B-GR-01-DUP	L1497000-143 Tissue 02-AUG-14 12:30 14-DDR-28-BERRY-01	L1497000-144 Tissue 02-AUG-14 12:30 14-DDR-28-WL-01	L1497000-145 Tissue 02-AUG-14 12:30 14-DDR-28-BR-01	L1497000-146 Tissue 02-AUG-14 12:30 14-DDR-28-LI-01
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g wwt)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g wwt)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1497000-147 Tissue 02-AUG-14 12:30 14-DDR-28-GR-01				
Grouping	Analyte					
TISSUE						
Dioxins and Furans	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD (%)					
	Surrogate: 13C12-OCDD (%)					
	Surrogate: 13C12-2,3,7,8-TCDF (%)					
	Surrogate: 13C12-1,2,3,7,8-PeCDF (%)					
	Surrogate: 13C12-2,3,4,7,8-PeCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF (%)					
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF (%)					
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF (%)					
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF (%)					
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF (%)					
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup) (%)					
Toxic Equivalency	Lower Bound PCDD/F TEQ (WHO 2005) (pg/g ww)					
	Mid Point PCDD/F TEQ (WHO 2005) (pg/g ww)					
	Upper Bound PCDD/F TEQ (WHO 2005) (pg/g ww)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comment:
L1497000-37	Tissue	Note: Sample fails high for 13C12-1,2,3,6,7,8-HxCDD but has no hits or totals for this target.	
L1497000-45	Soil	Note: Sample fails low for cleanup recovery. This cleanup standard recovery is for method diagnostic information only and has no impact on the reported target data.	
L1497000-50	Tissue	Note: Sample fails just low for 37Cl4-2,3,7,8-TCDD (Cleanup). No impact on data quality.	

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Total-HpCDD	A	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-HxCDF	A	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-HpCDF	A	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-HpCDD	A	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-HpCDF	A	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-HxCDF	A	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-TCDD	A	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-TCDF	A	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Duplicate	Fluorene	DLM	L1497000-10, -11, -12, -15, -16, -17, -18, -21, -22, -23, -25, -3, -4, -5, -55, -57, -58, -6, -73, -74, -76, -9
Duplicate	Benzo(b)fluoranthene	DLM	L1497000-112, -118, -124, -128, -130, -131, -132, -135, -136, -137, -138, -14, -140, -141, -2, -20, -53, -54, -60, -8, -89, -92
Duplicate	Benzo(b)fluoranthene	DLM	L1497000-112, -118, -124, -128, -130, -131, -132, -135, -136, -137, -138, -14, -140, -141, -2, -20, -53, -54, -60, -8, -89, -92
Duplicate	2-methylnaphthalene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Anthracene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Benzo(b)fluoranthene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Benzo(k)fluoranthene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Phenanthrene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Benzo(b)fluoranthene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Benzo(k)fluoranthene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Fluorene	DLM	L1497000-143, -144, -145, -146, -147
Duplicate	Acenaphthene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Acenaphthylene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Anthracene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Fluorene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Phenanthrene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Acenaphthene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Acenaphthylene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Anthracene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Benzo(a)pyrene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Fluorene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Indeno(1,2,3-c,d)pyrene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Phenanthrene	DLM	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Benzo(a)pyrene	DLM	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42, -43
Duplicate	Benzo(a)pyrene	DLM	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Benzo(k)fluoranthene	DLM	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Benzo(a)pyrene	DLM	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Benzo(k)fluoranthene	DLM	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Benzo(k)fluoranthene	DUP-H	L1497000-10, -11, -12, -15, -16, -17, -18, -21, -22, -23, -25, -3, -4, -5, -55, -57, -58, -6, -73, -74, -76, -9
Duplicate	Benzo(g,h,i)perylene	DUP-H	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Benzo(g,h,i)perylene	DUP-H	L1497000-113, -114, -115, -116, -119, -120, -121, -122, -125, -126, -85, -86, -87, -90, -94, -95, -97
Duplicate	Bismuth (Bi)-Total	DUP-H	L1497000-10, -11, -12, -121, -126, -128, -131, -132, -136, -137, -138, -146, -147, -17, -18, -23, -25, -29, -3, -30, -31, -33, -34, -35, -38, -6, -9
Duplicate	Phenanthrene	DUP-H	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42, -43
Duplicate	Benzo(g,h,i)perylene	DUP-H	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Phenanthrene	DUP-H	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Duplicate	Phenanthrene	DUP-H	L1497000-44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Method Blank	1,2,3,4,6,7,8-HpCDF	J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	OCDF	J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,4,6,7,8-HpCDD	M,J	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	OCDD	M,J	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,7,8,9-HpCDF	M,J	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,6,7,8-HxCDF	M,J	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	2,3,4,6,7,8-HxCDF	M,J	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
			82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	OCDD	M,J	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,7,8,9-HxCDF	M,J,R	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,7,8-PeCDF	M,J,R	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,6,7,8-HpCDD	M,J,R	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,4,6,7,8-HpCDF	M,J,R	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	OCDD	M,J,R	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	OCDF	M,J,R	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,4,6,7,8-HpCDD	M,J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,7,8,9-HxCDF	M,J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,7,8-PeCDF	M,J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	2,3,4,7,8-PeCDF	M,J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	2,3,7,8-TCDF	M,J,R	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	OCDF	M,U	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDF	M,U	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Certified Reference Material	Cadmium (Cd)-Total	RM-H	L1497000-60
Certified Reference Material	Cadmium (Cd)-Total	RM-H	L1497000-60
Duplicate	Antimony (Sb)-Total	RRU	L1497000-10, -11, -12, -121, -126, -128, -131, -132, -136, -137, -138, -146, -147, -17, -18, -23, -25, -29, -3, -30, -31, -33, -34, -35, -38, -6, -9
Method Blank	1,2,3,4,7,8,9-HpCDF	[J]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,4,6,7,8-HpCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	1,2,3,4,7,8,9-HpCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,6,7,8-HxCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,6,7,8-HxCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,7,8,9-HxCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,7,8-PeCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	2,3,4,6,7,8-HxCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	2,3,4,7,8-PeCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	2,3,7,8-TCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	2,3,7,8-TCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-HpCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-HxCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-PeCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-PeCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-TCDD	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	Total-TCDF	[U]	L1497000-26, -32, -36, -39, -45, -46, -78
Comments:	Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,6,7,8-HxCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,6,7,8-HxCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,7,8,9-HxCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,7,8,9-HxCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,7,8-PeCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	1,2,3,7,8-PeCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	2,3,4,6,7,8-HxCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	2,3,4,7,8-PeCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	2,3,7,8-TCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	2,3,7,8-TCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-HpCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-HxCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-HxCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-PeCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-PeCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-TCDD	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	Total-TCDF	[U]	L1497000-27, -28, -29, -30, -31, -33, -34, -35, -37, -38, -40, -41, -42
Comments:	Method blank has low level HpCDF hits but is within method blank criteria.		
Method Blank	1,2,3,4,7,8-HxCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,6,7,8-HxCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,7,8,9-HxCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	1,2,3,7,8-PeCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	2,3,7,8-TCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-HxCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-PeCDD	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		
Method Blank	Total-PeCDF	[U]	L1497000-43, -44, -47, -48, -49, -50, -51, -79, -80, -81, -82, -83
Comments:	Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.		

Qualifiers for Individual Parameters Listed:

Qualifier	Description
A	Method Blank exceeds ALS DQO. Refer to narrative comments for further information.
DLHM	Detection Limit Adjusted: Sample has High Moisture Content
DLIS	Detection Limit Adjusted: Insufficient Sample
DLM	Detection Limit Adjusted due to sample matrix effects.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
G	QC result did not meet ALS DQO. Refer to narrative comments for further information.
J,B	The analyte was detected below the calibrated range but above the EDL, and was detected in the Method Blank at >10% of the sample concentration.
J,R	The analyte was detected below the calibrated range but above the EDL, and the ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
M	A peak has been manually integrated.
M,J	A peak has been manually integrated, and the analyte was detected below the calibrated range but above the EDL.
M,J,R	A peak has been manually integrated, the analyte was detected below the calibrated range but above the EDL, and the ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
M,U	A peak has been manually integrated, and the analyte was not detected above the EDL.
RM-H	Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RRR	Refer to Report Remarks for issues regarding this analysis
RRU	Reported Result is Uncertain due to proximity to the estimated Method Detection Limit.
SMI	Surrogate recovery could not be measured due to sample matrix interference.
[J]	The analyte was detected below the calibrated range but above the EDL.
[U]	The analyte was not detected above the EDL.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
AG-DRY-CCMS-VA	Tissue	Silver in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020A
This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by Inductively Coupled Plasma - Mass Spectrometry, adapted from US EPA Method 6020A.			
AG-WET-CCMS-VA	Tissue	Silver in Tissue by CRC ICPMS (WET)	EPA 200.3/6020A
This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by Inductively Coupled Plasma - Mass Spectrometry, adapted from US EPA Method 6020A.			
C-TOT-ORG-LECO-SK	Soil	Organic Carbon by combustion method	SSSA (1996) p. 973
Total Organic Carbon (C-TOT-ORG-LECO-SK, C-TOT-ORG-SK)			

Total C and inorganic C are determined on separate samples. The total C is determined by combustion and thermal conductivity detection, while inorganic C is determined by weight loss after addition of hydrochloric acid. Organic C is calculated by the difference between these two determinations.

Reference for Total C:

Nelson, D.W. and Sommers, L.E. 1996. Total Carbon, organic carbon and organic matter. P. 961-1010 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

Reference for Inorganic C:

Loeppert, R.H. and Suarez, D.L. 1996. Gravimetric Method for Loss of Carbon Dioxide. P. 455-456 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

Reference Information

DX-1613B-HRMS-BU Soil Dioxins and Furans HR 1613B USEPA 1613B

Samples are extracted by Soxhlet. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS.

DX-1613B-HRMS-BU Tissue Dioxins and Furans HR 1613B USEPA 1613B

Samples are extracted by Soxhlet. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS.

HG-200.2-CVAF-VA Soil Mercury in Soil by CVAFS EPA 200.2/245.7

This analysis is carried out using procedures from CSR Analytical Method: "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, 26 June 2009, and procedures adapted from EPA Method 200.2. The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve (this sieve step is omitted for international soil samples), and a representative subsample of the dry material is weighed. The sample is then digested at 95 degrees Celsius for 2 hours by block digester using concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

HG-DRY-CVAFS-VA Tissue Mercury in Tissue by CVAFS (DRY) EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7. This digestion procedure was implemented on October 5, 2009.

HG-WET-CVAFS-VA Tissue Mercury in Tissue by CVAFS (WET) EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7. This digestion procedure was implemented on October 5, 2009.

MET-200.2-CCMS-VA Soil Metals in Soil by CRC ICPMS EPA 200.2/6020A

This analysis is carried out using procedures from CSR Analytical Method: "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, 26 June 2009, and procedures adapted from EPA Method 200.2. The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve (this sieve step is omitted for international soil samples), and a representative subsample of the dry material is weighed. The sample is then digested at 95 degrees Celsius for 2 hours by block digester using concentrated nitric and hydrochloric acids. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

MET-DRY-CCMS-VA Tissue Metals in Tissue by CRC ICPMS (DRY) EPA 200.3/6020A

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-WET-CCMS-VA Tissue Metals in Tissue by CRC ICPMS (WET) EPA 200.3/6020A

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MOISTURE-TISS-VA Tissue % Moisture in Tissues ASTM D2974-00 Method A

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

MOISTURE-VA Soil Moisture content ASTM D2974-00 Method A

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

PAH-SURR-MS-VA Tissue PAH Surrogates for Tissues SURROGATE

Reference Information

PAH-T-DRY-SOX-MS-VA Tissue PAHs in Tissue - dry weight basis EPA METHODS 3540, 3600 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PAH-T-WET-SOX-MS-VA Tissue PAHs in Tissue - wet weight basis EPA METHODS 3540, 3600 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PAH-TMB-H/A-MS-VA Soil PAH - Rotary Extraction (Hexane/Acetone) EPA 3570/8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PH-1:2-VA Soil pH in Soil (1:2 Soil:Water Extraction) BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
BU	ALS ENVIRONMENTAL - BURLINGTON, ONTARIO, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-365152	10-365153	10-365154	10-365155	10-365156
10-365157	10-365158	10-365159	10-365160	10-365161
10-365162				

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

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Client: GOLDER ASSOCIATES LTD.

500 - 4260 Still Creek Drive

Burnaby BC V5C 6C6

Contact: Stephanie Ko

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-TOT-ORG-LECO-SK		Soil						
Batch	R2929028							
WG1936505-1 DUP		L1497000-45						
Total Organic Carbon		11.6	11.9		%	2.9	30	26-AUG-14
WG1936505-4 DUP		L1497000-129						
Total Organic Carbon		0.46	0.45		%	0.9	30	26-AUG-14
WG1936505-2 IRM		08-109_SOIL						
Total Organic Carbon			1.08		%		0.77-1.43	26-AUG-14
WG1936505-5 IRM		08-109_SOIL						
Total Organic Carbon			0.93		%		0.77-1.43	26-AUG-14
WG1936505-3 MB								
Total Organic Carbon			<0.10		%		0.1	26-AUG-14
WG1936505-6 MB								
Total Organic Carbon			<0.10		%		0.1	26-AUG-14
DX-1613B-HRMS-BU		Soil						
Batch	R2952083							
WG1940179-2 LCS								
2,3,7,8-TCDD			111.0		%		67-158	13-SEP-14
1,2,3,7,8-PeCDD			109.0		%		70-142	13-SEP-14
1,2,3,4,7,8-HxCDD			106.0		%		70-164	13-SEP-14
1,2,3,6,7,8-HxCDD			97.0		%		76-134	13-SEP-14
1,2,3,7,8,9-HxCDD			121.0		%		64-162	13-SEP-14
1,2,3,4,6,7,8-HpCDD			106.0		%		70-140	13-SEP-14
OCDD			97.0		%		78-144	13-SEP-14
2,3,7,8-TCDF			105.0		%		75-158	13-SEP-14
1,2,3,7,8-PeCDF			108.0		%		80-134	13-SEP-14
2,3,4,7,8-PeCDF			101.0		%		68-160	13-SEP-14
1,2,3,4,7,8-HxCDF			106.0		%		72-134	13-SEP-14
1,2,3,6,7,8-HxCDF			103.0		%		84-130	13-SEP-14
2,3,4,6,7,8-HxCDF			102.0		%		78-130	13-SEP-14
1,2,3,7,8,9-HxCDF			108.0		%		70-156	13-SEP-14
1,2,3,4,6,7,8-HpCDF			99.0		%		82-122	13-SEP-14
1,2,3,4,7,8,9-HpCDF			105.0		%		78-138	13-SEP-14
OCDF			104.0		%		63-170	13-SEP-14
WG1940179-1 MB								
2,3,7,8-TCDD			<0.027	[U]	pg/g		0.027	13-SEP-14
1,2,3,7,8-PeCDD			<0.014	[U]	pg/g		0.014	13-SEP-14
1,2,3,4,7,8-HxCDD			<0.014	[U]	pg/g		0.014	13-SEP-14

COMMENTS: Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU	Soil							
Batch	R2952083							
WG1940179-1 MB								
1,2,3,6,7,8-HxCDD			<0.013	[U]	pg/g		0.013	13-SEP-14
1,2,3,7,8,9-HxCDD			<0.013	[U]	pg/g		0.013	13-SEP-14
1,2,3,4,6,7,8-HpCDD			0.025	M,J	pg/g		0.015	13-SEP-14
OCDD			0.037	M,J	pg/g		0.017	13-SEP-14
2,3,7,8-TCDF			<0.019	[U]	pg/g		0.019	13-SEP-14
1,2,3,7,8-PeCDF			0.023	M,J,R	pg/g		0.011	13-SEP-14
2,3,4,7,8-PeCDF			<0.0090	[U]	pg/g		0.009	13-SEP-14
1,2,3,4,7,8-HxCDF			<0.0090	[U]	pg/g		0.009	13-SEP-14
1,2,3,6,7,8-HxCDF			<0.0083	[U]	pg/g		0.0083	13-SEP-14
2,3,4,6,7,8-HxCDF			<0.0084	[U]	pg/g		0.0084	13-SEP-14
1,2,3,7,8,9-HxCDF			0.030	M,J,R	pg/g		0.011	13-SEP-14
1,2,3,4,6,7,8-HpCDF			<0.011	[U]	pg/g		0.011	13-SEP-14
1,2,3,4,7,8,9-HpCDF			<0.014	[U]	pg/g		0.014	13-SEP-14
OCDF			<0.013	M,U	pg/g		0.013	13-SEP-14
Total-TCDD			<0.027	[U]	pg/g		0.027	13-SEP-14
Total-PeCDD			<0.014	[U]	pg/g		0.014	13-SEP-14
Total-HxCDD			<0.014	[U]	pg/g		0.014	13-SEP-14
Total-HpCDD			0.025	A	pg/g		0.015	13-SEP-14
Total-TCDF			<0.019	[U]	pg/g		0.019	13-SEP-14
Total-PeCDF			<0.011	[U]	pg/g		0.011	13-SEP-14
Total-HxCDF			0.087	A	pg/g		0.011	13-SEP-14
Total-HpCDF			<0.014	[U]	pg/g		0.014	13-SEP-14
Surrogate: 13C12-2,3,7,8-TCDD			77.0		%		25-164	13-SEP-14
Surrogate: 13C12-1,2,3,7,8-PeCDD			104.0		%		25-181	13-SEP-14
Surrogate: 13C12-1,2,3,4,7,8-HxCDD			62.0		%		32-141	13-SEP-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDD			83.0		%		28-130	13-SEP-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD			81.0		%		23-140	13-SEP-14
Surrogate: 13C12-OCDD			73.0		%		17-157	13-SEP-14
Surrogate: 13C12-2,3,7,8-TCDF			85.0		%		24-169	13-SEP-14
Surrogate: 13C12-1,2,3,7,8-PeCDF			100.0		%		24-185	13-SEP-14
Surrogate: 13C12-2,3,4,7,8-PeCDF			107.0		%		21-178	13-SEP-14
Surrogate: 13C12-1,2,3,4,7,8-HxCDF			71.0		%		26-152	13-SEP-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDF			88.0		%		26-123	13-SEP-14
Surrogate: 13C12-2,3,4,6,7,8-HxCDF			79.0		%		29-147	13-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU								
Soil								
Batch R2952083								
WG1940179-1 MB								
Surrogate: 13C12-1,2,3,7,8,9-HxCDF			79.0		%		28-136	13-SEP-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF			77.0		%		28-143	13-SEP-14
Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF			85.0		%		26-138	13-SEP-14
Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)			78.0		%		35-197	13-SEP-14
COMMENTS: Method blank has small HpCDD and HxCDF hits but is well within method blank criteria.								
HG-200.2-CVAF-VA								
Soil								
Batch R2927179								
WG1935238-4 CRM								
Mercury (Hg)		VA-NRC-STSD1	116.4		%		70-130	24-AUG-14
WG1935238-5 CRM								
Mercury (Hg)		VA-CANMET-TILL1	115.9		%		70-130	24-AUG-14
WG1935238-2 DUP								
Mercury (Hg)		L1497000-7	<0.0050		mg/kg	N/A	40	24-AUG-14
WG1935238-3 LCS								
Mercury (Hg)			111.7		%		70-130	24-AUG-14
WG1935238-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	24-AUG-14
MET-200.2-CCMS-VA								
Soil								
Batch R2927789								
WG1935238-4 CRM								
Aluminum (Al)		VA-NRC-STSD1	106.0		%		70-130	22-AUG-14
Antimony (Sb)			102.2		%		70-130	22-AUG-14
Arsenic (As)			100.9		%		70-130	22-AUG-14
Barium (Ba)			97.3		%		70-130	22-AUG-14
Beryllium (Be)			107.6		%		70-130	22-AUG-14
Bismuth (Bi)			102.9		%		70-130	22-AUG-14
Cadmium (Cd)			99.4		%		70-130	22-AUG-14
Calcium (Ca)			101.2		%		70-130	22-AUG-14
Chromium (Cr)			107.1		%		70-130	22-AUG-14
Cobalt (Co)			104.7		%		70-130	22-AUG-14
Copper (Cu)			103.9		%		70-130	22-AUG-14
Iron (Fe)			106.4		%		70-130	22-AUG-14
Lead (Pb)			105.9		%		70-130	22-AUG-14
Lithium (Li)			110.6		%		70-130	22-AUG-14
Magnesium (Mg)			105.3		%		70-130	22-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R2927789							
WG1935238-4	CRM	VA-NRC-STSD1						
Manganese (Mn)			105.3		%		70-130	22-AUG-14
Molybdenum (Mo)			100.8		%		70-130	22-AUG-14
Nickel (Ni)			104.0		%		70-130	22-AUG-14
Phosphorus (P)			107.1		%		70-130	22-AUG-14
Potassium (K)			114.0		%		70-130	22-AUG-14
Selenium (Se)			101.4		%		70-130	22-AUG-14
Silver (Ag)			99.8		%		70-130	22-AUG-14
Sodium (Na)			114.5		%		70-130	22-AUG-14
Strontium (Sr)			105.9		%		70-130	22-AUG-14
Thallium (Tl)			100.2		%		70-130	22-AUG-14
Tin (Sn)			127.5		%		70-130	22-AUG-14
Titanium (Ti)			121.1		%		70-130	22-AUG-14
Vanadium (V)			108.6		%		70-130	22-AUG-14
Zinc (Zn)			103.0		%		70-130	22-AUG-14
WG1935238-5	CRM	VA-CANMET-TILL1						
Aluminum (Al)			104.2		%		70-130	22-AUG-14
Antimony (Sb)			104.3		%		70-130	22-AUG-14
Arsenic (As)			108.6		%		70-130	22-AUG-14
Barium (Ba)			106.5		%		70-130	22-AUG-14
Beryllium (Be)			0.59		mg/kg		0.34-0.74	22-AUG-14
Bismuth (Bi)			105.9		%		70-130	22-AUG-14
Cadmium (Cd)			102.0		%		70-130	22-AUG-14
Calcium (Ca)			113.1		%		70-130	22-AUG-14
Chromium (Cr)			112.8		%		70-130	22-AUG-14
Cobalt (Co)			103.2		%		70-130	22-AUG-14
Copper (Cu)			101.9		%		70-130	22-AUG-14
Iron (Fe)			104.2		%		70-130	22-AUG-14
Lead (Pb)			97.3		%		70-130	22-AUG-14
Lithium (Li)			114.4		%		70-130	22-AUG-14
Magnesium (Mg)			106.9		%		70-130	22-AUG-14
Manganese (Mn)			102.5		%		70-130	22-AUG-14
Molybdenum (Mo)			0.69		mg/kg		0.24-1.24	22-AUG-14
Nickel (Ni)			106.2		%		70-130	22-AUG-14
Phosphorus (P)			112.0		%		70-130	22-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R2927789							
WG1935238-5	CRM	VA-CANMET-TILL1						
Potassium (K)			125.0		%		70-130	22-AUG-14
Selenium (Se)			0.34		mg/kg		0.12-0.52	22-AUG-14
Silver (Ag)			0.23		mg/kg		0.12-0.32	22-AUG-14
Sodium (Na)			128.5		%		70-130	22-AUG-14
Strontium (Sr)			117.6		%		70-130	22-AUG-14
Thallium (Tl)			0.128		mg/kg		0.075-0.175	22-AUG-14
Tin (Sn)			1.1		mg/kg		0-3	22-AUG-14
Titanium (Ti)			121.6		%		70-130	22-AUG-14
Uranium (U)			115.9		%		70-130	22-AUG-14
Vanadium (V)			113.9		%		70-130	22-AUG-14
Zinc (Zn)			104.3		%		70-130	22-AUG-14
WG1935238-2	DUP	L1497000-7						
Aluminum (Al)		6550	6980		mg/kg	6.3	40	22-AUG-14
Antimony (Sb)		<0.10	<0.10	RPD-NA	mg/kg	N/A	30	22-AUG-14
Arsenic (As)		2.19	2.23		mg/kg	2.0	30	22-AUG-14
Barium (Ba)		36.0	37.3		mg/kg	3.5	40	22-AUG-14
Beryllium (Be)		0.36	0.36		mg/kg	1.8	30	22-AUG-14
Bismuth (Bi)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	22-AUG-14
Cadmium (Cd)		<0.050	<0.050	RPD-NA	mg/kg	N/A	30	22-AUG-14
Calcium (Ca)		1330	1320		mg/kg	1.1	30	22-AUG-14
Chromium (Cr)		17.2	18.6		mg/kg	7.9	30	22-AUG-14
Cobalt (Co)		3.73	4.38		mg/kg	16	30	22-AUG-14
Copper (Cu)		6.10	5.71		mg/kg	6.6	30	22-AUG-14
Iron (Fe)		9920	10400		mg/kg	4.6	30	22-AUG-14
Lead (Pb)		2.86	3.08		mg/kg	7.6	40	22-AUG-14
Lithium (Li)		26.8	26.6		mg/kg	0.9	30	22-AUG-14
Magnesium (Mg)		3090	3330		mg/kg	7.4	30	22-AUG-14
Manganese (Mn)		99.1	110		mg/kg	10	30	22-AUG-14
Molybdenum (Mo)		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	22-AUG-14
Nickel (Ni)		8.82	9.38		mg/kg	6.2	30	22-AUG-14
Phosphorus (P)		417	480		mg/kg	14	30	22-AUG-14
Potassium (K)		2100	2180		mg/kg	4.0	40	22-AUG-14
Selenium (Se)		<0.20	<0.20	RPD-NA	mg/kg	N/A	30	22-AUG-14
Silver (Ag)		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	22-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R2927789							
WG1935238-2	DUP	L1497000-7						
Sodium (Na)		150	140		mg/kg	6.8	40	22-AUG-14
Strontium (Sr)		5.91	5.63		mg/kg	4.9	40	22-AUG-14
Thallium (Tl)		0.164	0.156		mg/kg	4.6	30	22-AUG-14
Tin (Sn)		<2.0	<2.0	RPD-NA	mg/kg	N/A	40	22-AUG-14
Titanium (Ti)		494	485		mg/kg	1.8	40	22-AUG-14
Uranium (U)		2.42	2.67		mg/kg	9.9	30	22-AUG-14
Vanadium (V)		19.0	18.0		mg/kg	5.6	30	22-AUG-14
Zinc (Zn)		26.0	27.0		mg/kg	3.8	30	22-AUG-14
WG1935238-3	LCS							
Aluminum (Al)			97.2		%		70-130	22-AUG-14
Antimony (Sb)			97.2		%		70-130	22-AUG-14
Arsenic (As)			99.1		%		70-130	22-AUG-14
Barium (Ba)			100.5		%		70-130	22-AUG-14
Beryllium (Be)			98.2		%		70-130	22-AUG-14
Bismuth (Bi)			99.0		%		70-130	22-AUG-14
Cadmium (Cd)			98.2		%		70-130	22-AUG-14
Calcium (Ca)			93.2		%		70-130	22-AUG-14
Chromium (Cr)			100.1		%		70-130	22-AUG-14
Cobalt (Co)			97.6		%		70-130	22-AUG-14
Copper (Cu)			97.5		%		70-130	22-AUG-14
Iron (Fe)			100.6		%		70-130	22-AUG-14
Lead (Pb)			98.8		%		70-130	22-AUG-14
Lithium (Li)			97.6		%		70-130	22-AUG-14
Magnesium (Mg)			99.0		%		70-130	22-AUG-14
Manganese (Mn)			99.7		%		70-130	22-AUG-14
Molybdenum (Mo)			96.2		%		70-130	22-AUG-14
Nickel (Ni)			97.4		%		70-130	22-AUG-14
Phosphorus (P)			98.6		%		70-130	22-AUG-14
Potassium (K)			101.0		%		70-130	22-AUG-14
Selenium (Se)			101.2		%		70-130	22-AUG-14
Silver (Ag)			92.9		%		70-130	22-AUG-14
Sodium (Na)			100.5		%		70-130	22-AUG-14
Strontium (Sr)			98.3		%		70-130	22-AUG-14
Thallium (Tl)			99.1		%		70-130	22-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA		Soil						
Batch	R2927789							
WG1935238-3	LCS							
Tin (Sn)			95.8		%		70-130	22-AUG-14
Titanium (Ti)			99.7		%		70-130	22-AUG-14
Uranium (U)			97.7		%		70-130	22-AUG-14
Vanadium (V)			100.6		%		70-130	22-AUG-14
Zinc (Zn)			93.8		%		70-130	22-AUG-14
WG1935238-1	MB							
Aluminum (Al)			<50		mg/kg		50	22-AUG-14
Antimony (Sb)			<0.10		mg/kg		0.1	22-AUG-14
Arsenic (As)			<0.050		mg/kg		0.05	22-AUG-14
Barium (Ba)			<0.50		mg/kg		0.5	22-AUG-14
Beryllium (Be)			<0.20		mg/kg		0.2	22-AUG-14
Bismuth (Bi)			<0.20		mg/kg		0.2	22-AUG-14
Cadmium (Cd)			<0.050		mg/kg		0.05	22-AUG-14
Calcium (Ca)			<50		mg/kg		50	22-AUG-14
Chromium (Cr)			<0.50		mg/kg		0.5	22-AUG-14
Cobalt (Co)			<0.10		mg/kg		0.1	22-AUG-14
Copper (Cu)			<0.50		mg/kg		0.5	22-AUG-14
Iron (Fe)			<50		mg/kg		50	22-AUG-14
Lead (Pb)			<0.50		mg/kg		0.5	22-AUG-14
Lithium (Li)			<5.0		mg/kg		5	22-AUG-14
Magnesium (Mg)			<20		mg/kg		20	22-AUG-14
Manganese (Mn)			<1.0		mg/kg		1	22-AUG-14
Molybdenum (Mo)			<0.50		mg/kg		0.5	22-AUG-14
Nickel (Ni)			<0.50		mg/kg		0.5	22-AUG-14
Phosphorus (P)			<50		mg/kg		50	22-AUG-14
Potassium (K)			<100		mg/kg		100	22-AUG-14
Selenium (Se)			<0.20		mg/kg		0.2	22-AUG-14
Silver (Ag)			<0.10		mg/kg		0.1	22-AUG-14
Sodium (Na)			<100		mg/kg		100	22-AUG-14
Strontium (Sr)			<0.50		mg/kg		0.5	22-AUG-14
Thallium (Tl)			<0.050		mg/kg		0.05	22-AUG-14
Tin (Sn)			<2.0		mg/kg		2	22-AUG-14
Titanium (Ti)			<1.0		mg/kg		1	22-AUG-14
Uranium (U)			<0.050		mg/kg		0.05	22-AUG-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-VA								
Soil								
Batch R2927789								
WG1935238-1 MB								
Vanadium (V)			<0.20		mg/kg		0.2	22-AUG-14
Zinc (Zn)			<1.0		mg/kg		1	22-AUG-14
MOISTURE-VA								
Soil								
Batch R2925148								
WG1935235-2 LCS								
Moisture			99.9		%		90-110	20-AUG-14
WG1935235-1 MB								
Moisture			<0.25		%		0.25	20-AUG-14
PAH-TMB-H/A-MS-VA								
Soil								
Batch R2926503								
WG1934691-6 DUP								
		L1497000-39						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	26-AUG-14
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	26-AUG-14
Anthracene		<0.0040	<0.0040	RPD-NA	mg/kg	N/A	50	26-AUG-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Benzo(b)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Dibenz(a,h)anthracene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	50	26-AUG-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Fluorene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
2-Methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg	N/A	50	26-AUG-14
WG1934691-4 IRM								
		ALS PAH1 RM						
Acenaphthene			67.6		%		60-130	26-AUG-14
Acenaphthylene			116.8		%		60-130	26-AUG-14
Anthracene			109.1		%		60-130	26-AUG-14
Benz(a)anthracene			115.7		%		60-130	26-AUG-14
Benzo(a)pyrene			104.3		%		60-130	26-AUG-14
Benzo(b)fluoranthene			120.6		%		60-130	26-AUG-14



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TMB-H/A-MS-VA		Soil						
Batch	R2926503							
WG1934691-4		IRM	ALS PAH1 RM					
Benzo(g,h,i)perylene			122.6		%		60-130	26-AUG-14
Benzo(k)fluoranthene			117.4		%		60-130	26-AUG-14
Chrysene			124.9		%		60-130	26-AUG-14
Dibenz(a,h)anthracene			120.7		%		60-130	26-AUG-14
Fluoranthene			123.7		%		60-130	26-AUG-14
Fluorene			69.5		%		60-130	26-AUG-14
Indeno(1,2,3-c,d)pyrene			126.6		%		60-130	26-AUG-14
2-Methylnaphthalene			84.3		%		60-130	26-AUG-14
Naphthalene			71.7		%		50-130	26-AUG-14
Phenanthrene			120.9		%		60-130	26-AUG-14
Pyrene			121.0		%		60-130	26-AUG-14
WG1934691-1		MB						
Acenaphthene			<0.0050		mg/kg		0.005	26-AUG-14
Acenaphthylene			<0.0050		mg/kg		0.005	26-AUG-14
Anthracene			<0.0040		mg/kg		0.004	26-AUG-14
Benz(a)anthracene			<0.010		mg/kg		0.01	26-AUG-14
Benzo(a)pyrene			<0.010		mg/kg		0.01	26-AUG-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	26-AUG-14
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	26-AUG-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	26-AUG-14
Chrysene			<0.010		mg/kg		0.01	26-AUG-14
Dibenz(a,h)anthracene			<0.0050		mg/kg		0.005	26-AUG-14
Fluoranthene			<0.010		mg/kg		0.01	26-AUG-14
Fluorene			<0.010		mg/kg		0.01	26-AUG-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	26-AUG-14
2-Methylnaphthalene			<0.010		mg/kg		0.01	26-AUG-14
Naphthalene			<0.010		mg/kg		0.01	26-AUG-14
Phenanthrene			<0.010		mg/kg		0.01	26-AUG-14
Pyrene			<0.010		mg/kg		0.01	26-AUG-14
Surrogate: Naphthalene d8			98.2		%		50-130	26-AUG-14
Surrogate: Acenaphthene d10			100.7		%		60-130	26-AUG-14
Surrogate: Phenanthrene d10			97.5		%		60-130	26-AUG-14
Surrogate: Chrysene d12			116.2		%		60-130	26-AUG-14
PH-1:2-VA		Soil						

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PH-1:2-VA		Soil						
Batch	R2926598							
WG1935238-2	DUP	L1497000-7						
pH (1:2 soil:water)		5.47	5.47	J	pH	0.00	0.3	22-AUG-14
AG-DRY-CCMS-VA		Tissue						
Batch	R2979198							
WG1956812-4	CRM	VA-NIST-1566B						
Silver (Ag)-Total			95.4		%		70-130	08-OCT-14
WG1956812-1	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	08-OCT-14
WG1956812-2	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	08-OCT-14
Batch	R2980898							
WG1954103-5	CRM	VA-NIST-1566B						
Silver (Ag)-Total			99.4		%		70-130	24-SEP-14
WG1955066-11	CRM	VA-NIST-1566B						
Silver (Ag)-Total			92.7		%		70-130	24-SEP-14
WG1954103-1	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	24-SEP-14
WG1954103-2	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	24-SEP-14
WG1955066-7	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	24-SEP-14
WG1955066-8	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Batch	R3012388							
WG1954103-3	DUP	L1497000-10						
Silver (Ag)-Total		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	21-OCT-14
WG1954103-4	DUP	L1497000-146						
Silver (Ag)-Total		0.0162	0.0147		mg/kg	9.7	40	21-OCT-14
Batch	R3013448							
WG1979398-4	CRM	VA-NIST-1566B						
Silver (Ag)-Total			94.3		%		70-130	21-OCT-14
WG1979398-3	DUP	L1497000-122						
Silver (Ag)-Total		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	21-OCT-14
WG1979398-1	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	21-OCT-14
WG1979398-2	MB							
Silver (Ag)-Total			<0.0050		mg/kg		0.005	21-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
AG-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-5 CRM		VA-NIST-1566B						
Silver (Ag)-Total			95.3		%		70-130	23-OCT-14
WG1981395-3 DUP		L1497000-60						
Silver (Ag)-Total		0.0133	0.0142		mg/kg	6.5	40	23-OCT-14
WG1981395-1 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	23-OCT-14
WG1981395-2 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	23-OCT-14
Batch	R3034499							
WG1979546-4 CRM		VA-NIST-1566B						
Silver (Ag)-Total			98.2		%		70-130	29-OCT-14
WG1980627-4 CRM		VA-NIST-1566B						
Silver (Ag)-Total			101.3		%		70-130	29-OCT-14
WG1979546-3 DUP		L1497000-82						
Silver (Ag)-Total		0.0154	0.0147		mg/kg	4.2	40	29-OCT-14
WG1980627-3 DUP		L1497000-93						
Silver (Ag)-Total		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	29-OCT-14
WG1979546-1 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1979546-2 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1980627-1 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1980627-2 MB								
Silver (Ag)-Total			<0.0050		mg/kg		0.005	29-OCT-14
AG-WET-CCMS-VA		Tissue						
Batch	R2979198							
WG1956812-4 CRM		VA-NIST-1566B						
Silver (Ag)-Total			94.5		%		70-130	08-OCT-14
WG1956812-1 MB								
Silver (Ag)-Total			<0.0010		mg/kg wwt		0.001	08-OCT-14
WG1956812-2 MB								
Silver (Ag)-Total			<0.0010		mg/kg wwt		0.001	08-OCT-14
Batch	R2980898							
WG1954103-5 CRM		VA-NIST-1566B						
Silver (Ag)-Total			98.6		%		70-130	24-SEP-14
WG1955066-11 CRM		VA-NIST-1566B						
Silver (Ag)-Total			91.8		%		70-130	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
AG-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-1 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
WG1954103-2 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
WG1955066-7 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
WG1955066-8 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Batch	R2997730							
WG1955066-10 DUP		L1497000-114						
Silver (Ag)-Total		0.0013	<0.0010	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Batch	R3012388							
WG1954103-3 DUP		L1497000-10						
Silver (Ag)-Total		<0.0010	<0.0010	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
WG1954103-4 DUP		L1497000-146						
Silver (Ag)-Total		0.0142	0.0129		mg/kg ww	9.7	40	21-OCT-14
Batch	R3013448							
WG1979398-4 CRM		VA-NIST-1566B						
Silver (Ag)-Total			93.4		%		70-130	21-OCT-14
WG1979398-3 DUP		L1497000-122						
Silver (Ag)-Total		<0.0010	<0.0010	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
WG1979398-1 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
WG1979398-2 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
Batch	R3020548							
WG1981395-5 CRM		VA-NIST-1566B						
Silver (Ag)-Total			94.4		%		70-130	23-OCT-14
WG1955066-9 DUP		L1497000-22						
Silver (Ag)-Total		0.0183	0.0184		mg/kg ww	1.0	40	23-OCT-14
WG1981395-3 DUP		L1497000-60						
Silver (Ag)-Total		0.0021	0.0023		mg/kg ww	6.5	40	23-OCT-14
WG1981395-1 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14
WG1981395-2 MB								
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
AG-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-4	CRM	VA-NIST-1566B						
Silver (Ag)-Total			97.3		%		70-130	29-OCT-14
WG1980627-4	CRM	VA-NIST-1566B						
Silver (Ag)-Total			100.4		%		70-130	29-OCT-14
WG1979546-3	DUP	L1497000-82						
Silver (Ag)-Total		0.0140	0.0135		mg/kg ww	4.2	40	29-OCT-14
WG1980627-3	DUP	L1497000-93						
Silver (Ag)-Total		<0.0010	<0.0010	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
WG1979546-1	MB							
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
WG1979546-2	MB							
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
WG1980627-1	MB							
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
WG1980627-2	MB							
Silver (Ag)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
DX-1613B-HRMS-BU		Tissue						
Batch	R3106748							
WG1987830-2	LCS							
2,3,7,8-TCDD			75.0		%		67-158	21-NOV-14
1,2,3,7,8-PeCDD			97.0		%		70-142	21-NOV-14
1,2,3,4,7,8-HxCDD			95.0		%		70-164	21-NOV-14
1,2,3,6,7,8-HxCDD			83.0		%		76-134	21-NOV-14
1,2,3,7,8,9-HxCDD			94.0		%		64-162	21-NOV-14
1,2,3,4,6,7,8-HpCDD			100.0		%		70-140	21-NOV-14
OCDD			88.0		%		78-144	21-NOV-14
2,3,7,8-TCDF			84.0		%		75-158	21-NOV-14
1,2,3,7,8-PeCDF			99.0		%		80-134	21-NOV-14
2,3,4,7,8-PeCDF			91.0		%		68-160	21-NOV-14
1,2,3,4,7,8-HxCDF			97.0		%		72-134	21-NOV-14
1,2,3,6,7,8-HxCDF			94.0		%		84-130	21-NOV-14
2,3,4,6,7,8-HxCDF			99.0		%		78-130	21-NOV-14
1,2,3,7,8,9-HxCDF			98.0		%		70-156	21-NOV-14
1,2,3,4,6,7,8-HpCDF			93.0		%		82-122	21-NOV-14
1,2,3,4,7,8,9-HpCDF			93.0		%		78-138	21-NOV-14
OCDF			89.0		%		63-170	21-NOV-14
WG1987830-1	MB							

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU Tissue								
Batch	R3106748							
WG1987830-1 MB								
2,3,7,8-TCDD			<0.26	[U]	pg/g ww		0.26	21-NOV-14
1,2,3,7,8-PeCDD			<0.067	[U]	pg/g ww		0.067	21-NOV-14
1,2,3,4,7,8-HxCDD			<0.059	[U]	pg/g ww		0.059	21-NOV-14
1,2,3,6,7,8-HxCDD			<0.056	[U]	pg/g ww		0.056	21-NOV-14
1,2,3,7,8,9-HxCDD			<0.056	[U]	pg/g ww		0.056	21-NOV-14
1,2,3,4,6,7,8-HpCDD			0.110	M,J,R	pg/g ww		0.052	21-NOV-14
OCDD			0.440	M,J,R	pg/g ww		0.056	21-NOV-14
2,3,7,8-TCDF			<0.13	[U]	pg/g ww		0.13	21-NOV-14
1,2,3,7,8-PeCDF			<0.062	[U]	pg/g ww		0.062	21-NOV-14
2,3,4,7,8-PeCDF			<0.055	[U]	pg/g ww		0.055	21-NOV-14
1,2,3,4,7,8-HxCDF			<0.046	[U]	pg/g ww		0.046	21-NOV-14
1,2,3,6,7,8-HxCDF			<0.045	[U]	pg/g ww		0.045	21-NOV-14
2,3,4,6,7,8-HxCDF			<0.049	[U]	pg/g ww		0.049	21-NOV-14
1,2,3,7,8,9-HxCDF			<0.062	[U]	pg/g ww		0.062	21-NOV-14
1,2,3,4,6,7,8-HpCDF			0.058	M,J,R	pg/g ww		0.037	21-NOV-14
1,2,3,4,7,8,9-HpCDF			0.064	M,J	pg/g ww		0.052	21-NOV-14
OCDF			0.210	M,J,R	pg/g ww		0.083	21-NOV-14
Total-TCDD			<0.26	[U]	pg/g ww		0.26	21-NOV-14
Total-PeCDD			<0.067	[U]	pg/g ww		0.067	21-NOV-14
Total-HxCDD			<0.059	[U]	pg/g ww		0.059	21-NOV-14
Total-HpCDD			<0.052	[U]	pg/g ww		0.052	21-NOV-14
Total-TCDF			<0.13	[U]	pg/g ww		0.13	21-NOV-14
Total-PeCDF			<0.062	[U]	pg/g ww		0.062	21-NOV-14
Total-HxCDF			<0.062	[U]	pg/g ww		0.062	21-NOV-14
Total-HpCDF			0.064	A	pg/g ww		0.052	21-NOV-14
Surrogate: 13C12-2,3,7,8-TCDD			56.0		%		25-164	21-NOV-14
Surrogate: 13C12-1,2,3,7,8-PeCDD			74.0		%		25-181	21-NOV-14
Surrogate: 13C12-1,2,3,4,7,8-HxCDD			80.0		%		32-141	21-NOV-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDD			105.0		%		28-130	21-NOV-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD			90.0		%		23-140	21-NOV-14
Surrogate: 13C12-OCDD			86.0		%		17-157	21-NOV-14
Surrogate: 13C12-2,3,7,8-TCDF			69.0		%		24-169	21-NOV-14
Surrogate: 13C12-1,2,3,7,8-PeCDF			75.0		%		21-192	21-NOV-14
Surrogate: 13C12-2,3,4,7,8-PeCDF			79.0		%		21-178	21-NOV-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU Tissue								
Batch R3106748								
WG1987830-1 MB								
Surrogate: 13C12-1,2,3,4,7,8-HxCDF			83.0		%		26-152	21-NOV-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDF			94.0		%		26-123	21-NOV-14
Surrogate: 13C12-2,3,4,6,7,8-HxCDF			81.0		%		29-147	21-NOV-14
Surrogate: 13C12-1,2,3,7,8,9-HxCDF			80.0		%		28-136	21-NOV-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF			86.0		%		28-143	21-NOV-14
Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF			87.0		%		26-138	21-NOV-14
Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)			63.0		%		31-197	21-NOV-14
COMMENTS: Method blank has low level HpCDF hits but is within method blank criteria.								
Batch R3106749								
WG1987842-2 LCS								
2,3,7,8-TCDD			86.0		%		67-158	19-NOV-14
1,2,3,7,8-PeCDD			99.0		%		70-142	19-NOV-14
1,2,3,4,7,8-HxCDD			93.0		%		70-164	19-NOV-14
1,2,3,6,7,8-HxCDD			82.0		%		76-134	19-NOV-14
1,2,3,7,8,9-HxCDD			96.0		%		64-162	19-NOV-14
1,2,3,4,6,7,8-HpCDD			99.0		%		70-140	19-NOV-14
OCDD			89.0		%		78-144	19-NOV-14
2,3,7,8-TCDF			81.0		%		75-158	19-NOV-14
1,2,3,7,8-PeCDF			97.0		%		80-134	19-NOV-14
2,3,4,7,8-PeCDF			89.0		%		68-160	19-NOV-14
1,2,3,4,7,8-HxCDF			94.0		%		72-134	19-NOV-14
1,2,3,6,7,8-HxCDF			95.0		%		84-130	19-NOV-14
2,3,4,6,7,8-HxCDF			96.0		%		78-130	19-NOV-14
1,2,3,7,8,9-HxCDF			93.0		%		70-156	19-NOV-14
1,2,3,4,6,7,8-HpCDF			91.0		%		82-122	19-NOV-14
1,2,3,4,7,8,9-HpCDF			95.0		%		78-138	19-NOV-14
OCDF			91.0		%		63-170	19-NOV-14
WG1987842-1 MB								
2,3,7,8-TCDD			<0.045	[U]	pg/g ww		0.045	19-NOV-14
1,2,3,7,8-PeCDD			<0.017	[U]	pg/g ww		0.017	19-NOV-14
1,2,3,4,7,8-HxCDD			<0.024	[U]	pg/g ww		0.024	19-NOV-14
1,2,3,6,7,8-HxCDD			<0.022	[U]	pg/g ww		0.022	19-NOV-14
1,2,3,7,8,9-HxCDD			<0.023	[U]	pg/g ww		0.023	19-NOV-14
1,2,3,4,6,7,8-HpCDD			0.031	M,J,R	pg/g ww		0.016	19-NOV-14
OCDD			0.134	M,J	pg/g ww		0.011	19-NOV-14

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DX-1613B-HRMS-BU Tissue								
Batch	R3106749							
WG1987842-1 MB								
2,3,7,8-TCDF			0.190	M,J,R	pg/g ww		0.033	19-NOV-14
1,2,3,7,8-PeCDF			0.021	M,J,R	pg/g ww		0.02	19-NOV-14
2,3,4,7,8-PeCDF			0.021	M,J,R	pg/g ww		0.018	19-NOV-14
1,2,3,4,7,8-HxCDF			<0.011	M,U	pg/g ww		0.011	19-NOV-14
1,2,3,6,7,8-HxCDF			0.012	M,J	pg/g ww		0.011	19-NOV-14
2,3,4,6,7,8-HxCDF			0.019	M,J	pg/g ww		0.011	19-NOV-14
1,2,3,7,8,9-HxCDF			0.029	M,J,R	pg/g ww		0.014	19-NOV-14
1,2,3,4,6,7,8-HpCDF			0.026	J,R	pg/g ww		0.011	19-NOV-14
1,2,3,4,7,8,9-HpCDF			0.025	[J]	pg/g ww		0.014	19-NOV-14
OCDF			0.071	J,R	pg/g ww		0.011	19-NOV-14
Total-TCDD			0.080	A	pg/g ww		0.045	19-NOV-14
Total-PeCDD			<0.017	[U]	pg/g ww		0.017	19-NOV-14
Total-HxCDD			<0.024	[U]	pg/g ww		0.024	19-NOV-14
Total-HpCDD			0.021	A	pg/g ww		0.016	19-NOV-14
Total-TCDF			0.137	A	pg/g ww		0.033	19-NOV-14
Total-PeCDF			<0.020	[U]	pg/g ww		0.02	19-NOV-14
Total-HxCDF			0.031	A	pg/g ww		0.014	19-NOV-14
Total-HpCDF			0.025	A	pg/g ww		0.014	19-NOV-14
Surrogate: 13C12-2,3,7,8-TCDD			74.0		%		25-164	19-NOV-14
Surrogate: 13C12-1,2,3,7,8-PeCDD			74.0		%		25-181	19-NOV-14
Surrogate: 13C12-1,2,3,4,7,8-HxCDD			91.0		%		32-141	19-NOV-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDD			96.0		%		28-130	19-NOV-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD			91.0		%		23-140	19-NOV-14
Surrogate: 13C12-OCDD			94.0		%		17-157	19-NOV-14
Surrogate: 13C12-2,3,7,8-TCDF			79.0		%		24-169	19-NOV-14
Surrogate: 13C12-1,2,3,7,8-PeCDF			79.0		%		21-192	19-NOV-14
Surrogate: 13C12-2,3,4,7,8-PeCDF			83.0		%		21-178	19-NOV-14
Surrogate: 13C12-1,2,3,4,7,8-HxCDF			86.0		%		26-152	19-NOV-14
Surrogate: 13C12-1,2,3,6,7,8-HxCDF			93.0		%		26-123	19-NOV-14
Surrogate: 13C12-2,3,4,6,7,8-HxCDF			86.0		%		29-147	19-NOV-14
Surrogate: 13C12-1,2,3,7,8,9-HxCDF			91.0		%		28-136	19-NOV-14
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF			94.0		%		28-143	19-NOV-14
Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF			104.0		%		26-138	19-NOV-14
Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)			67.0		%		31-197	19-NOV-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU Tissue								
Batch R3106749								
WG1987842-1 MB								
COMMENTS: Method blank has low level hits for dioxins and funans. Samples are tagged with a "B" flag where method blank hit exceeds 10% of sample hit.								
HG-DRY-CVAFS-VA Tissue								
Batch R2959660								
WG1954103-5 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			88.0		%		70-130	25-SEP-14
WG1954103-6 CRM		VA-NIST-1547						
Mercury (Hg)-Total			99.0		%		70-130	25-SEP-14
WG1955066-11 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			94.9		%		70-130	25-SEP-14
WG1955066-12 CRM		VA-NIST-1547						
Mercury (Hg)-Total			105.5		%		70-130	25-SEP-14
WG1954103-3 DUP		L1497000-10						
Mercury (Hg)-Total		0.0143	0.0146		mg/kg	2.2	40	25-SEP-14
WG1954103-4 DUP		L1497000-146						
Mercury (Hg)-Total		0.0408	0.0397		mg/kg	2.9	40	25-SEP-14
WG1955066-10 DUP		L1497000-114						
Mercury (Hg)-Total		0.0128	0.0143		mg/kg	11	40	25-SEP-14
WG1955066-9 DUP		L1497000-22						
Mercury (Hg)-Total		0.102	0.100		mg/kg	1.9	40	25-SEP-14
WG1954103-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	25-SEP-14
WG1954103-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	25-SEP-14
WG1955066-7 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	25-SEP-14
WG1955066-8 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	25-SEP-14
Batch R2973811								
WG1956812-4 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			96.3		%		70-130	04-OCT-14
WG1956812-5 CRM		VA-NIST-1547						
Mercury (Hg)-Total			103.4		%		70-130	04-OCT-14
WG1956812-3 DUP		L1497000-60						
Mercury (Hg)-Total		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	04-OCT-14
WG1956812-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	04-OCT-14
WG1956812-2 MB								

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HG-DRY-CVAFS-VA Tissue								
Batch R2973811								
WG1956812-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	04-OCT-14
Batch R3033391								
WG1979546-4 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			94.6		%		70-130	29-OCT-14
WG1979546-5 CRM		VA-NIST-1547						
Mercury (Hg)-Total			100.3		%		70-130	29-OCT-14
WG1980627-4 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			91.9		%		70-130	29-OCT-14
WG1980627-5 CRM		VA-NIST-1547						
Mercury (Hg)-Total			103.7		%		70-130	29-OCT-14
WG1979546-3 DUP		L1497000-82						
Mercury (Hg)-Total		0.0732	0.0750		mg/kg	2.4	40	29-OCT-14
WG1980627-3 DUP		L1497000-93						
Mercury (Hg)-Total		0.0101	0.0115		mg/kg	12	40	29-OCT-14
WG1979546-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1979546-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1980627-1 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	29-OCT-14
WG1980627-2 MB								
Mercury (Hg)-Total			<0.0050		mg/kg		0.005	29-OCT-14
HG-WET-CVAFS-VA Tissue								
Batch R2959657								
WG1954103-5 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			88.0		%		70-130	25-SEP-14
WG1954103-6 CRM		VA-NIST-1547						
Mercury (Hg)-Total			99.0		%		70-130	25-SEP-14
WG1955066-11 CRM		VA-NIST-1566B						
Mercury (Hg)-Total			94.9		%		70-130	25-SEP-14
WG1955066-12 CRM		VA-NIST-1547						
Mercury (Hg)-Total			105.5		%		70-130	25-SEP-14
WG1954103-3 DUP		L1497000-10						
Mercury (Hg)-Total		0.0079	0.0081		mg/kg wwt	2.2	40	25-SEP-14
WG1954103-4 DUP		L1497000-146						
Mercury (Hg)-Total		0.0358	0.0347		mg/kg wwt	2.9	40	25-SEP-14
WG1955066-10 DUP		L1497000-114						



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-WET-CVAFS-VA		Tissue						
Batch	R2959657							
WG1955066-10	DUP	L1497000-114						
Mercury (Hg)-Total		0.0066	0.0073		mg/kg ww	11	40	25-SEP-14
WG1955066-9	DUP	L1497000-22						
Mercury (Hg)-Total		0.0991	0.0972		mg/kg ww	1.9	40	25-SEP-14
WG1954103-1	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	25-SEP-14
WG1954103-2	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	25-SEP-14
WG1955066-7	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	25-SEP-14
WG1955066-8	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	25-SEP-14
Batch	R2973810							
WG1956812-4	CRM	VA-NIST-1566B						
Mercury (Hg)-Total			96.3		%		70-130	04-OCT-14
WG1956812-5	CRM	VA-NIST-1547						
Mercury (Hg)-Total			103.4		%		70-130	04-OCT-14
WG1956812-3	DUP	L1497000-60						
Mercury (Hg)-Total		<0.0010	<0.0010	RPD-NA	mg/kg ww	N/A	40	04-OCT-14
WG1956812-1	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	04-OCT-14
WG1956812-2	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	04-OCT-14
Batch	R3033389							
WG1979546-4	CRM	VA-NIST-1566B						
Mercury (Hg)-Total			94.6		%		70-130	29-OCT-14
WG1979546-5	CRM	VA-NIST-1547						
Mercury (Hg)-Total			100.3		%		70-130	29-OCT-14
WG1980627-4	CRM	VA-NIST-1566B						
Mercury (Hg)-Total			91.9		%		70-130	29-OCT-14
WG1980627-5	CRM	VA-NIST-1547						
Mercury (Hg)-Total			103.7		%		70-130	29-OCT-14
WG1979546-3	DUP	L1497000-82						
Mercury (Hg)-Total		0.0669	0.0685		mg/kg ww	2.4	40	29-OCT-14
WG1980627-3	DUP	L1497000-93						
Mercury (Hg)-Total		0.0055	0.0062		mg/kg ww	12	40	29-OCT-14
WG1979546-1	MB							
Mercury (Hg)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
WG1979546-2	MB							

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HG-WET-CVAFS-VA Tissue								
Batch	R3033389							
WG1979546-2 MB								
Mercury (Hg)-Total			<0.0010		mg/kg wwt		0.001	29-OCT-14
WG1980627-1 MB								
Mercury (Hg)-Total			<0.0010		mg/kg wwt		0.001	29-OCT-14
WG1980627-2 MB								
Mercury (Hg)-Total			<0.0010		mg/kg wwt		0.001	29-OCT-14
MET-DRY-CCMS-VA Tissue								
Batch	R2963477							
WG1951333-4 CRM		VA-NRC-TORT3						
Arsenic (As)-Total			113.4		%		70-130	16-SEP-14
Cadmium (Cd)-Total			103.2		%		70-130	16-SEP-14
Chromium (Cr)-Total			102.1		%		70-130	16-SEP-14
Cobalt (Co)-Total			104.2		%		70-130	16-SEP-14
Copper (Cu)-Total			92.6		%		70-130	16-SEP-14
Iron (Fe)-Total			96.5		%		70-130	16-SEP-14
Lead (Pb)-Total			91.6		%		70-130	16-SEP-14
Manganese (Mn)-Total			96.0		%		70-130	16-SEP-14
Molybdenum (Mo)-Total			102.3		%		70-130	16-SEP-14
Nickel (Ni)-Total			98.7		%		70-130	16-SEP-14
Selenium (Se)-Total			99.3		%		70-130	16-SEP-14
Strontium (Sr)-Total			97.5		%		70-130	16-SEP-14
Vanadium (V)-Total			102.5		%		70-130	16-SEP-14
Zinc (Zn)-Total			95.8		%		70-130	16-SEP-14
WG1951333-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.010		mg/kg		0.001-0.021	16-SEP-14
Arsenic (As)-Total			105.9		%		70-130	16-SEP-14
Barium (Ba)-Total			88.5		%		70-130	16-SEP-14
Boron (B)-Total			112.2		%		70-130	16-SEP-14
Cadmium (Cd)-Total			107.1		%		70-130	16-SEP-14
Calcium (Ca)-Total			104.1		%		70-130	16-SEP-14
Cobalt (Co)-Total			101.7		%		70-130	16-SEP-14
Copper (Cu)-Total			102.5		%		70-130	16-SEP-14
Iron (Fe)-Total			99.2		%		70-130	16-SEP-14
Magnesium (Mg)-Total			99.9		%		70-130	16-SEP-14
Manganese (Mn)-Total			99.5		%		70-130	16-SEP-14
Nickel (Ni)-Total			99.9		%		70-130	16-SEP-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-5 CRM		VA-NIST-1566B						
Potassium (K)-Total			100.1		%		70-130	16-SEP-14
Rubidium (Rb)-Total			100.8		%		70-130	16-SEP-14
Selenium (Se)-Total			105.0		%		70-130	16-SEP-14
Sodium (Na)-Total			96.1		%		70-130	16-SEP-14
Strontium (Sr)-Total			100.9		%		70-130	16-SEP-14
Uranium (U)-Total			107.5		%		70-130	16-SEP-14
Vanadium (V)-Total			97.1		%		70-130	16-SEP-14
Zinc (Zn)-Total			96.7		%		70-130	16-SEP-14
WG1951333-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	16-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-SEP-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	16-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	16-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	16-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	16-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	16-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	16-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	16-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	16-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	16-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	16-SEP-14
Potassium (K)-Total			<20		mg/kg		20	16-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	16-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	16-SEP-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-1 MB								
Strontium (Sr)-Total			<0.050		mg/kg		0.05	16-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	16-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-SEP-14
WG1951333-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	16-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-SEP-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	16-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	16-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	16-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	16-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	16-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	16-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	16-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	16-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	16-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	16-SEP-14
Potassium (K)-Total			<20		mg/kg		20	16-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	16-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	16-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-2 MB								
Strontium (Sr)-Total			<0.050		mg/kg		0.05	16-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	16-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-SEP-14
Batch	R2980898							
WG1954103-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.008		mg/kg		0.001-0.021	24-SEP-14
Arsenic (As)-Total			102.6		%		70-130	24-SEP-14
Barium (Ba)-Total			85.8		%		70-130	24-SEP-14
Boron (B)-Total			107.1		%		70-130	24-SEP-14
Cadmium (Cd)-Total			107.4		%		70-130	24-SEP-14
Calcium (Ca)-Total			99.7		%		70-130	24-SEP-14
Cobalt (Co)-Total			97.8		%		70-130	24-SEP-14
Copper (Cu)-Total			97.8		%		70-130	24-SEP-14
Iron (Fe)-Total			83.5		%		70-130	24-SEP-14
Lead (Pb)-Total			97.2		%		70-130	24-SEP-14
Magnesium (Mg)-Total			97.1		%		70-130	24-SEP-14
Manganese (Mn)-Total			99.2		%		70-130	24-SEP-14
Nickel (Ni)-Total			102.4		%		70-130	24-SEP-14
Potassium (K)-Total			98.1		%		70-130	24-SEP-14
Rubidium (Rb)-Total			96.5		%		70-130	24-SEP-14
Selenium (Se)-Total			88.0		%		70-130	24-SEP-14
Sodium (Na)-Total			94.7		%		70-130	24-SEP-14
Strontium (Sr)-Total			97.9		%		70-130	24-SEP-14
Uranium (U)-Total			100.1		%		70-130	24-SEP-14
Vanadium (V)-Total			93.6		%		70-130	24-SEP-14
Zinc (Zn)-Total			107.2		%		70-130	24-SEP-14
WG1954103-6 CRM		VA-NIST-1547						
Aluminum (Al)-Total			114.0		%		70-130	24-SEP-14
Antimony (Sb)-Total			0.020		mg/kg		0.01-0.03	24-SEP-14
Barium (Ba)-Total			97.0		%		70-130	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-6 CRM		VA-NIST-1547						
Boron (B)-Total			97.4		%		70-130	24-SEP-14
Cadmium (Cd)-Total			99.1		%		70-130	24-SEP-14
Calcium (Ca)-Total			101.2		%		70-130	24-SEP-14
Chromium (Cr)-Total			76.8		%		70-130	24-SEP-14
Cobalt (Co)-Total			0.059		mg/kg		0.04-0.08	24-SEP-14
Copper (Cu)-Total			99.4		%		70-130	24-SEP-14
Iron (Fe)-Total			93.2		%		70-130	24-SEP-14
Lead (Pb)-Total			95.7		%		70-130	24-SEP-14
Magnesium (Mg)-Total			97.8		%		70-130	24-SEP-14
Manganese (Mn)-Total			99.6		%		70-130	24-SEP-14
Molybdenum (Mo)-Total			0.050		mg/kg		0.04-0.08	24-SEP-14
Nickel (Ni)-Total			75.0		%		70-130	24-SEP-14
Phosphorus (P)-Total			106.3		%		70-130	24-SEP-14
Potassium (K)-Total			98.7		%		70-130	24-SEP-14
Rubidium (Rb)-Total			96.6		%		70-130	24-SEP-14
Selenium (Se)-Total			0.122		mg/kg		0.07-0.17	24-SEP-14
Sodium (Na)-Total			29		mg/kg		4-44	24-SEP-14
Strontium (Sr)-Total			107.5		%		70-130	24-SEP-14
Vanadium (V)-Total			83.9		%		70-130	24-SEP-14
Zinc (Zn)-Total			106.4		%		70-130	24-SEP-14
WG1955066-11 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.005		mg/kg		0.001-0.021	24-SEP-14
Arsenic (As)-Total			101.1		%		70-130	24-SEP-14
Barium (Ba)-Total			82.9		%		70-130	24-SEP-14
Boron (B)-Total			97.6		%		70-130	24-SEP-14
Cadmium (Cd)-Total			100.8		%		70-130	24-SEP-14
Calcium (Ca)-Total			89.5		%		70-130	24-SEP-14
Cobalt (Co)-Total			97.3		%		70-130	24-SEP-14
Copper (Cu)-Total			94.7		%		70-130	24-SEP-14
Iron (Fe)-Total			92.0		%		70-130	24-SEP-14
Lead (Pb)-Total			88.9		%		70-130	24-SEP-14
Magnesium (Mg)-Total			94.8		%		70-130	24-SEP-14
Manganese (Mn)-Total			95.4		%		70-130	24-SEP-14
Nickel (Ni)-Total			100.3		%		70-130	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1955066-11 CRM		VA-NIST-1566B						
Potassium (K)-Total			97.3		%		70-130	24-SEP-14
Rubidium (Rb)-Total			100.1		%		70-130	24-SEP-14
Selenium (Se)-Total			98.3		%		70-130	24-SEP-14
Sodium (Na)-Total			95.0		%		70-130	24-SEP-14
Strontium (Sr)-Total			87.5		%		70-130	24-SEP-14
Uranium (U)-Total			92.4		%		70-130	24-SEP-14
Vanadium (V)-Total			91.9		%		70-130	24-SEP-14
Zinc (Zn)-Total			105.3		%		70-130	24-SEP-14
WG1955066-12 CRM		VA-NIST-1547						
Aluminum (Al)-Total			99.9		%		70-130	24-SEP-14
Antimony (Sb)-Total			0.016		mg/kg		0.01-0.03	24-SEP-14
Arsenic (As)-Total			0.074		mg/kg		0.04-0.08	24-SEP-14
Barium (Ba)-Total			89.3		%		70-130	24-SEP-14
Boron (B)-Total			82.9		%		70-130	24-SEP-14
Cadmium (Cd)-Total			90.8		%		70-130	24-SEP-14
Calcium (Ca)-Total			86.0		%		70-130	24-SEP-14
Chromium (Cr)-Total			70.2		%		70-130	24-SEP-14
Cobalt (Co)-Total			0.053		mg/kg		0.04-0.08	24-SEP-14
Copper (Cu)-Total			87.4		%		70-130	24-SEP-14
Iron (Fe)-Total			84.2		%		70-130	24-SEP-14
Lead (Pb)-Total			82.5		%		70-130	24-SEP-14
Magnesium (Mg)-Total			87.8		%		70-130	24-SEP-14
Manganese (Mn)-Total			87.9		%		70-130	24-SEP-14
Molybdenum (Mo)-Total			0.045		mg/kg		0.04-0.08	08-OCT-14
Phosphorus (P)-Total			99.6		%		70-130	24-SEP-14
Potassium (K)-Total			89.8		%		70-130	24-SEP-14
Rubidium (Rb)-Total			89.7		%		70-130	24-SEP-14
Selenium (Se)-Total			0.108		mg/kg		0.07-0.17	24-SEP-14
Sodium (Na)-Total			27		mg/kg		4-44	24-SEP-14
Strontium (Sr)-Total			89.6		%		70-130	24-SEP-14
Vanadium (V)-Total			77.3		%		70-130	24-SEP-14
Zinc (Zn)-Total			96.8		%		70-130	24-SEP-14
WG1954103-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	24-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-1 MB								
Arsenic (As)-Total			<0.020		mg/kg		0.02	24-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	24-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	24-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	24-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	24-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	24-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	24-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	24-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	24-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	24-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	24-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	24-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	24-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	24-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	24-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	24-SEP-14
Potassium (K)-Total			<20		mg/kg		20	24-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	24-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	24-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	24-SEP-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	24-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	24-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	24-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	24-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	24-SEP-14
WG1954103-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	24-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	24-SEP-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-2	MB							
Arsenic (As)-Total			<0.020		mg/kg		0.02	24-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	24-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	24-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	24-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	24-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	24-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	24-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	24-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	24-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	24-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	24-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	24-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	24-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	24-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	24-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	24-SEP-14
Potassium (K)-Total			<20		mg/kg		20	24-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	24-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	24-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	24-SEP-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	24-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	24-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	24-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	24-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	24-SEP-14
WG1955066-7	MB							
Aluminum (Al)-Total			<2.0		mg/kg		2	24-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1955066-7 MB								
Arsenic (As)-Total			<0.020		mg/kg		0.02	24-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	24-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	24-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	24-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	24-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	24-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	24-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	24-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	24-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	24-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	24-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	24-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	24-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	24-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	24-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	24-SEP-14
Potassium (K)-Total			<20		mg/kg		20	24-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	24-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	24-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	24-SEP-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	24-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	24-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	24-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	24-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	24-SEP-14
WG1955066-8 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	24-SEP-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R2980898							
WG1955066-8 MB								
Arsenic (As)-Total			<0.020		mg/kg		0.02	24-SEP-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	24-SEP-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	24-SEP-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	24-SEP-14
Boron (B)-Total			<1.0		mg/kg		1	24-SEP-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Calcium (Ca)-Total			<20		mg/kg		20	24-SEP-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	24-SEP-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	24-SEP-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	24-SEP-14
Iron (Fe)-Total			<3.0		mg/kg		3	24-SEP-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	24-SEP-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	24-SEP-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	24-SEP-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	24-SEP-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	24-SEP-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	24-SEP-14
Phosphorus (P)-Total			<10		mg/kg		10	24-SEP-14
Potassium (K)-Total			<20		mg/kg		20	24-SEP-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	24-SEP-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	24-SEP-14
Sodium (Na)-Total			<20		mg/kg		20	24-SEP-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	24-SEP-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	24-SEP-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	24-SEP-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	24-SEP-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	24-SEP-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	24-SEP-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	24-SEP-14

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MET-DRY-CCMS-VA Tissue								
Batch R2997730								
WG1954103-6 CRM		VA-NIST-1547						
Arsenic (As)-Total			0.066		mg/kg		0.04-0.08	14-OCT-14
Batch R2998022								
WG1975738-4 CRM		VA-NIST-1515						
Aluminum (Al)-Total			106.6		%		70-130	16-OCT-14
Antimony (Sb)-Total			0.010		mg/kg		0-0.023	16-OCT-14
Arsenic (As)-Total			0.029		mg/kg		0.018-0.058	16-OCT-14
Barium (Ba)-Total			97.4		%		70-130	16-OCT-14
Boron (B)-Total			95.9		%		70-130	16-OCT-14
Cadmium (Cd)-Total			0.0147		mg/kg		0.008-0.018	16-OCT-14
Calcium (Ca)-Total			91.7		%		70-130	16-OCT-14
Chromium (Cr)-Total			73.3		%		70-130	16-OCT-14
Cobalt (Co)-Total			94.2		%		70-130	16-OCT-14
Copper (Cu)-Total			90.4		%		70-130	16-OCT-14
Iron (Fe)-Total			81.0		%		70-130	16-OCT-14
Lead (Pb)-Total			83.6		%		70-130	16-OCT-14
Magnesium (Mg)-Total			94.8		%		70-130	16-OCT-14
Manganese (Mn)-Total			93.9		%		70-130	16-OCT-14
Molybdenum (Mo)-Total			83.3		%		70-130	16-OCT-14
Nickel (Ni)-Total			87.6		%		70-130	16-OCT-14
Phosphorus (P)-Total			104.0		%		70-130	16-OCT-14
Potassium (K)-Total			95.0		%		70-130	16-OCT-14
Rubidium (Rb)-Total			91.0		%		70-130	16-OCT-14
Selenium (Se)-Total			0.056		mg/kg		0-0.1	16-OCT-14
Sodium (Na)-Total			28		mg/kg		4-44	16-OCT-14
Strontium (Sr)-Total			91.6		%		70-130	16-OCT-14
Uranium (U)-Total			0.0049		mg/kg		0.004-0.008	16-OCT-14
Vanadium (V)-Total			0.16		mg/kg		0.16-0.36	16-OCT-14
Zinc (Zn)-Total			92.0		%		70-130	16-OCT-14
WG1975738-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			117.3		%		70-130	16-OCT-14
Antimony (Sb)-Total			0.021		mg/kg		0.01-0.03	16-OCT-14
Arsenic (As)-Total			0.059		mg/kg		0.04-0.08	16-OCT-14
Barium (Ba)-Total			104.1		%		70-130	16-OCT-14
Boron (B)-Total			91.1		%		70-130	16-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-5 CRM		VA-NIST-1547						
Cadmium (Cd)-Total			97.8		%		70-130	16-OCT-14
Calcium (Ca)-Total			91.8		%		70-130	16-OCT-14
Chromium (Cr)-Total			75.0		%		70-130	16-OCT-14
Cobalt (Co)-Total			0.063		mg/kg		0.04-0.08	16-OCT-14
Copper (Cu)-Total			95.2		%		70-130	16-OCT-14
Iron (Fe)-Total			91.2		%		70-130	16-OCT-14
Lead (Pb)-Total			86.6		%		70-130	16-OCT-14
Magnesium (Mg)-Total			99.4		%		70-130	16-OCT-14
Manganese (Mn)-Total			99.2		%		70-130	16-OCT-14
Molybdenum (Mo)-Total			0.044		mg/kg		0.04-0.08	16-OCT-14
Nickel (Ni)-Total			70.2		%		70-130	16-OCT-14
Phosphorus (P)-Total			113.0		%		70-130	16-OCT-14
Potassium (K)-Total			101.2		%		70-130	16-OCT-14
Rubidium (Rb)-Total			97.7		%		70-130	16-OCT-14
Selenium (Se)-Total			0.119		mg/kg		0.07-0.17	16-OCT-14
Sodium (Na)-Total			31		mg/kg		4-44	16-OCT-14
Strontium (Sr)-Total			95.1		%		70-130	16-OCT-14
Vanadium (V)-Total			86.2		%		70-130	16-OCT-14
Zinc (Zn)-Total			100.6		%		70-130	16-OCT-14
WG1975738-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	16-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	16-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	16-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	16-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	16-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	16-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	16-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	16-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-1	MB							
Lead (Pb)-Total			<0.020		mg/kg		0.02	16-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	16-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	16-OCT-14
Potassium (K)-Total			<20		mg/kg		20	16-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	16-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	16-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	16-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	16-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-OCT-14
WG1975738-2	MB							
Aluminum (Al)-Total			<2.0		mg/kg		2	16-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	16-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	16-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	16-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	16-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	16-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	16-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	16-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	16-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	16-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	16-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	16-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	16-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	16-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-2	MB							
Lead (Pb)-Total			<0.020		mg/kg		0.02	16-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	16-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	16-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	16-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	16-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	16-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	16-OCT-14
Potassium (K)-Total			<20		mg/kg		20	16-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	16-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	16-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	16-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	16-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	16-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	16-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	16-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	16-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	16-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	16-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	16-OCT-14
Batch	R3002648							
WG1956812-5	CRM	VA-NIST-1547						
Aluminum (Al)-Total			105.8		%		70-130	17-OCT-14
Antimony (Sb)-Total			0.022		mg/kg		0.01-0.03	17-OCT-14
Arsenic (As)-Total			0.059		mg/kg		0.04-0.08	17-OCT-14
Barium (Ba)-Total			92.7		%		70-130	17-OCT-14
Boron (B)-Total			86.0		%		70-130	17-OCT-14
Cadmium (Cd)-Total			90.2		%		70-130	17-OCT-14
Calcium (Ca)-Total			93.3		%		70-130	17-OCT-14
Chromium (Cr)-Total			70.4		%		70-130	17-OCT-14
Cobalt (Co)-Total			0.056		mg/kg		0.04-0.08	17-OCT-14
Copper (Cu)-Total			87.3		%		70-130	17-OCT-14
Iron (Fe)-Total			84.7		%		70-130	17-OCT-14
Lead (Pb)-Total			86.4		%		70-130	17-OCT-14
Magnesium (Mg)-Total			89.5		%		70-130	17-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3002648							
WG1956812-5 CRM		VA-NIST-1547						
Manganese (Mn)-Total			88.4		%		70-130	17-OCT-14
Molybdenum (Mo)-Total			0.047		mg/kg		0.04-0.08	17-OCT-14
Phosphorus (P)-Total			102.9		%		70-130	17-OCT-14
Potassium (K)-Total			91.4		%		70-130	17-OCT-14
Rubidium (Rb)-Total			88.8		%		70-130	17-OCT-14
Selenium (Se)-Total			0.115		mg/kg		0.07-0.17	17-OCT-14
Sodium (Na)-Total			28		mg/kg		4-44	17-OCT-14
Strontium (Sr)-Total			96.1		%		70-130	17-OCT-14
Vanadium (V)-Total			76.2		%		70-130	17-OCT-14
Zinc (Zn)-Total			90.3		%		70-130	17-OCT-14
Batch	R3012388							
WG1954103-3 DUP		L1497000-10						
Aluminum (Al)-Total		52.0	61.3		mg/kg	16	40	21-OCT-14
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Arsenic (As)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	21-OCT-14
Barium (Ba)-Total		66.0	70.4		mg/kg	6.4	40	21-OCT-14
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Boron (B)-Total		9.8	9.2		mg/kg	6.1	40	21-OCT-14
Cadmium (Cd)-Total		<0.0050	0.0052	RPD-NA	mg/kg	N/A	40	21-OCT-14
Calcium (Ca)-Total		5070	4810		mg/kg	5.3	60	21-OCT-14
Cesium (Cs)-Total		0.172	0.168		mg/kg	2.2	40	21-OCT-14
Chromium (Cr)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	21-OCT-14
Cobalt (Co)-Total		0.100	0.113		mg/kg	12	40	21-OCT-14
Copper (Cu)-Total		2.48	2.71		mg/kg	8.9	40	21-OCT-14
Iron (Fe)-Total		26.9	28.8		mg/kg	6.8	40	21-OCT-14
Lead (Pb)-Total		0.025	0.026		mg/kg	3.1	40	21-OCT-14
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	21-OCT-14
Magnesium (Mg)-Total		967	1060		mg/kg	9.6	40	21-OCT-14
Manganese (Mn)-Total		970	1050		mg/kg	8.3	40	21-OCT-14
Molybdenum (Mo)-Total		0.569	0.540		mg/kg	5.1	40	21-OCT-14
Nickel (Ni)-Total		0.65	0.72		mg/kg	10	40	21-OCT-14
Phosphorus (P)-Total		1030	1110		mg/kg	7.9	40	21-OCT-14
Potassium (K)-Total		4630	5130		mg/kg	10	40	21-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3012388							
WG1954103-3	DUP	L1497000-10						
Rubidium (Rb)-Total		17.5	18.9		mg/kg	7.6	40	21-OCT-14
Selenium (Se)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	21-OCT-14
Sodium (Na)-Total		<20	<20	RPD-NA	mg/kg	N/A	40	21-OCT-14
Strontium (Sr)-Total		7.28	6.87		mg/kg	5.8	60	21-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.257	0.271		mg/kg	5.3	40	21-OCT-14
Tin (Sn)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	21-OCT-14
Uranium (U)-Total		0.0024	0.0025		mg/kg	2.9	40	21-OCT-14
Vanadium (V)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	21-OCT-14
Zinc (Zn)-Total		21.5	23.0		mg/kg	6.8	40	21-OCT-14
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	21-OCT-14
WG1954103-4	DUP	L1497000-146						
Aluminum (Al)-Total		341	330		mg/kg	3.3	40	21-OCT-14
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Arsenic (As)-Total		0.362	0.356		mg/kg	1.7	40	21-OCT-14
Barium (Ba)-Total		31.2	30.4		mg/kg	2.5	40	21-OCT-14
Beryllium (Be)-Total		0.036	0.034		mg/kg	6.5	40	21-OCT-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Boron (B)-Total		1.5	1.5		mg/kg	1.7	40	21-OCT-14
Cadmium (Cd)-Total		0.0668	0.0675		mg/kg	1.0	40	21-OCT-14
Calcium (Ca)-Total		1580	1580		mg/kg	0.3	60	21-OCT-14
Cesium (Cs)-Total		0.187	0.175		mg/kg	6.5	40	21-OCT-14
Chromium (Cr)-Total		0.489	0.456		mg/kg	7.0	40	21-OCT-14
Cobalt (Co)-Total		1.16	1.15		mg/kg	0.6	40	21-OCT-14
Copper (Cu)-Total		3.71	3.65		mg/kg	1.6	40	21-OCT-14
Iron (Fe)-Total		368	357		mg/kg	2.8	40	21-OCT-14
Lead (Pb)-Total		0.211	0.207		mg/kg	2.2	40	21-OCT-14
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	21-OCT-14
Magnesium (Mg)-Total		501	490		mg/kg	2.3	40	21-OCT-14
Manganese (Mn)-Total		76.4	76.7		mg/kg	0.4	40	21-OCT-14
Molybdenum (Mo)-Total		0.143	0.131		mg/kg	8.4	40	21-OCT-14
Nickel (Ni)-Total		3.20	3.15		mg/kg	1.3	40	21-OCT-14
Phosphorus (P)-Total		754	729		mg/kg	3.4	40	21-OCT-14
Potassium (K)-Total		2100	2020		mg/kg	3.8	40	21-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3012388							
WG1954103-4	DUP	L1497000-146						
Rubidium (Rb)-Total		7.31	7.06		mg/kg	3.5	40	21-OCT-14
Selenium (Se)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	21-OCT-14
Sodium (Na)-Total		66	64		mg/kg	3.1	40	21-OCT-14
Strontium (Sr)-Total		10.9	10.7		mg/kg	1.3	60	21-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.0110	0.0107		mg/kg	2.8	40	21-OCT-14
Tin (Sn)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	21-OCT-14
Uranium (U)-Total		0.179	0.175		mg/kg	2.4	40	21-OCT-14
Vanadium (V)-Total		0.46	0.45		mg/kg	3.5	40	21-OCT-14
Zinc (Zn)-Total		28.9	28.5		mg/kg	1.6	40	21-OCT-14
Zirconium (Zr)-Total		0.38	0.36		mg/kg	5.3	40	21-OCT-14
Batch	R3013448							
WG1979398-4	CRM	VA-NIST-1566B						
Antimony (Sb)-Total			0.008		mg/kg		0.001-0.021	21-OCT-14
Arsenic (As)-Total			98.5		%		70-130	21-OCT-14
Barium (Ba)-Total			84.2		%		70-130	21-OCT-14
Boron (B)-Total			100.3		%		70-130	21-OCT-14
Cadmium (Cd)-Total			102.7		%		70-130	21-OCT-14
Calcium (Ca)-Total			96.6		%		70-130	21-OCT-14
Cobalt (Co)-Total			97.4		%		70-130	21-OCT-14
Copper (Cu)-Total			95.4		%		70-130	21-OCT-14
Iron (Fe)-Total			94.5		%		70-130	21-OCT-14
Lead (Pb)-Total			93.2		%		70-130	21-OCT-14
Magnesium (Mg)-Total			95.7		%		70-130	21-OCT-14
Manganese (Mn)-Total			97.7		%		70-130	21-OCT-14
Nickel (Ni)-Total			92.8		%		70-130	21-OCT-14
Potassium (K)-Total			97.6		%		70-130	21-OCT-14
Rubidium (Rb)-Total			95.0		%		70-130	21-OCT-14
Selenium (Se)-Total			101.7		%		70-130	21-OCT-14
Sodium (Na)-Total			91.8		%		70-130	21-OCT-14
Strontium (Sr)-Total			94.3		%		70-130	21-OCT-14
Uranium (U)-Total			98.1		%		70-130	21-OCT-14
Vanadium (V)-Total			92.7		%		70-130	21-OCT-14
Zinc (Zn)-Total			93.9		%		70-130	21-OCT-14
WG1979398-5		VA-NIST-1547						

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			108.4		%		70-130	21-OCT-14
Antimony (Sb)-Total			0.021		mg/kg		0.01-0.03	21-OCT-14
Arsenic (As)-Total			0.068		mg/kg		0.04-0.08	21-OCT-14
Barium (Ba)-Total			95.2		%		70-130	21-OCT-14
Boron (B)-Total			87.5		%		70-130	21-OCT-14
Cadmium (Cd)-Total			93.4		%		70-130	21-OCT-14
Calcium (Ca)-Total			96.9		%		70-130	21-OCT-14
Chromium (Cr)-Total			70.2		%		70-130	21-OCT-14
Cobalt (Co)-Total			0.055		mg/kg		0.04-0.08	21-OCT-14
Copper (Cu)-Total			90.9		%		70-130	21-OCT-14
Iron (Fe)-Total			88.0		%		70-130	21-OCT-14
Lead (Pb)-Total			96.6		%		70-130	21-OCT-14
Magnesium (Mg)-Total			92.9		%		70-130	21-OCT-14
Manganese (Mn)-Total			92.8		%		70-130	21-OCT-14
Molybdenum (Mo)-Total			0.046		mg/kg		0.04-0.08	21-OCT-14
Phosphorus (P)-Total			104.0		%		70-130	21-OCT-14
Potassium (K)-Total			96.7		%		70-130	21-OCT-14
Rubidium (Rb)-Total			91.8		%		70-130	21-OCT-14
Selenium (Se)-Total			0.112		mg/kg		0.07-0.17	21-OCT-14
Sodium (Na)-Total			29		mg/kg		4-44	21-OCT-14
Strontium (Sr)-Total			99.8		%		70-130	21-OCT-14
Vanadium (V)-Total			79.1		%		70-130	21-OCT-14
Zinc (Zn)-Total			98.0		%		70-130	21-OCT-14
WG1979398-3 DUP		L1497000-122						
Aluminum (Al)-Total		10.9	13.5		mg/kg	21	40	21-OCT-14
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Arsenic (As)-Total		0.045	0.047		mg/kg	3.9	40	21-OCT-14
Barium (Ba)-Total		30.2	31.8		mg/kg	5.2	40	21-OCT-14
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	21-OCT-14
Boron (B)-Total		2.0	2.4		mg/kg	21	40	21-OCT-14
Cadmium (Cd)-Total		0.0139	0.0156		mg/kg	11	40	21-OCT-14
Calcium (Ca)-Total		2030	2420		mg/kg	18	60	21-OCT-14
Cesium (Cs)-Total		0.0325	0.0367		mg/kg	12	40	21-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-3	DUP	L1497000-122						
Chromium (Cr)-Total		<0.050	0.084	RPD-NA	mg/kg	N/A	40	21-OCT-14
Cobalt (Co)-Total		0.297	0.332		mg/kg	11	40	21-OCT-14
Copper (Cu)-Total		1.75	1.84		mg/kg	5.6	40	21-OCT-14
Iron (Fe)-Total		37.9	42.9		mg/kg	12	40	21-OCT-14
Lead (Pb)-Total		0.021	0.030		mg/kg	36	40	21-OCT-14
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	21-OCT-14
Magnesium (Mg)-Total		1270	1350		mg/kg	6.6	40	21-OCT-14
Manganese (Mn)-Total		853	917		mg/kg	7.3	40	21-OCT-14
Molybdenum (Mo)-Total		0.624	0.727		mg/kg	15	40	21-OCT-14
Nickel (Ni)-Total		1.21	1.34		mg/kg	10	40	21-OCT-14
Phosphorus (P)-Total		998	1040		mg/kg	3.7	40	21-OCT-14
Potassium (K)-Total		11800	12300		mg/kg	3.8	40	21-OCT-14
Rubidium (Rb)-Total		11.2	11.7		mg/kg	4.3	40	21-OCT-14
Selenium (Se)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	21-OCT-14
Sodium (Na)-Total		<20	<20	RPD-NA	mg/kg	N/A	40	21-OCT-14
Strontium (Sr)-Total		9.21	11.0		mg/kg	18	60	21-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.0035	0.0040		mg/kg	14	40	21-OCT-14
Tin (Sn)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	21-OCT-14
Uranium (U)-Total		0.0032	0.0042		mg/kg	26	40	21-OCT-14
Vanadium (V)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	21-OCT-14
Zinc (Zn)-Total		17.8	20.2		mg/kg	13	40	21-OCT-14
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	21-OCT-14
WG1979398-1	MB							
Aluminum (Al)-Total			<2.0		mg/kg		2	21-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	21-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	21-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	21-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	21-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	21-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	21-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	21-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	21-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	21-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-1 MB								
Chromium (Cr)-Total			<0.050		mg/kg		0.05	21-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	21-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	21-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	21-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	21-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	21-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	21-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	21-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	21-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	21-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	21-OCT-14
Potassium (K)-Total			<20		mg/kg		20	21-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	21-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	21-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	21-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	21-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	21-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	21-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	21-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	21-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	21-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	21-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	21-OCT-14
WG1979398-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	21-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	21-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	21-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	21-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	21-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	21-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	21-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	21-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	21-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	21-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-2 MB								
Chromium (Cr)-Total			<0.050		mg/kg		0.05	21-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	21-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	21-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	21-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	21-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	21-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	21-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	21-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	21-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	21-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	21-OCT-14
Potassium (K)-Total			<20		mg/kg		20	21-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	21-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	21-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	21-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	21-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	21-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	21-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	21-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	21-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	21-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	21-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	21-OCT-14
Batch	R3020548							
WG1981395-4 CRM		VA-NIST-1515						
Aluminum (Al)-Total			109.6		%		70-130	23-OCT-14
Antimony (Sb)-Total			0.011		mg/kg		0-0.023	23-OCT-14
Arsenic (As)-Total			0.028		mg/kg		0.018-0.058	24-OCT-14
Barium (Ba)-Total			98.8		%		70-130	23-OCT-14
Boron (B)-Total			99.2		%		70-130	23-OCT-14
Cadmium (Cd)-Total			0.0293	RM-H	mg/kg		0.008-0.018	24-OCT-14
Calcium (Ca)-Total			98.2		%		70-130	23-OCT-14
Chromium (Cr)-Total			72.1		%		70-130	24-OCT-14
Cobalt (Co)-Total			90.2		%		70-130	23-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-4 CRM		VA-NIST-1515						
Copper (Cu)-Total			92.0		%		70-130	23-OCT-14
Iron (Fe)-Total			83.3		%		70-130	23-OCT-14
Lead (Pb)-Total			88.9		%		70-130	23-OCT-14
Magnesium (Mg)-Total			95.6		%		70-130	23-OCT-14
Manganese (Mn)-Total			92.4		%		70-130	23-OCT-14
Molybdenum (Mo)-Total			88.4		%		70-130	23-OCT-14
Nickel (Ni)-Total			90.1		%		70-130	23-OCT-14
Phosphorus (P)-Total			103.4		%		70-130	23-OCT-14
Potassium (K)-Total			95.5		%		70-130	23-OCT-14
Rubidium (Rb)-Total			91.2		%		70-130	23-OCT-14
Selenium (Se)-Total			0.052		mg/kg		0-0.1	23-OCT-14
Sodium (Na)-Total			32		mg/kg		4-44	23-OCT-14
Strontium (Sr)-Total			99.0		%		70-130	23-OCT-14
Uranium (U)-Total			0.0053		mg/kg		0.004-0.008	23-OCT-14
Vanadium (V)-Total			0.17		mg/kg		0.16-0.36	23-OCT-14
Zinc (Zn)-Total			92.5		%		70-130	23-OCT-14
WG1981395-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.009		mg/kg		0.001-0.021	23-OCT-14
Arsenic (As)-Total			99.6		%		70-130	23-OCT-14
Barium (Ba)-Total			81.6		%		70-130	23-OCT-14
Boron (B)-Total			95.7		%		70-130	23-OCT-14
Cadmium (Cd)-Total			100.4		%		70-130	23-OCT-14
Calcium (Ca)-Total			93.5		%		70-130	23-OCT-14
Cobalt (Co)-Total			96.0		%		70-130	23-OCT-14
Copper (Cu)-Total			97.8		%		70-130	23-OCT-14
Iron (Fe)-Total			94.0		%		70-130	23-OCT-14
Lead (Pb)-Total			93.1		%		70-130	23-OCT-14
Magnesium (Mg)-Total			95.9		%		70-130	23-OCT-14
Manganese (Mn)-Total			96.0		%		70-130	23-OCT-14
Nickel (Ni)-Total			95.5		%		70-130	23-OCT-14
Potassium (K)-Total			95.9		%		70-130	23-OCT-14
Rubidium (Rb)-Total			97.8		%		70-130	23-OCT-14
Selenium (Se)-Total			100.9		%		70-130	23-OCT-14
Sodium (Na)-Total			93.1		%		70-130	23-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-5 CRM		VA-NIST-1566B						
Strontium (Sr)-Total			92.3		%		70-130	23-OCT-14
Uranium (U)-Total			95.4		%		70-130	23-OCT-14
Vanadium (V)-Total			91.2		%		70-130	23-OCT-14
Zinc (Zn)-Total			94.5		%		70-130	23-OCT-14
WG1981395-3 DUP		L1497000-60						
Aluminum (Al)-Total		3.3	2.7		mg/kg	19	40	23-OCT-14
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	23-OCT-14
Arsenic (As)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	23-OCT-14
Barium (Ba)-Total		0.593	0.517		mg/kg	14	40	23-OCT-14
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	23-OCT-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	23-OCT-14
Boron (B)-Total		15.7	13.2		mg/kg	17	40	23-OCT-14
Cadmium (Cd)-Total		0.394	0.326		mg/kg	19	40	23-OCT-14
Calcium (Ca)-Total		1070	874		mg/kg	20	60	23-OCT-14
Cesium (Cs)-Total		0.302	0.251		mg/kg	18	40	23-OCT-14
Chromium (Cr)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	23-OCT-14
Cobalt (Co)-Total		0.452	0.369		mg/kg	20	40	23-OCT-14
Copper (Cu)-Total		6.61	5.56		mg/kg	17	40	23-OCT-14
Iron (Fe)-Total		25.5	21.5		mg/kg	17	40	23-OCT-14
Lead (Pb)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	23-OCT-14
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	23-OCT-14
Magnesium (Mg)-Total		2320	2000		mg/kg	15	40	23-OCT-14
Manganese (Mn)-Total		110	95.2		mg/kg	15	40	23-OCT-14
Molybdenum (Mo)-Total		1.38	1.12		mg/kg	21	40	23-OCT-14
Nickel (Ni)-Total		4.47	3.82		mg/kg	16	40	23-OCT-14
Phosphorus (P)-Total		2590	2220		mg/kg	15	40	23-OCT-14
Potassium (K)-Total		13300	11400		mg/kg	16	40	23-OCT-14
Rubidium (Rb)-Total		53.2	45.1		mg/kg	16	40	23-OCT-14
Selenium (Se)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	23-OCT-14
Sodium (Na)-Total		95	81		mg/kg	16	40	23-OCT-14
Strontium (Sr)-Total		2.93	2.50		mg/kg	16	60	23-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	23-OCT-14
Thallium (Tl)-Total		<0.0020	<0.0020	RPD-NA	mg/kg	N/A	40	23-OCT-14
Tin (Sn)-Total		0.43	0.44		mg/kg	2.4	40	23-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-3	DUP	L1497000-60						
Uranium (U)-Total		<0.0020	<0.0020	RPD-NA	mg/kg	N/A	40	23-OCT-14
Vanadium (V)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	23-OCT-14
Zinc (Zn)-Total		31.7	27.3		mg/kg	15	40	23-OCT-14
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	23-OCT-14
WG1981395-1	MB							
Aluminum (Al)-Total			<2.0		mg/kg		2	23-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	23-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	23-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	23-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	23-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	23-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	23-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	23-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	23-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	23-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	23-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	23-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	23-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	23-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	23-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	23-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	23-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	23-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	23-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	23-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	23-OCT-14
Potassium (K)-Total			<20		mg/kg		20	23-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	23-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	23-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	23-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	23-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	23-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	23-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	23-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-1 MB								
Uranium (U)-Total			<0.0020		mg/kg		0.002	23-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	23-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	23-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	23-OCT-14
WG1981395-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	23-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	23-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	23-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	23-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	23-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	23-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	23-OCT-14
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	23-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	23-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	23-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	23-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	23-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	23-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	23-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	23-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	23-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	23-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	23-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	23-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	23-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	23-OCT-14
Potassium (K)-Total			<20		mg/kg		20	23-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	23-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	23-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	23-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	23-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	23-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	23-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	23-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-2 MB								
Uranium (U)-Total			<0.0020		mg/kg		0.002	23-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	23-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	23-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	23-OCT-14
Batch	R3034499							
WG1979546-4 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.010		mg/kg		0.001-0.021	29-OCT-14
Arsenic (As)-Total			105.7		%		70-130	29-OCT-14
Barium (Ba)-Total			88.7		%		70-130	29-OCT-14
Boron (B)-Total			109.2		%		70-130	29-OCT-14
Cadmium (Cd)-Total			110.3		%		70-130	29-OCT-14
Calcium (Ca)-Total			104.1		%		70-130	29-OCT-14
Cobalt (Co)-Total			101.9		%		70-130	29-OCT-14
Copper (Cu)-Total			100.3		%		70-130	29-OCT-14
Iron (Fe)-Total			100.2		%		70-130	29-OCT-14
Lead (Pb)-Total			102.0		%		70-130	29-OCT-14
Magnesium (Mg)-Total			104.1		%		70-130	29-OCT-14
Manganese (Mn)-Total			104.1		%		70-130	29-OCT-14
Nickel (Ni)-Total			101.0		%		70-130	29-OCT-14
Potassium (K)-Total			102.7		%		70-130	29-OCT-14
Rubidium (Rb)-Total			102.0		%		70-130	29-OCT-14
Selenium (Se)-Total			107.4		%		70-130	29-OCT-14
Sodium (Na)-Total			100.3		%		70-130	29-OCT-14
Strontium (Sr)-Total			98.0		%		70-130	29-OCT-14
Uranium (U)-Total			108.2		%		70-130	29-OCT-14
Vanadium (V)-Total			97.7		%		70-130	29-OCT-14
Zinc (Zn)-Total			98.3		%		70-130	29-OCT-14
WG1979546-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			109.0		%		70-130	29-OCT-14
Antimony (Sb)-Total			0.017		mg/kg		0.01-0.03	29-OCT-14
Arsenic (As)-Total			0.075		mg/kg		0.04-0.08	29-OCT-14
Barium (Ba)-Total			92.7		%		70-130	29-OCT-14
Boron (B)-Total			89.0		%		70-130	29-OCT-14
Cadmium (Cd)-Total			92.4		%		70-130	29-OCT-14
Calcium (Ca)-Total			97.9		%		70-130	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-5 CRM		VA-NIST-1547						
Cobalt (Co)-Total			0.056		mg/kg		0.04-0.08	29-OCT-14
Copper (Cu)-Total			90.8		%		70-130	29-OCT-14
Iron (Fe)-Total			88.4		%		70-130	29-OCT-14
Lead (Pb)-Total			88.4		%		70-130	29-OCT-14
Magnesium (Mg)-Total			94.6		%		70-130	29-OCT-14
Manganese (Mn)-Total			92.4		%		70-130	29-OCT-14
Molybdenum (Mo)-Total			0.047		mg/kg		0.04-0.08	29-OCT-14
Phosphorus (P)-Total			104.8		%		70-130	29-OCT-14
Potassium (K)-Total			97.2		%		70-130	29-OCT-14
Rubidium (Rb)-Total			93.1		%		70-130	29-OCT-14
Selenium (Se)-Total			0.119		mg/kg		0.07-0.17	29-OCT-14
Sodium (Na)-Total			31		mg/kg		4-44	29-OCT-14
Strontium (Sr)-Total			98.5		%		70-130	29-OCT-14
Vanadium (V)-Total			80.9		%		70-130	29-OCT-14
Zinc (Zn)-Total			95.7		%		70-130	29-OCT-14
WG1980627-4 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.008		mg/kg		0.001-0.021	29-OCT-14
Arsenic (As)-Total			103.8		%		70-130	29-OCT-14
Barium (Ba)-Total			86.0		%		70-130	29-OCT-14
Boron (B)-Total			104.5		%		70-130	29-OCT-14
Cadmium (Cd)-Total			106.9		%		70-130	29-OCT-14
Calcium (Ca)-Total			102.1		%		70-130	29-OCT-14
Cobalt (Co)-Total			102.7		%		70-130	29-OCT-14
Copper (Cu)-Total			98.8		%		70-130	29-OCT-14
Iron (Fe)-Total			99.2		%		70-130	29-OCT-14
Lead (Pb)-Total			99.6		%		70-130	29-OCT-14
Magnesium (Mg)-Total			101.3		%		70-130	29-OCT-14
Manganese (Mn)-Total			103.9		%		70-130	29-OCT-14
Nickel (Ni)-Total			97.8		%		70-130	29-OCT-14
Potassium (K)-Total			101.7		%		70-130	29-OCT-14
Rubidium (Rb)-Total			100.5		%		70-130	29-OCT-14
Selenium (Se)-Total			106.7		%		70-130	29-OCT-14
Sodium (Na)-Total			98.3		%		70-130	29-OCT-14
Strontium (Sr)-Total			95.0		%		70-130	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-4 CRM		VA-NIST-1566B						
Uranium (U)-Total			105.1		%		70-130	29-OCT-14
Vanadium (V)-Total			95.8		%		70-130	29-OCT-14
Zinc (Zn)-Total			99.1		%		70-130	29-OCT-14
WG1980627-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			110.0		%		70-130	29-OCT-14
Antimony (Sb)-Total			0.019		mg/kg		0.01-0.03	29-OCT-14
Arsenic (As)-Total			0.068		mg/kg		0.04-0.08	29-OCT-14
Barium (Ba)-Total			93.5		%		70-130	29-OCT-14
Boron (B)-Total			91.0		%		70-130	29-OCT-14
Cadmium (Cd)-Total			92.6		%		70-130	29-OCT-14
Calcium (Ca)-Total			97.9		%		70-130	29-OCT-14
Chromium (Cr)-Total			72.6		%		70-130	29-OCT-14
Cobalt (Co)-Total			0.055		mg/kg		0.04-0.08	29-OCT-14
Copper (Cu)-Total			91.7		%		70-130	29-OCT-14
Iron (Fe)-Total			89.0		%		70-130	29-OCT-14
Lead (Pb)-Total			89.1		%		70-130	29-OCT-14
Magnesium (Mg)-Total			94.5		%		70-130	29-OCT-14
Manganese (Mn)-Total			92.8		%		70-130	29-OCT-14
Molybdenum (Mo)-Total			0.043		mg/kg		0.04-0.08	29-OCT-14
Phosphorus (P)-Total			107.3		%		70-130	29-OCT-14
Potassium (K)-Total			97.3		%		70-130	29-OCT-14
Rubidium (Rb)-Total			91.4		%		70-130	29-OCT-14
Selenium (Se)-Total			0.126		mg/kg		0.07-0.17	29-OCT-14
Sodium (Na)-Total			26		mg/kg		4-44	29-OCT-14
Strontium (Sr)-Total			99.5		%		70-130	29-OCT-14
Vanadium (V)-Total			80.9		%		70-130	29-OCT-14
Zinc (Zn)-Total			98.0		%		70-130	29-OCT-14
WG1979546-3 DUP		L1497000-82						
Aluminum (Al)-Total		880	853		mg/kg	3.0	40	29-OCT-14
Antimony (Sb)-Total		0.014	0.012		mg/kg	12	40	29-OCT-14
Arsenic (As)-Total		0.408	0.407		mg/kg	0.2	40	29-OCT-14
Barium (Ba)-Total		37.4	37.7		mg/kg	0.9	40	29-OCT-14
Beryllium (Be)-Total		0.032	0.033		mg/kg	5.3	40	29-OCT-14
Bismuth (Bi)-Total		0.069	0.069		mg/kg	0.2	40	29-OCT-14
Boron (B)-Total		2.6	2.4		mg/kg	6.6	40	29-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-3	DUP	L1497000-82						
Cadmium (Cd)-Total		0.0774	0.0761		mg/kg	1.8	40	29-OCT-14
Calcium (Ca)-Total		1790	1800		mg/kg	0.5	60	29-OCT-14
Cesium (Cs)-Total		0.444	0.440		mg/kg	0.9	40	29-OCT-14
Chromium (Cr)-Total		2.51	2.53		mg/kg	0.6	40	29-OCT-14
Cobalt (Co)-Total		0.911	0.932		mg/kg	2.3	40	29-OCT-14
Copper (Cu)-Total		3.51	3.56		mg/kg	1.5	40	29-OCT-14
Iron (Fe)-Total		900	903		mg/kg	0.4	40	29-OCT-14
Lead (Pb)-Total		0.922	0.966		mg/kg	4.7	40	29-OCT-14
Lithium (Li)-Total		1.29	1.25		mg/kg	2.7	40	29-OCT-14
Magnesium (Mg)-Total		799	798		mg/kg	0.1	40	29-OCT-14
Manganese (Mn)-Total		97.4	100		mg/kg	3.1	40	29-OCT-14
Molybdenum (Mo)-Total		0.332	0.324		mg/kg	2.4	40	29-OCT-14
Nickel (Ni)-Total		4.09	4.15		mg/kg	1.5	40	29-OCT-14
Phosphorus (P)-Total		922	908		mg/kg	1.6	40	29-OCT-14
Potassium (K)-Total		1890	1890		mg/kg	0.3	40	29-OCT-14
Rubidium (Rb)-Total		7.83	7.66		mg/kg	2.2	40	29-OCT-14
Selenium (Se)-Total		0.053	0.055		mg/kg	3.6	40	29-OCT-14
Sodium (Na)-Total		60	61		mg/kg	2.5	40	29-OCT-14
Strontium (Sr)-Total		9.93	10.1		mg/kg	1.2	60	29-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	29-OCT-14
Thallium (Tl)-Total		0.0341	0.0341		mg/kg	0.1	40	29-OCT-14
Tin (Sn)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	29-OCT-14
Uranium (U)-Total		0.379	0.391		mg/kg	3.1	40	29-OCT-14
Vanadium (V)-Total		1.75	1.69		mg/kg	3.3	40	29-OCT-14
Zinc (Zn)-Total		27.5	28.2		mg/kg	2.7	40	29-OCT-14
Zirconium (Zr)-Total		1.09	1.03		mg/kg	5.0	40	29-OCT-14
WG1980627-3	DUP	L1497000-93						
Aluminum (Al)-Total		71.4	72.0		mg/kg	0.8	40	29-OCT-14
Antimony (Sb)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	29-OCT-14
Arsenic (As)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	29-OCT-14
Barium (Ba)-Total		65.8	64.4		mg/kg	2.3	40	29-OCT-14
Beryllium (Be)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	29-OCT-14
Bismuth (Bi)-Total		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	29-OCT-14
Boron (B)-Total		12.8	13.2		mg/kg	3.2	40	29-OCT-14

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MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-3 DUP		L1497000-93						
Cadmium (Cd)-Total		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	29-OCT-14
Calcium (Ca)-Total		5260	5220		mg/kg	0.8	60	29-OCT-14
Cesium (Cs)-Total		0.314	0.323		mg/kg	2.8	40	29-OCT-14
Chromium (Cr)-Total		0.061	0.062		mg/kg	2.0	40	29-OCT-14
Cobalt (Co)-Total		0.232	0.247		mg/kg	6.4	40	29-OCT-14
Copper (Cu)-Total		2.35	2.29		mg/kg	2.5	40	29-OCT-14
Iron (Fe)-Total		30.8	31.7		mg/kg	3.0	40	29-OCT-14
Lead (Pb)-Total		0.030	0.038		mg/kg	22	40	29-OCT-14
Lithium (Li)-Total		<0.50	<0.50	RPD-NA	mg/kg	N/A	40	29-OCT-14
Magnesium (Mg)-Total		1060	1020		mg/kg	3.8	40	29-OCT-14
Manganese (Mn)-Total		512	485		mg/kg	5.6	40	29-OCT-14
Molybdenum (Mo)-Total		<0.020	0.020	RPD-NA	mg/kg	N/A	40	29-OCT-14
Nickel (Ni)-Total		2.70	2.67		mg/kg	1.2	40	29-OCT-14
Phosphorus (P)-Total		901	884		mg/kg	1.9	40	29-OCT-14
Potassium (K)-Total		4420	4370		mg/kg	1.3	40	29-OCT-14
Rubidium (Rb)-Total		16.9	16.3		mg/kg	3.4	40	29-OCT-14
Selenium (Se)-Total		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	29-OCT-14
Sodium (Na)-Total		<20	<20	RPD-NA	mg/kg	N/A	40	29-OCT-14
Strontium (Sr)-Total		9.62	9.53		mg/kg	0.9	60	29-OCT-14
Tellurium (Te)-Total		<0.020	<0.020	RPD-NA	mg/kg	N/A	40	29-OCT-14
Thallium (Tl)-Total		0.212	0.222		mg/kg	4.6	40	29-OCT-14
Tin (Sn)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	29-OCT-14
Uranium (U)-Total		<0.0020	0.0022	RPD-NA	mg/kg	N/A	40	29-OCT-14
Vanadium (V)-Total		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	29-OCT-14
Zinc (Zn)-Total		19.1	18.5		mg/kg	3.5	40	29-OCT-14
Zirconium (Zr)-Total		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	29-OCT-14
WG1979546-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	29-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	29-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	29-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	29-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	29-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	29-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-1 MB								
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	29-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	29-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	29-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	29-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	29-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	29-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	29-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	29-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	29-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	29-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	29-OCT-14
Potassium (K)-Total			<20		mg/kg		20	29-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	29-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	29-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	29-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	29-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	29-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	29-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	29-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	29-OCT-14
WG1979546-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	29-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	29-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	29-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	29-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	29-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	29-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	29-OCT-14

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MET-DRY-CCMS-VA	Tissue							
Batch	R3034499							
WG1979546-2 MB								
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	29-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	29-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	29-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	29-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	29-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	29-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	29-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	29-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	29-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	29-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	29-OCT-14
Potassium (K)-Total			<20		mg/kg		20	29-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	29-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	29-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	29-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	29-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	29-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	29-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	29-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	29-OCT-14
WG1980627-1 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	29-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	29-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	29-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	29-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	29-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	29-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-1 MB								
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	29-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	29-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	29-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	29-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	29-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	29-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	29-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	29-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	29-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	29-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	29-OCT-14
Potassium (K)-Total			<20		mg/kg		20	29-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	29-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	29-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	29-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	29-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	29-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	29-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	29-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	29-OCT-14
WG1980627-2 MB								
Aluminum (Al)-Total			<2.0		mg/kg		2	29-OCT-14
Antimony (Sb)-Total			<0.010		mg/kg		0.01	29-OCT-14
Arsenic (As)-Total			<0.020		mg/kg		0.02	29-OCT-14
Barium (Ba)-Total			<0.050		mg/kg		0.05	29-OCT-14
Beryllium (Be)-Total			<0.010		mg/kg		0.01	29-OCT-14
Bismuth (Bi)-Total			<0.010		mg/kg		0.01	29-OCT-14
Boron (B)-Total			<1.0		mg/kg		1	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DRY-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-2 MB								
Cadmium (Cd)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Calcium (Ca)-Total			<20		mg/kg		20	29-OCT-14
Cesium (Cs)-Total			<0.0050		mg/kg		0.005	29-OCT-14
Chromium (Cr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Cobalt (Co)-Total			<0.020		mg/kg		0.02	29-OCT-14
Copper (Cu)-Total			<0.10		mg/kg		0.1	29-OCT-14
Iron (Fe)-Total			<3.0		mg/kg		3	29-OCT-14
Lead (Pb)-Total			<0.020		mg/kg		0.02	29-OCT-14
Lithium (Li)-Total			<0.50		mg/kg		0.5	29-OCT-14
Magnesium (Mg)-Total			<2.0		mg/kg		2	29-OCT-14
Manganese (Mn)-Total			<0.050		mg/kg		0.05	29-OCT-14
Molybdenum (Mo)-Total			<0.020		mg/kg		0.02	29-OCT-14
Nickel (Ni)-Total			<0.20		mg/kg		0.2	29-OCT-14
Phosphorus (P)-Total			<10		mg/kg		10	29-OCT-14
Potassium (K)-Total			<20		mg/kg		20	29-OCT-14
Rubidium (Rb)-Total			<0.050		mg/kg		0.05	29-OCT-14
Selenium (Se)-Total			<0.050		mg/kg		0.05	29-OCT-14
Sodium (Na)-Total			<20		mg/kg		20	29-OCT-14
Strontium (Sr)-Total			<0.050		mg/kg		0.05	29-OCT-14
Tellurium (Te)-Total			<0.020		mg/kg		0.02	29-OCT-14
Thallium (Tl)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Tin (Sn)-Total			<0.10		mg/kg		0.1	29-OCT-14
Uranium (U)-Total			<0.0020		mg/kg		0.002	29-OCT-14
Vanadium (V)-Total			<0.10		mg/kg		0.1	29-OCT-14
Zinc (Zn)-Total			<0.50		mg/kg		0.5	29-OCT-14
Zirconium (Zr)-Total			<0.20		mg/kg		0.2	29-OCT-14
Batch	R3038188							
WG1979546-5 CRM		VA-NIST-1547						
Chromium (Cr)-Total			70.4		%		70-130	30-OCT-14
MET-WET-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-4 CRM		VA-NRC-TORT3						
Arsenic (As)-Total			113.4		%		70-130	16-SEP-14
Cadmium (Cd)-Total			103.2		%		70-130	16-SEP-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-4 CRM		VA-NRC-TORT3						
Chromium (Cr)-Total			102.1		%		70-130	16-SEP-14
Cobalt (Co)-Total			104.2		%		70-130	16-SEP-14
Copper (Cu)-Total			92.6		%		70-130	16-SEP-14
Iron (Fe)-Total			96.5		%		70-130	16-SEP-14
Lead (Pb)-Total			91.6		%		70-130	16-SEP-14
Manganese (Mn)-Total			96.0		%		70-130	16-SEP-14
Molybdenum (Mo)-Total			102.3		%		70-130	16-SEP-14
Nickel (Ni)-Total			98.7		%		70-130	16-SEP-14
Selenium (Se)-Total			99.3		%		70-130	16-SEP-14
Strontium (Sr)-Total			97.5		%		70-130	16-SEP-14
Vanadium (V)-Total			102.5		%		70-130	16-SEP-14
Zinc (Zn)-Total			95.8		%		70-130	16-SEP-14
WG1951333-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0100		mg/kg ww		0.001-0.021	16-SEP-14
Arsenic (As)-Total			105.9		%		70-130	16-SEP-14
Barium (Ba)-Total			88.5		%		70-130	16-SEP-14
Boron (B)-Total			5.05		mg/kg ww		3.5-5.5	16-SEP-14
Cadmium (Cd)-Total			107.1		%		70-130	16-SEP-14
Calcium (Ca)-Total			104.1		%		70-130	16-SEP-14
Cobalt (Co)-Total			101.7		%		70-130	16-SEP-14
Copper (Cu)-Total			102.5		%		70-130	16-SEP-14
Iron (Fe)-Total			99.2		%		70-130	16-SEP-14
Magnesium (Mg)-Total			99.9		%		70-130	16-SEP-14
Manganese (Mn)-Total			99.5		%		70-130	16-SEP-14
Nickel (Ni)-Total			99.9		%		70-130	16-SEP-14
Potassium (K)-Total			100.1		%		70-130	16-SEP-14
Rubidium (Rb)-Total			100.8		%		70-130	16-SEP-14
Selenium (Se)-Total			105.0		%		70-130	16-SEP-14
Sodium (Na)-Total			96.1		%		70-130	16-SEP-14
Strontium (Sr)-Total			100.9		%		70-130	16-SEP-14
Uranium (U)-Total			107.5		%		70-130	16-SEP-14
Vanadium (V)-Total			97.1		%		70-130	16-SEP-14
Zinc (Zn)-Total			96.7		%		70-130	16-SEP-14
WG1951333-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	16-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-1 MB								
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	16-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	16-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	16-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	16-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	16-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	16-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	16-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	16-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	16-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	16-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	16-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	16-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	16-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	16-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	16-SEP-14
WG1951333-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	16-SEP-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2963477							
WG1951333-2 MB								
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	16-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	16-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	16-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	16-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	16-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	16-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	16-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	16-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	16-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	16-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	16-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	16-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	16-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	16-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	16-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	16-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	16-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	16-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	16-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0085		mg/kg wwt		0.001-0.021	24-SEP-14
Arsenic (As)-Total			102.6		%		70-130	24-SEP-14
Barium (Ba)-Total			85.8		%		70-130	24-SEP-14
Boron (B)-Total			4.82		mg/kg wwt		3.5-5.5	24-SEP-14
Cadmium (Cd)-Total			107.4		%		70-130	24-SEP-14
Calcium (Ca)-Total			99.7		%		70-130	24-SEP-14
Cobalt (Co)-Total			97.8		%		70-130	24-SEP-14
Copper (Cu)-Total			97.8		%		70-130	24-SEP-14
Iron (Fe)-Total			83.5		%		70-130	24-SEP-14
Lead (Pb)-Total			97.2		%		70-130	24-SEP-14
Magnesium (Mg)-Total			97.1		%		70-130	24-SEP-14
Manganese (Mn)-Total			99.2		%		70-130	24-SEP-14
Nickel (Ni)-Total			102.4		%		70-130	24-SEP-14
Potassium (K)-Total			98.1		%		70-130	24-SEP-14
Rubidium (Rb)-Total			96.5		%		70-130	24-SEP-14
Selenium (Se)-Total			88.0		%		70-130	24-SEP-14
Sodium (Na)-Total			94.7		%		70-130	24-SEP-14
Strontium (Sr)-Total			97.9		%		70-130	24-SEP-14
Uranium (U)-Total			100.1		%		70-130	24-SEP-14
Vanadium (V)-Total			93.6		%		70-130	24-SEP-14
Zinc (Zn)-Total			107.2		%		70-130	24-SEP-14
WG1954103-6 CRM		VA-NIST-1547						
Aluminum (Al)-Total			114.0		%		70-130	24-SEP-14
Antimony (Sb)-Total			0.0197		mg/kg wwt		0.01-0.03	24-SEP-14
Barium (Ba)-Total			97.0		%		70-130	24-SEP-14
Boron (B)-Total			97.4		%		70-130	24-SEP-14
Cadmium (Cd)-Total			99.1		%		70-130	24-SEP-14
Calcium (Ca)-Total			101.2		%		70-130	24-SEP-14
Chromium (Cr)-Total			76.8		%		70-130	24-SEP-14
Cobalt (Co)-Total			0.0594		mg/kg wwt		0.04-0.08	24-SEP-14
Copper (Cu)-Total			99.4		%		70-130	24-SEP-14
Iron (Fe)-Total			93.2		%		70-130	24-SEP-14
Lead (Pb)-Total			95.7		%		70-130	24-SEP-14
Magnesium (Mg)-Total			97.8		%		70-130	24-SEP-14

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MET-WET-CCMS-VA	Tissue							
Batch	R2980898							
WG1954103-6 CRM		VA-NIST-1547						
Manganese (Mn)-Total			99.6		%		70-130	24-SEP-14
Molybdenum (Mo)-Total			0.0500		mg/kg ww		0.04-0.08	24-SEP-14
Nickel (Ni)-Total			75.0		%		70-130	24-SEP-14
Phosphorus (P)-Total			106.3		%		70-130	24-SEP-14
Potassium (K)-Total			98.7		%		70-130	24-SEP-14
Rubidium (Rb)-Total			96.6		%		70-130	24-SEP-14
Selenium (Se)-Total			0.122		mg/kg ww		0.07-0.17	24-SEP-14
Sodium (Na)-Total			29.3		mg/kg ww		4-44	24-SEP-14
Strontium (Sr)-Total			107.5		%		70-130	24-SEP-14
Vanadium (V)-Total			83.9		%		70-130	24-SEP-14
Zinc (Zn)-Total			106.4		%		70-130	24-SEP-14
WG1955066-11 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0050		mg/kg ww		0.001-0.021	24-SEP-14
Arsenic (As)-Total			101.1		%		70-130	24-SEP-14
Barium (Ba)-Total			82.9		%		70-130	24-SEP-14
Boron (B)-Total			4.39		mg/kg ww		3.5-5.5	24-SEP-14
Cadmium (Cd)-Total			100.8		%		70-130	24-SEP-14
Calcium (Ca)-Total			89.5		%		70-130	24-SEP-14
Cobalt (Co)-Total			97.3		%		70-130	24-SEP-14
Copper (Cu)-Total			94.7		%		70-130	24-SEP-14
Iron (Fe)-Total			92.0		%		70-130	24-SEP-14
Lead (Pb)-Total			88.9		%		70-130	24-SEP-14
Magnesium (Mg)-Total			94.8		%		70-130	24-SEP-14
Manganese (Mn)-Total			95.4		%		70-130	24-SEP-14
Nickel (Ni)-Total			100.3		%		70-130	24-SEP-14
Potassium (K)-Total			97.3		%		70-130	24-SEP-14
Rubidium (Rb)-Total			100.1		%		70-130	24-SEP-14
Selenium (Se)-Total			98.3		%		70-130	24-SEP-14
Sodium (Na)-Total			95.0		%		70-130	24-SEP-14
Strontium (Sr)-Total			87.5		%		70-130	24-SEP-14
Uranium (U)-Total			92.4		%		70-130	24-SEP-14
Vanadium (V)-Total			91.9		%		70-130	24-SEP-14
Zinc (Zn)-Total			105.3		%		70-130	24-SEP-14
WG1955066-12 CRM		VA-NIST-1547						
Aluminum (Al)-Total			99.9		%		70-130	24-SEP-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1955066-12 CRM		VA-NIST-1547						
Antimony (Sb)-Total			0.0163		mg/kg ww		0.01-0.03	24-SEP-14
Arsenic (As)-Total			0.0739		mg/kg ww		0.04-0.08	24-SEP-14
Barium (Ba)-Total			89.3		%		70-130	24-SEP-14
Boron (B)-Total			82.9		%		70-130	24-SEP-14
Cadmium (Cd)-Total			90.8		%		70-130	24-SEP-14
Calcium (Ca)-Total			86.0		%		70-130	24-SEP-14
Chromium (Cr)-Total			70.2		%		70-130	24-SEP-14
Cobalt (Co)-Total			0.0531		mg/kg ww		0.04-0.08	24-SEP-14
Copper (Cu)-Total			87.4		%		70-130	24-SEP-14
Iron (Fe)-Total			84.2		%		70-130	24-SEP-14
Lead (Pb)-Total			82.5		%		70-130	24-SEP-14
Magnesium (Mg)-Total			87.8		%		70-130	24-SEP-14
Manganese (Mn)-Total			87.9		%		70-130	24-SEP-14
Molybdenum (Mo)-Total			0.0452		mg/kg ww		0.04-0.08	08-OCT-14
Phosphorus (P)-Total			99.6		%		70-130	24-SEP-14
Potassium (K)-Total			89.8		%		70-130	24-SEP-14
Rubidium (Rb)-Total			89.7		%		70-130	24-SEP-14
Selenium (Se)-Total			0.108		mg/kg ww		0.07-0.17	24-SEP-14
Sodium (Na)-Total			27.1		mg/kg ww		4-44	24-SEP-14
Strontium (Sr)-Total			89.6		%		70-130	24-SEP-14
Vanadium (V)-Total			77.3		%		70-130	24-SEP-14
Zinc (Zn)-Total			96.8		%		70-130	24-SEP-14
WG1954103-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	24-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	24-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-1 MB								
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	24-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	24-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	24-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	24-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
WG1954103-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	24-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	24-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1954103-2	MB							
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	24-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	24-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	24-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	24-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
WG1955066-7	MB							
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	24-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	24-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2980898							
WG1955066-7 MB								
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	24-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	24-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	24-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	24-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
WG1955066-8 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	24-SEP-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	24-SEP-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	24-SEP-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	24-SEP-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14

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MET-WET-CCMS-VA Tissue								
Batch R2980898								
WG1955066-8 MB								
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	24-SEP-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	24-SEP-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	24-SEP-14
Potassium (K)-Total			<4.0		mg/kg ww		4	24-SEP-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	24-SEP-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	24-SEP-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	24-SEP-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	24-SEP-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	24-SEP-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	24-SEP-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	24-SEP-14
Batch R2997730								
WG1954103-6 CRM		VA-NIST-1547						
Arsenic (As)-Total			0.0659		mg/kg ww		0.04-0.08	14-OCT-14
WG1955066-10 DUP		L1497000-114						
Aluminum (Al)-Total		27.8	28.1		mg/kg ww	1.1	40	14-OCT-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Arsenic (As)-Total		0.0106	0.0111		mg/kg ww	4.7	40	14-OCT-14
Barium (Ba)-Total		39.8	39.3		mg/kg ww	1.0	40	14-OCT-14
Beryllium (Be)-Total		0.0022	<0.0020	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Bismuth (Bi)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Boron (B)-Total		4.55	4.30		mg/kg ww	5.7	40	14-OCT-14
Cadmium (Cd)-Total		0.0025	0.0023		mg/kg ww	11	40	14-OCT-14
Calcium (Ca)-Total		2940	2880		mg/kg ww	2.1	60	14-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2997730							
WG1955066-10	DUP	L1497000-114						
Cesium (Cs)-Total		0.0452	0.0431		mg/kg ww	4.7	40	14-OCT-14
Chromium (Cr)-Total		0.028	0.025		mg/kg ww	10	40	14-OCT-14
Cobalt (Co)-Total		0.131	0.125		mg/kg ww	4.6	40	14-OCT-14
Copper (Cu)-Total		1.44	1.46		mg/kg ww	1.0	40	14-OCT-14
Iron (Fe)-Total		12.5	12.9		mg/kg ww	3.4	40	14-OCT-14
Lead (Pb)-Total		0.0138	0.0148		mg/kg ww	7.5	40	14-OCT-14
Lithium (Li)-Total		<0.10	<0.10	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Magnesium (Mg)-Total		653	631		mg/kg ww	3.5	40	14-OCT-14
Manganese (Mn)-Total		457	445		mg/kg ww	2.6	40	14-OCT-14
Molybdenum (Mo)-Total		0.0251	0.0262		mg/kg ww	4.1	40	14-OCT-14
Nickel (Ni)-Total		0.736	0.735		mg/kg ww	0.1	40	14-OCT-14
Phosphorus (P)-Total		502	485		mg/kg ww	3.5	40	14-OCT-14
Potassium (K)-Total		2410	2410		mg/kg ww	0.1	40	14-OCT-14
Rubidium (Rb)-Total		5.41	5.24		mg/kg ww	3.2	40	14-OCT-14
Selenium (Se)-Total		<0.010	<0.010	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Sodium (Na)-Total		<4.0	<4.0	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Strontium (Sr)-Total		7.50	7.32		mg/kg ww	2.4	60	14-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Thallium (Tl)-Total		0.0146	0.0131		mg/kg ww	11	40	14-OCT-14
Tin (Sn)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Uranium (U)-Total		0.00155	0.00187		mg/kg ww	19	40	14-OCT-14
Vanadium (V)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Zinc (Zn)-Total		11.4	11.1		mg/kg ww	2.8	40	14-OCT-14
Zirconium (Zr)-Total		<0.040	<0.040	RPD-NA	mg/kg ww	N/A	40	14-OCT-14
Batch	R2998022							
WG1975738-4	CRM	VA-NIST-1515						
Aluminum (Al)-Total			106.6		%		70-130	16-OCT-14
Antimony (Sb)-Total			0.0105		mg/kg ww		0.003-0.023	16-OCT-14
Arsenic (As)-Total			0.0289		mg/kg ww		0.018-0.058	16-OCT-14
Barium (Ba)-Total			97.4		%		70-130	16-OCT-14
Boron (B)-Total			95.9		%		70-130	16-OCT-14
Cadmium (Cd)-Total			0.0147		mg/kg ww		0.008-0.018	16-OCT-14
Calcium (Ca)-Total			91.7		%		70-130	16-OCT-14
Chromium (Cr)-Total			73.3		%		70-130	16-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-4 CRM		VA-NIST-1515						
Cobalt (Co)-Total			0.0848		mg/kg ww		0.07-0.11	16-OCT-14
Copper (Cu)-Total			90.4		%		70-130	16-OCT-14
Iron (Fe)-Total			81.0		%		70-130	16-OCT-14
Lead (Pb)-Total			83.6		%		70-130	16-OCT-14
Magnesium (Mg)-Total			94.8		%		70-130	16-OCT-14
Manganese (Mn)-Total			93.9		%		70-130	16-OCT-14
Molybdenum (Mo)-Total			83.3		%		70-130	16-OCT-14
Nickel (Ni)-Total			87.6		%		70-130	16-OCT-14
Phosphorus (P)-Total			104.0		%		70-130	16-OCT-14
Potassium (K)-Total			95.0		%		70-130	16-OCT-14
Rubidium (Rb)-Total			91.0		%		70-130	16-OCT-14
Selenium (Se)-Total			0.056		mg/kg ww		0-0.1	16-OCT-14
Sodium (Na)-Total			28.2		mg/kg ww		4.4-44.4	16-OCT-14
Strontium (Sr)-Total			91.6		%		70-130	16-OCT-14
Uranium (U)-Total			0.00486		mg/kg ww		0.004-0.008	16-OCT-14
Vanadium (V)-Total			0.161		mg/kg ww		0.16-0.36	16-OCT-14
Zinc (Zn)-Total			92.0		%		70-130	16-OCT-14
WG1975738-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			117.3		%		70-130	16-OCT-14
Antimony (Sb)-Total			0.0208		mg/kg ww		0.01-0.03	16-OCT-14
Arsenic (As)-Total			0.0586		mg/kg ww		0.04-0.08	16-OCT-14
Barium (Ba)-Total			104.1		%		70-130	16-OCT-14
Boron (B)-Total			91.1		%		70-130	16-OCT-14
Cadmium (Cd)-Total			97.8		%		70-130	16-OCT-14
Calcium (Ca)-Total			91.8		%		70-130	16-OCT-14
Chromium (Cr)-Total			75.0		%		70-130	16-OCT-14
Cobalt (Co)-Total			0.0626		mg/kg ww		0.04-0.08	16-OCT-14
Copper (Cu)-Total			95.2		%		70-130	16-OCT-14
Iron (Fe)-Total			91.2		%		70-130	16-OCT-14
Lead (Pb)-Total			86.6		%		70-130	16-OCT-14
Magnesium (Mg)-Total			99.4		%		70-130	16-OCT-14
Manganese (Mn)-Total			99.2		%		70-130	16-OCT-14
Molybdenum (Mo)-Total			0.0442		mg/kg ww		0.04-0.08	16-OCT-14
Nickel (Ni)-Total			70.2		%		70-130	16-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-5 CRM		VA-NIST-1547						
Phosphorus (P)-Total			113.0		%		70-130	16-OCT-14
Potassium (K)-Total			101.2		%		70-130	16-OCT-14
Rubidium (Rb)-Total			97.7		%		70-130	16-OCT-14
Selenium (Se)-Total			0.119		mg/kg ww		0.07-0.17	16-OCT-14
Sodium (Na)-Total			30.6		mg/kg ww		4-44	16-OCT-14
Strontium (Sr)-Total			95.1		%		70-130	16-OCT-14
Vanadium (V)-Total			86.2		%		70-130	16-OCT-14
Zinc (Zn)-Total			100.6		%		70-130	16-OCT-14
WG1975738-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	16-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	16-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	16-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	16-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	16-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	16-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	16-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	16-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	16-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	16-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	16-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	16-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R2998022							
WG1975738-1 MB								
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	16-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	16-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	16-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	16-OCT-14
WG1975738-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	16-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	16-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	16-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	16-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	16-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	16-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	16-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	16-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	16-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	16-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	16-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	16-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	16-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch R2998022								
WG1975738-2 MB								
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	16-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	16-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	16-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	16-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	16-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	16-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	16-OCT-14
Batch R3002648								
WG1956812-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			105.8		%		70-130	17-OCT-14
Antimony (Sb)-Total			0.0223		mg/kg ww		0.01-0.03	17-OCT-14
Arsenic (As)-Total			0.0590		mg/kg ww		0.04-0.08	17-OCT-14
Barium (Ba)-Total			92.7		%		70-130	17-OCT-14
Boron (B)-Total			86.0		%		70-130	17-OCT-14
Cadmium (Cd)-Total			90.2		%		70-130	17-OCT-14
Calcium (Ca)-Total			93.3		%		70-130	17-OCT-14
Chromium (Cr)-Total			70.4		%		70-130	17-OCT-14
Cobalt (Co)-Total			0.0556		mg/kg ww		0.04-0.08	17-OCT-14
Copper (Cu)-Total			87.3		%		70-130	17-OCT-14
Iron (Fe)-Total			84.7		%		70-130	17-OCT-14
Lead (Pb)-Total			86.4		%		70-130	17-OCT-14
Magnesium (Mg)-Total			89.5		%		70-130	17-OCT-14
Manganese (Mn)-Total			88.4		%		70-130	17-OCT-14
Molybdenum (Mo)-Total			0.0467		mg/kg ww		0.04-0.08	17-OCT-14
Phosphorus (P)-Total			102.9		%		70-130	17-OCT-14
Potassium (K)-Total			91.4		%		70-130	17-OCT-14
Rubidium (Rb)-Total			88.8		%		70-130	17-OCT-14
Selenium (Se)-Total			0.115		mg/kg ww		0.07-0.17	17-OCT-14
Sodium (Na)-Total			28.0		mg/kg ww		4-44	17-OCT-14
Strontium (Sr)-Total			96.1		%		70-130	17-OCT-14
Vanadium (V)-Total			76.2		%		70-130	17-OCT-14
Zinc (Zn)-Total			90.3		%		70-130	17-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA Tissue								
Batch	R3012388							
WG1954103-3 DUP		L1497000-10						
Aluminum (Al)-Total		28.8	33.9		mg/kg wwt	16	40	21-OCT-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Arsenic (As)-Total		0.0070	0.0100		mg/kg wwt	36	40	21-OCT-14
Barium (Ba)-Total		36.5	38.9		mg/kg wwt	6.4	40	21-OCT-14
Beryllium (Be)-Total		<0.0020	<0.0020	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Bismuth (Bi)-Total		0.0041	<0.0020	DUP-H	mg/kg wwt	N/A	40	21-OCT-14
Boron (B)-Total		5.43	5.11		mg/kg wwt	6.1	40	21-OCT-14
Cadmium (Cd)-Total		0.0028	0.0029		mg/kg wwt	4.2	40	21-OCT-14
Calcium (Ca)-Total		2800	2660		mg/kg wwt	5.3	60	21-OCT-14
Cesium (Cs)-Total		0.0951	0.0930		mg/kg wwt	2.2	40	21-OCT-14
Chromium (Cr)-Total		0.019	0.026		mg/kg wwt	34	40	21-OCT-14
Cobalt (Co)-Total		0.0552	0.0624		mg/kg wwt	12	40	21-OCT-14
Copper (Cu)-Total		1.37	1.50		mg/kg wwt	8.9	40	21-OCT-14
Iron (Fe)-Total		14.9	15.9		mg/kg wwt	6.8	40	21-OCT-14
Lead (Pb)-Total		0.0138	0.0142		mg/kg wwt	3.1	40	21-OCT-14
Lithium (Li)-Total		<0.10	<0.10	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Magnesium (Mg)-Total		535	588		mg/kg wwt	9.6	40	21-OCT-14
Manganese (Mn)-Total		536	583		mg/kg wwt	8.3	40	21-OCT-14
Molybdenum (Mo)-Total		0.314	0.299		mg/kg wwt	5.1	40	21-OCT-14
Nickel (Ni)-Total		0.362	0.401		mg/kg wwt	10	40	21-OCT-14
Phosphorus (P)-Total		569	616		mg/kg wwt	7.9	40	21-OCT-14
Potassium (K)-Total		2560	2830		mg/kg wwt	10	40	21-OCT-14
Rubidium (Rb)-Total		9.69	10.5		mg/kg wwt	7.6	40	21-OCT-14
Selenium (Se)-Total		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Sodium (Na)-Total		<4.0	<4.0	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Strontium (Sr)-Total		4.02	3.80		mg/kg wwt	5.8	60	21-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.142	0.150		mg/kg wwt	5.3	40	21-OCT-14
Tin (Sn)-Total		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Uranium (U)-Total		0.00134	0.00138		mg/kg wwt	2.9	40	21-OCT-14
Vanadium (V)-Total		<0.020	0.023	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
Zinc (Zn)-Total		11.9	12.7		mg/kg wwt	6.8	40	21-OCT-14
Zirconium (Zr)-Total		<0.040	<0.040	RPD-NA	mg/kg wwt	N/A	40	21-OCT-14
WG1954103-4 DUP		L1497000-146						

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MET-WET-CCMS-VA		Tissue						
Batch	R3012388							
WG1954103-4 DUP		L1497000-146						
Aluminum (Al)-Total		299	289		mg/kg ww	3.3	40	21-OCT-14
Antimony (Sb)-Total		0.0077	0.0074		mg/kg ww	3.9	40	21-OCT-14
Arsenic (As)-Total		0.317	0.312		mg/kg ww	1.7	40	21-OCT-14
Barium (Ba)-Total		27.4	26.7		mg/kg ww	2.5	40	21-OCT-14
Beryllium (Be)-Total		0.0318	0.0298		mg/kg ww	6.5	40	21-OCT-14
Bismuth (Bi)-Total		0.0055	0.0050		mg/kg ww	9.5	40	21-OCT-14
Boron (B)-Total		1.30	1.33		mg/kg ww	1.7	40	21-OCT-14
Cadmium (Cd)-Total		0.0585	0.0592		mg/kg ww	1.0	40	21-OCT-14
Calcium (Ca)-Total		1390	1380		mg/kg ww	0.3	60	21-OCT-14
Cesium (Cs)-Total		0.164	0.153		mg/kg ww	6.5	40	21-OCT-14
Chromium (Cr)-Total		0.428	0.399		mg/kg ww	7.0	40	21-OCT-14
Cobalt (Co)-Total		1.02	1.01		mg/kg ww	0.6	40	21-OCT-14
Copper (Cu)-Total		3.25	3.20		mg/kg ww	1.6	40	21-OCT-14
Iron (Fe)-Total		322	313		mg/kg ww	2.8	40	21-OCT-14
Lead (Pb)-Total		0.185	0.181		mg/kg ww	2.2	40	21-OCT-14
Lithium (Li)-Total		0.14	0.13		mg/kg ww	7.5	40	21-OCT-14
Magnesium (Mg)-Total		439	429		mg/kg ww	2.3	40	21-OCT-14
Manganese (Mn)-Total		67.0	67.2		mg/kg ww	0.4	40	21-OCT-14
Molybdenum (Mo)-Total		0.125	0.115		mg/kg ww	8.4	40	21-OCT-14
Nickel (Ni)-Total		2.80	2.76		mg/kg ww	1.3	40	21-OCT-14
Phosphorus (P)-Total		661	639		mg/kg ww	3.4	40	21-OCT-14
Potassium (K)-Total		1840	1770		mg/kg ww	3.8	40	21-OCT-14
Rubidium (Rb)-Total		6.40	6.18		mg/kg ww	3.5	40	21-OCT-14
Selenium (Se)-Total		0.040	0.038		mg/kg ww	6.1	40	21-OCT-14
Sodium (Na)-Total		58.2	56.4		mg/kg ww	3.1	40	21-OCT-14
Strontium (Sr)-Total		9.53	9.41		mg/kg ww	1.3	60	21-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.00961	0.00934		mg/kg ww	2.8	40	21-OCT-14
Tin (Sn)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Uranium (U)-Total		0.157	0.153		mg/kg ww	2.4	40	21-OCT-14
Vanadium (V)-Total		0.405	0.391		mg/kg ww	3.5	40	21-OCT-14
Zinc (Zn)-Total		25.3	24.9		mg/kg ww	1.6	40	21-OCT-14
Zirconium (Zr)-Total		0.333	0.316		mg/kg ww	5.3	40	21-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-4 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0082		mg/kg wwt		0.001-0.021	21-OCT-14
Arsenic (As)-Total			98.5		%		70-130	21-OCT-14
Barium (Ba)-Total			84.2		%		70-130	21-OCT-14
Boron (B)-Total			4.51		mg/kg wwt		3.5-5.5	21-OCT-14
Cadmium (Cd)-Total			102.7		%		70-130	21-OCT-14
Calcium (Ca)-Total			96.6		%		70-130	21-OCT-14
Cobalt (Co)-Total			97.4		%		70-130	21-OCT-14
Copper (Cu)-Total			95.4		%		70-130	21-OCT-14
Iron (Fe)-Total			94.5		%		70-130	21-OCT-14
Lead (Pb)-Total			93.2		%		70-130	21-OCT-14
Magnesium (Mg)-Total			95.7		%		70-130	21-OCT-14
Manganese (Mn)-Total			97.7		%		70-130	21-OCT-14
Nickel (Ni)-Total			92.8		%		70-130	21-OCT-14
Potassium (K)-Total			97.6		%		70-130	21-OCT-14
Rubidium (Rb)-Total			95.0		%		70-130	21-OCT-14
Selenium (Se)-Total			101.7		%		70-130	21-OCT-14
Sodium (Na)-Total			91.8		%		70-130	21-OCT-14
Strontium (Sr)-Total			94.3		%		70-130	21-OCT-14
Uranium (U)-Total			98.1		%		70-130	21-OCT-14
Vanadium (V)-Total			92.7		%		70-130	21-OCT-14
Zinc (Zn)-Total			93.9		%		70-130	21-OCT-14
WG1979398-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			108.4		%		70-130	21-OCT-14
Antimony (Sb)-Total			0.0209		mg/kg wwt		0.01-0.03	21-OCT-14
Arsenic (As)-Total			0.0681		mg/kg wwt		0.04-0.08	21-OCT-14
Barium (Ba)-Total			95.2		%		70-130	21-OCT-14
Boron (B)-Total			87.5		%		70-130	21-OCT-14
Cadmium (Cd)-Total			93.4		%		70-130	21-OCT-14
Calcium (Ca)-Total			96.9		%		70-130	21-OCT-14
Chromium (Cr)-Total			70.2		%		70-130	21-OCT-14
Cobalt (Co)-Total			0.0554		mg/kg wwt		0.04-0.08	21-OCT-14
Copper (Cu)-Total			90.9		%		70-130	21-OCT-14
Iron (Fe)-Total			88.0		%		70-130	21-OCT-14
Lead (Pb)-Total			96.6		%		70-130	21-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-5 CRM		VA-NIST-1547						
Magnesium (Mg)-Total			92.9		%		70-130	21-OCT-14
Manganese (Mn)-Total			92.8		%		70-130	21-OCT-14
Molybdenum (Mo)-Total			0.0460		mg/kg ww		0.04-0.08	21-OCT-14
Phosphorus (P)-Total			104.0		%		70-130	21-OCT-14
Potassium (K)-Total			96.7		%		70-130	21-OCT-14
Rubidium (Rb)-Total			91.8		%		70-130	21-OCT-14
Selenium (Se)-Total			0.112		mg/kg ww		0.07-0.17	21-OCT-14
Sodium (Na)-Total			29.2		mg/kg ww		4-44	21-OCT-14
Strontium (Sr)-Total			99.8		%		70-130	21-OCT-14
Vanadium (V)-Total			79.1		%		70-130	21-OCT-14
Zinc (Zn)-Total			98.0		%		70-130	21-OCT-14
WG1979398-3 DUP		L1497000-122						
Aluminum (Al)-Total		4.76	5.87		mg/kg ww	21	40	21-OCT-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Arsenic (As)-Total		0.0196	0.0204		mg/kg ww	3.9	40	21-OCT-14
Barium (Ba)-Total		13.1	13.8		mg/kg ww	5.2	40	21-OCT-14
Beryllium (Be)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Bismuth (Bi)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Boron (B)-Total		0.86	1.06		mg/kg ww	21	40	21-OCT-14
Cadmium (Cd)-Total		0.0061	0.0068		mg/kg ww	11	40	21-OCT-14
Calcium (Ca)-Total		883	1050		mg/kg ww	18	60	21-OCT-14
Cesium (Cs)-Total		0.0141	0.0160		mg/kg ww	12	40	21-OCT-14
Chromium (Cr)-Total		0.017	0.037	J	mg/kg ww	0.019	0.02	21-OCT-14
Cobalt (Co)-Total		0.129	0.145		mg/kg ww	11	40	21-OCT-14
Copper (Cu)-Total		0.760	0.803		mg/kg ww	5.6	40	21-OCT-14
Iron (Fe)-Total		16.5	18.7		mg/kg ww	12	40	21-OCT-14
Lead (Pb)-Total		0.0092	0.0132		mg/kg ww	36	40	21-OCT-14
Lithium (Li)-Total		<0.10	<0.10	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Magnesium (Mg)-Total		551	589		mg/kg ww	6.6	40	21-OCT-14
Manganese (Mn)-Total		371	399		mg/kg ww	7.3	40	21-OCT-14
Molybdenum (Mo)-Total		0.272	0.317		mg/kg ww	15	40	21-OCT-14
Nickel (Ni)-Total		0.528	0.584		mg/kg ww	10	40	21-OCT-14
Phosphorus (P)-Total		434	451		mg/kg ww	3.7	40	21-OCT-14
Potassium (K)-Total		5150	5350		mg/kg ww	3.8	40	21-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-3	DUP	L1497000-122						
Rubidium (Rb)-Total		4.86	5.08		mg/kg ww	4.3	40	21-OCT-14
Selenium (Se)-Total		<0.010	<0.010	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Sodium (Na)-Total		<4.0	4.6	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Strontium (Sr)-Total		4.01	4.79		mg/kg ww	18	60	21-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Thallium (Tl)-Total		0.00153	0.00176		mg/kg ww	14	40	21-OCT-14
Tin (Sn)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Uranium (U)-Total		0.00139	0.00182		mg/kg ww	26	40	21-OCT-14
Vanadium (V)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
Zinc (Zn)-Total		7.76	8.81		mg/kg ww	13	40	21-OCT-14
Zirconium (Zr)-Total		<0.040	<0.040	RPD-NA	mg/kg ww	N/A	40	21-OCT-14
WG1979398-1	MB							
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	21-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	21-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	21-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	21-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	21-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	21-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	21-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	21-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	21-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	21-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-1 MB								
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	21-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	21-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	21-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	21-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	21-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	21-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	21-OCT-14
WG1979398-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	21-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	21-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	21-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	21-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	21-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	21-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	21-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	21-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	21-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	21-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	21-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	21-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	21-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	21-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3013448							
WG1979398-2 MB								
Rubidium (Rb)-Total			<0.010		mg/kg wwt		0.01	21-OCT-14
Selenium (Se)-Total			<0.010		mg/kg wwt		0.01	21-OCT-14
Sodium (Na)-Total			<4.0		mg/kg wwt		4	21-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg wwt		0.01	21-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg wwt		0.004	21-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg wwt		0.0004	21-OCT-14
Tin (Sn)-Total			<0.020		mg/kg wwt		0.02	21-OCT-14
Uranium (U)-Total			<0.00040		mg/kg wwt		0.0004	21-OCT-14
Vanadium (V)-Total			<0.020		mg/kg wwt		0.02	21-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg wwt		0.1	21-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg wwt		0.04	21-OCT-14
Batch	R3020548							
WG1981395-4 CRM		VA-NIST-1515						
Aluminum (Al)-Total			109.6		%		70-130	23-OCT-14
Antimony (Sb)-Total			0.0106		mg/kg wwt		0.003-0.023	23-OCT-14
Arsenic (As)-Total			0.0279		mg/kg wwt		0.018-0.058	24-OCT-14
Barium (Ba)-Total			98.8		%		70-130	23-OCT-14
Boron (B)-Total			99.2		%		70-130	23-OCT-14
Cadmium (Cd)-Total			0.0293	RM-H	mg/kg wwt		0.008-0.018	24-OCT-14
Calcium (Ca)-Total			98.2		%		70-130	23-OCT-14
Chromium (Cr)-Total			72.1		%		70-130	24-OCT-14
Cobalt (Co)-Total			0.0812		mg/kg wwt		0.07-0.11	23-OCT-14
Copper (Cu)-Total			92.0		%		70-130	23-OCT-14
Iron (Fe)-Total			83.3		%		70-130	23-OCT-14
Lead (Pb)-Total			88.9		%		70-130	23-OCT-14
Magnesium (Mg)-Total			95.6		%		70-130	23-OCT-14
Manganese (Mn)-Total			92.4		%		70-130	23-OCT-14
Molybdenum (Mo)-Total			88.4		%		70-130	23-OCT-14
Nickel (Ni)-Total			90.1		%		70-130	23-OCT-14
Phosphorus (P)-Total			103.4		%		70-130	23-OCT-14
Potassium (K)-Total			95.5		%		70-130	23-OCT-14
Rubidium (Rb)-Total			91.2		%		70-130	23-OCT-14
Selenium (Se)-Total			0.052		mg/kg wwt		0-0.1	23-OCT-14
Sodium (Na)-Total			31.6		mg/kg wwt		4.4-44.4	23-OCT-14

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MET-WET-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-4 CRM		VA-NIST-1515						
Strontium (Sr)-Total			99.0		%		70-130	23-OCT-14
Uranium (U)-Total			0.00531		mg/kg ww		0.004-0.008	23-OCT-14
Vanadium (V)-Total			0.173		mg/kg ww		0.16-0.36	23-OCT-14
Zinc (Zn)-Total			92.5		%		70-130	23-OCT-14
WG1981395-5 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0090		mg/kg ww		0.001-0.021	23-OCT-14
Arsenic (As)-Total			99.6		%		70-130	23-OCT-14
Barium (Ba)-Total			81.6		%		70-130	23-OCT-14
Boron (B)-Total			4.31		mg/kg ww		3.5-5.5	23-OCT-14
Cadmium (Cd)-Total			100.4		%		70-130	23-OCT-14
Calcium (Ca)-Total			93.5		%		70-130	23-OCT-14
Cobalt (Co)-Total			96.0		%		70-130	23-OCT-14
Copper (Cu)-Total			97.8		%		70-130	23-OCT-14
Iron (Fe)-Total			94.0		%		70-130	23-OCT-14
Lead (Pb)-Total			93.1		%		70-130	23-OCT-14
Magnesium (Mg)-Total			95.9		%		70-130	23-OCT-14
Manganese (Mn)-Total			96.0		%		70-130	23-OCT-14
Nickel (Ni)-Total			95.5		%		70-130	23-OCT-14
Potassium (K)-Total			95.9		%		70-130	23-OCT-14
Rubidium (Rb)-Total			97.8		%		70-130	23-OCT-14
Selenium (Se)-Total			100.9		%		70-130	23-OCT-14
Sodium (Na)-Total			93.1		%		70-130	23-OCT-14
Strontium (Sr)-Total			92.3		%		70-130	23-OCT-14
Uranium (U)-Total			95.4		%		70-130	23-OCT-14
Vanadium (V)-Total			91.2		%		70-130	23-OCT-14
Zinc (Zn)-Total			94.5		%		70-130	23-OCT-14
WG1955066-9 DUP		L1497000-22						
Aluminum (Al)-Total		580	605		mg/kg ww	4.3	40	23-OCT-14
Antimony (Sb)-Total		0.0157	0.0153		mg/kg ww	2.6	40	23-OCT-14
Arsenic (As)-Total		0.362	0.369		mg/kg ww	1.9	40	23-OCT-14
Barium (Ba)-Total		73.1	75.9		mg/kg ww	3.8	40	23-OCT-14
Beryllium (Be)-Total		0.0295	0.0298		mg/kg ww	0.7	40	23-OCT-14
Bismuth (Bi)-Total		0.0321	0.0340		mg/kg ww	5.7	40	23-OCT-14
Boron (B)-Total		1.58	1.47		mg/kg ww	7.1	40	23-OCT-14
Cadmium (Cd)-Total		0.117	0.114		mg/kg ww	2.6	40	23-OCT-14

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MET-WET-CCMS-VA Tissue								
Batch	R3020548							
WG1955066-9 DUP		L1497000-22						
Calcium (Ca)-Total		2330	2260		mg/kg ww	3.2	60	23-OCT-14
Cesium (Cs)-Total		0.419	0.417		mg/kg ww	0.4	40	23-OCT-14
Chromium (Cr)-Total		2.07	2.38		mg/kg ww	14	40	23-OCT-14
Cobalt (Co)-Total		0.837	0.876		mg/kg ww	4.5	40	23-OCT-14
Copper (Cu)-Total		5.54	5.76		mg/kg ww	3.9	40	23-OCT-14
Iron (Fe)-Total		806	847		mg/kg ww	4.9	40	23-OCT-14
Lead (Pb)-Total		0.762	0.790		mg/kg ww	3.6	40	23-OCT-14
Lithium (Li)-Total		0.48	0.50		mg/kg ww	4.7	40	23-OCT-14
Magnesium (Mg)-Total		1170	1180		mg/kg ww	1.0	40	23-OCT-14
Manganese (Mn)-Total		54.4	53.1		mg/kg ww	2.5	40	23-OCT-14
Molybdenum (Mo)-Total		0.378	0.392		mg/kg ww	3.7	40	23-OCT-14
Nickel (Ni)-Total		5.23	5.41		mg/kg ww	3.3	40	23-OCT-14
Phosphorus (P)-Total		592	591		mg/kg ww	0.2	40	23-OCT-14
Potassium (K)-Total		1020	998		mg/kg ww	1.8	40	23-OCT-14
Rubidium (Rb)-Total		4.97	4.88		mg/kg ww	1.8	40	23-OCT-14
Selenium (Se)-Total		0.071	0.071		mg/kg ww	0.0	40	23-OCT-14
Sodium (Na)-Total		77.4	77.8		mg/kg ww	0.5	40	23-OCT-14
Strontium (Sr)-Total		19.7	19.5		mg/kg ww	1.2	60	23-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Thallium (Tl)-Total		0.0550	0.0531		mg/kg ww	3.6	40	23-OCT-14
Tin (Sn)-Total		0.023	0.024		mg/kg ww	6.4	40	23-OCT-14
Uranium (U)-Total		0.294	0.311		mg/kg ww	5.7	40	23-OCT-14
Vanadium (V)-Total		1.82	1.88		mg/kg ww	3.3	40	23-OCT-14
Zinc (Zn)-Total		21.1	21.1		mg/kg ww	0.1	40	23-OCT-14
Zirconium (Zr)-Total		0.864	0.900		mg/kg ww	4.1	40	23-OCT-14
WG1981395-3 DUP		L1497000-60						
Aluminum (Al)-Total		0.52	0.43		mg/kg ww	19	40	23-OCT-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Arsenic (As)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Barium (Ba)-Total		0.095	0.082		mg/kg ww	14	40	23-OCT-14
Beryllium (Be)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Bismuth (Bi)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Boron (B)-Total		2.51	2.11		mg/kg ww	17	40	23-OCT-14
Cadmium (Cd)-Total		0.0628	0.0520		mg/kg ww	19	40	23-OCT-14

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MET-WET-CCMS-VA Tissue								
Batch	R3020548							
WG1981395-3 DUP		L1497000-60						
Calcium (Ca)-Total		170	140		mg/kg ww	20	60	23-OCT-14
Cesium (Cs)-Total		0.0482	0.0401		mg/kg ww	18	40	23-OCT-14
Chromium (Cr)-Total		<0.010	<0.010	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Cobalt (Co)-Total		0.0720	0.0589		mg/kg ww	20	40	23-OCT-14
Copper (Cu)-Total		1.05	0.887		mg/kg ww	17	40	23-OCT-14
Iron (Fe)-Total		4.07	3.43		mg/kg ww	17	40	23-OCT-14
Lead (Pb)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Lithium (Li)-Total		<0.10	<0.10	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Magnesium (Mg)-Total		371	320		mg/kg ww	15	40	23-OCT-14
Manganese (Mn)-Total		17.6	15.2		mg/kg ww	15	40	23-OCT-14
Molybdenum (Mo)-Total		0.220	0.179		mg/kg ww	21	40	23-OCT-14
Nickel (Ni)-Total		0.714	0.610		mg/kg ww	16	40	23-OCT-14
Phosphorus (P)-Total		414	355		mg/kg ww	15	40	23-OCT-14
Potassium (K)-Total		2120	1820		mg/kg ww	16	40	23-OCT-14
Rubidium (Rb)-Total		8.49	7.20		mg/kg ww	16	40	23-OCT-14
Selenium (Se)-Total		<0.010	<0.010	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Sodium (Na)-Total		15.2	13.0		mg/kg ww	16	40	23-OCT-14
Strontium (Sr)-Total		0.467	0.398		mg/kg ww	16	60	23-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Thallium (Tl)-Total		<0.00040	<0.00040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Tin (Sn)-Total		0.069	0.071		mg/kg ww	2.4	40	23-OCT-14
Uranium (U)-Total		<0.00040	<0.00040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Vanadium (V)-Total		<0.020	<0.020	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
Zinc (Zn)-Total		5.06	4.35		mg/kg ww	15	40	23-OCT-14
Zirconium (Zr)-Total		<0.040	<0.040	RPD-NA	mg/kg ww	N/A	40	23-OCT-14
WG1981395-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	23-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	23-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-1 MB								
Calcium (Ca)-Total			<4.0		mg/kg ww		4	23-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	23-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	23-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	23-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	23-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	23-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	23-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	23-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	23-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	23-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	23-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	23-OCT-14
WG1981395-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	23-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	23-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	23-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3020548							
WG1981395-2 MB								
Calcium (Ca)-Total			<4.0		mg/kg ww		4	23-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	23-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	23-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	23-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	23-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	23-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	23-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	23-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	23-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	23-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	23-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	23-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	23-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	23-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	23-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	23-OCT-14
Batch	R3034499							
WG1979546-4 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0100		mg/kg ww		0.001-0.021	29-OCT-14
Arsenic (As)-Total			105.7		%		70-130	29-OCT-14
Barium (Ba)-Total			88.7		%		70-130	29-OCT-14
Boron (B)-Total			4.91		mg/kg ww		3.5-5.5	29-OCT-14
Cadmium (Cd)-Total			110.3		%		70-130	29-OCT-14
Calcium (Ca)-Total			104.1		%		70-130	29-OCT-14
Cobalt (Co)-Total			101.9		%		70-130	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-4 CRM		VA-NIST-1566B						
Copper (Cu)-Total			100.3		%		70-130	29-OCT-14
Iron (Fe)-Total			100.2		%		70-130	29-OCT-14
Lead (Pb)-Total			102.0		%		70-130	29-OCT-14
Magnesium (Mg)-Total			104.1		%		70-130	29-OCT-14
Manganese (Mn)-Total			104.1		%		70-130	29-OCT-14
Nickel (Ni)-Total			101.0		%		70-130	29-OCT-14
Potassium (K)-Total			102.7		%		70-130	29-OCT-14
Rubidium (Rb)-Total			102.0		%		70-130	29-OCT-14
Selenium (Se)-Total			107.4		%		70-130	29-OCT-14
Sodium (Na)-Total			100.3		%		70-130	29-OCT-14
Strontium (Sr)-Total			98.0		%		70-130	29-OCT-14
Uranium (U)-Total			108.2		%		70-130	29-OCT-14
Vanadium (V)-Total			97.7		%		70-130	29-OCT-14
Zinc (Zn)-Total			98.3		%		70-130	29-OCT-14
WG1979546-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			113.1		%		70-130	29-OCT-14
Antimony (Sb)-Total			0.0227		mg/kg ww		0.01-0.03	29-OCT-14
Arsenic (As)-Total			0.0658		mg/kg ww		0.04-0.08	29-OCT-14
Barium (Ba)-Total			95.0		%		70-130	29-OCT-14
Boron (B)-Total			95.3		%		70-130	29-OCT-14
Cadmium (Cd)-Total			93.4		%		70-130	29-OCT-14
Calcium (Ca)-Total			99.7		%		70-130	29-OCT-14
Cobalt (Co)-Total			0.0561		mg/kg ww		0.04-0.08	29-OCT-14
Copper (Cu)-Total			93.9		%		70-130	29-OCT-14
Iron (Fe)-Total			90.4		%		70-130	29-OCT-14
Lead (Pb)-Total			91.6		%		70-130	29-OCT-14
Magnesium (Mg)-Total			97.8		%		70-130	29-OCT-14
Manganese (Mn)-Total			94.2		%		70-130	29-OCT-14
Molybdenum (Mo)-Total			0.0466		mg/kg ww		0.04-0.08	29-OCT-14
Phosphorus (P)-Total			109.5		%		70-130	29-OCT-14
Potassium (K)-Total			98.4		%		70-130	29-OCT-14
Rubidium (Rb)-Total			93.3		%		70-130	29-OCT-14
Selenium (Se)-Total			0.126		mg/kg ww		0.07-0.17	29-OCT-14
Sodium (Na)-Total			30.9		mg/kg ww		4-44	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-5 CRM		VA-NIST-1547						
Strontium (Sr)-Total			100.9		%		70-130	29-OCT-14
Vanadium (V)-Total			83.2		%		70-130	29-OCT-14
Zinc (Zn)-Total			98.2		%		70-130	29-OCT-14
WG1980627-4 CRM		VA-NIST-1566B						
Antimony (Sb)-Total			0.0077		mg/kg wwt		0.001-0.021	29-OCT-14
Arsenic (As)-Total			103.8		%		70-130	29-OCT-14
Barium (Ba)-Total			86.0		%		70-130	29-OCT-14
Boron (B)-Total			4.70		mg/kg wwt		3.5-5.5	29-OCT-14
Cadmium (Cd)-Total			106.9		%		70-130	29-OCT-14
Calcium (Ca)-Total			102.1		%		70-130	29-OCT-14
Cobalt (Co)-Total			102.7		%		70-130	29-OCT-14
Copper (Cu)-Total			98.8		%		70-130	29-OCT-14
Iron (Fe)-Total			99.2		%		70-130	29-OCT-14
Lead (Pb)-Total			99.6		%		70-130	29-OCT-14
Magnesium (Mg)-Total			101.3		%		70-130	29-OCT-14
Manganese (Mn)-Total			103.9		%		70-130	29-OCT-14
Nickel (Ni)-Total			97.8		%		70-130	29-OCT-14
Potassium (K)-Total			101.7		%		70-130	29-OCT-14
Rubidium (Rb)-Total			100.5		%		70-130	29-OCT-14
Selenium (Se)-Total			106.7		%		70-130	29-OCT-14
Sodium (Na)-Total			98.3		%		70-130	29-OCT-14
Strontium (Sr)-Total			95.0		%		70-130	29-OCT-14
Uranium (U)-Total			105.1		%		70-130	29-OCT-14
Vanadium (V)-Total			95.8		%		70-130	29-OCT-14
Zinc (Zn)-Total			99.1		%		70-130	29-OCT-14
WG1980627-5 CRM		VA-NIST-1547						
Aluminum (Al)-Total			110.0		%		70-130	29-OCT-14
Antimony (Sb)-Total			0.0194		mg/kg wwt		0.01-0.03	29-OCT-14
Arsenic (As)-Total			0.0676		mg/kg wwt		0.04-0.08	29-OCT-14
Barium (Ba)-Total			93.5		%		70-130	29-OCT-14
Boron (B)-Total			91.0		%		70-130	29-OCT-14
Cadmium (Cd)-Total			92.6		%		70-130	29-OCT-14
Calcium (Ca)-Total			97.9		%		70-130	29-OCT-14
Chromium (Cr)-Total			72.6		%		70-130	29-OCT-14
Cobalt (Co)-Total			0.0554		mg/kg wwt		0.04-0.08	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-5 CRM		VA-NIST-1547						
Copper (Cu)-Total			91.7		%		70-130	29-OCT-14
Iron (Fe)-Total			89.0		%		70-130	29-OCT-14
Lead (Pb)-Total			89.1		%		70-130	29-OCT-14
Magnesium (Mg)-Total			94.5		%		70-130	29-OCT-14
Manganese (Mn)-Total			92.8		%		70-130	29-OCT-14
Molybdenum (Mo)-Total			0.0430		mg/kg ww		0.04-0.08	29-OCT-14
Phosphorus (P)-Total			107.3		%		70-130	29-OCT-14
Potassium (K)-Total			97.3		%		70-130	29-OCT-14
Rubidium (Rb)-Total			91.4		%		70-130	29-OCT-14
Selenium (Se)-Total			0.126		mg/kg ww		0.07-0.17	29-OCT-14
Sodium (Na)-Total			26.2		mg/kg ww		4-44	29-OCT-14
Strontium (Sr)-Total			99.5		%		70-130	29-OCT-14
Vanadium (V)-Total			80.9		%		70-130	29-OCT-14
Zinc (Zn)-Total			98.0		%		70-130	29-OCT-14
WG1979546-3 DUP		L1497000-82						
Aluminum (Al)-Total		804	779		mg/kg ww	3.0	40	29-OCT-14
Antimony (Sb)-Total		0.0124	0.0110		mg/kg ww	12	40	29-OCT-14
Arsenic (As)-Total		0.373	0.372		mg/kg ww	0.2	40	29-OCT-14
Barium (Ba)-Total		34.1	34.4		mg/kg ww	0.9	40	29-OCT-14
Beryllium (Be)-Total		0.0290	0.0305		mg/kg ww	5.3	40	29-OCT-14
Bismuth (Bi)-Total		0.0628	0.0627		mg/kg ww	0.2	40	29-OCT-14
Boron (B)-Total		2.34	2.19		mg/kg ww	6.6	40	29-OCT-14
Cadmium (Cd)-Total		0.0708	0.0695		mg/kg ww	1.8	40	29-OCT-14
Calcium (Ca)-Total		1640	1640		mg/kg ww	0.5	60	29-OCT-14
Cesium (Cs)-Total		0.406	0.402		mg/kg ww	0.9	40	29-OCT-14
Chromium (Cr)-Total		2.30	2.31		mg/kg ww	0.6	40	29-OCT-14
Cobalt (Co)-Total		0.832	0.852		mg/kg ww	2.3	40	29-OCT-14
Copper (Cu)-Total		3.20	3.25		mg/kg ww	1.5	40	29-OCT-14
Iron (Fe)-Total		822	825		mg/kg ww	0.4	40	29-OCT-14
Lead (Pb)-Total		0.842	0.883		mg/kg ww	4.7	40	29-OCT-14
Lithium (Li)-Total		1.17	1.14		mg/kg ww	2.7	40	29-OCT-14
Magnesium (Mg)-Total		730	729		mg/kg ww	0.1	40	29-OCT-14
Manganese (Mn)-Total		89.0	91.8		mg/kg ww	3.1	40	29-OCT-14
Molybdenum (Mo)-Total		0.303	0.296		mg/kg ww	2.4	40	29-OCT-14

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MET-WET-CCMS-VA Tissue								
Batch	R3034499							
WG1979546-3 DUP		L1497000-82						
Nickel (Ni)-Total		3.74	3.79		mg/kg ww	1.5	40	29-OCT-14
Phosphorus (P)-Total		843	830		mg/kg ww	1.6	40	29-OCT-14
Potassium (K)-Total		1730	1730		mg/kg ww	0.3	40	29-OCT-14
Rubidium (Rb)-Total		7.15	7.00		mg/kg ww	2.2	40	29-OCT-14
Selenium (Se)-Total		0.049	0.051		mg/kg ww	3.6	40	29-OCT-14
Sodium (Na)-Total		54.4	55.8		mg/kg ww	2.5	40	29-OCT-14
Strontium (Sr)-Total		9.07	9.18		mg/kg ww	1.2	60	29-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
Thallium (Tl)-Total		0.0311	0.0312		mg/kg ww	0.1	40	29-OCT-14
Tin (Sn)-Total		0.049	0.040		mg/kg ww	20	40	29-OCT-14
Uranium (U)-Total		0.346	0.357		mg/kg ww	3.1	40	29-OCT-14
Vanadium (V)-Total		1.60	1.55		mg/kg ww	3.3	40	29-OCT-14
Zinc (Zn)-Total		25.1	25.8		mg/kg ww	2.7	40	29-OCT-14
Zirconium (Zr)-Total		0.993	0.945		mg/kg ww	5.0	40	29-OCT-14
WG1980627-3 DUP		L1497000-93						
Aluminum (Al)-Total		38.5	38.9		mg/kg ww	0.8	40	29-OCT-14
Antimony (Sb)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
Arsenic (As)-Total		0.0056	0.0074		mg/kg ww	27	40	29-OCT-14
Barium (Ba)-Total		35.5	34.8		mg/kg ww	2.3	40	29-OCT-14
Beryllium (Be)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
Bismuth (Bi)-Total		<0.0020	<0.0020	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
Boron (B)-Total		6.90	7.13		mg/kg ww	3.2	40	29-OCT-14
Cadmium (Cd)-Total		0.0026	0.0021		mg/kg ww	20	40	29-OCT-14
Calcium (Ca)-Total		2840	2820		mg/kg ww	0.8	60	29-OCT-14
Cesium (Cs)-Total		0.169	0.174		mg/kg ww	2.8	40	29-OCT-14
Chromium (Cr)-Total		0.033	0.033		mg/kg ww	2.0	40	29-OCT-14
Cobalt (Co)-Total		0.125	0.133		mg/kg ww	6.4	40	29-OCT-14
Copper (Cu)-Total		1.27	1.24		mg/kg ww	2.5	40	29-OCT-14
Iron (Fe)-Total		16.6	17.1		mg/kg ww	3.0	40	29-OCT-14
Lead (Pb)-Total		0.0162	0.0203		mg/kg ww	22	40	29-OCT-14
Lithium (Li)-Total		<0.10	<0.10	RPD-NA	mg/kg ww	N/A	40	29-OCT-14
Magnesium (Mg)-Total		575	553		mg/kg ww	3.8	40	29-OCT-14
Manganese (Mn)-Total		277	262		mg/kg ww	5.6	40	29-OCT-14
Molybdenum (Mo)-Total		0.0101	0.0109		mg/kg ww	7.8	40	29-OCT-14

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MET-WET-CCMS-VA Tissue								
Batch	R3034499							
WG1980627-3 DUP		L1497000-93						
Nickel (Ni)-Total		1.46	1.44		mg/kg wwt	1.2	40	29-OCT-14
Phosphorus (P)-Total		486	477		mg/kg wwt	1.9	40	29-OCT-14
Potassium (K)-Total		2390	2360		mg/kg wwt	1.3	40	29-OCT-14
Rubidium (Rb)-Total		9.11	8.81		mg/kg wwt	3.4	40	29-OCT-14
Selenium (Se)-Total		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	40	29-OCT-14
Sodium (Na)-Total		<4.0	<4.0	RPD-NA	mg/kg wwt	N/A	40	29-OCT-14
Strontium (Sr)-Total		5.19	5.14		mg/kg wwt	0.9	60	29-OCT-14
Tellurium (Te)-Total		<0.0040	<0.0040	RPD-NA	mg/kg wwt	N/A	40	29-OCT-14
Thallium (Tl)-Total		0.114	0.120		mg/kg wwt	4.6	40	29-OCT-14
Tin (Sn)-Total		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	40	29-OCT-14
Uranium (U)-Total		0.00096	0.00121		mg/kg wwt	23	40	29-OCT-14
Vanadium (V)-Total		0.028	0.028		mg/kg wwt	0.5	40	29-OCT-14
Zinc (Zn)-Total		10.3	9.97		mg/kg wwt	3.5	40	29-OCT-14
Zirconium (Zr)-Total		<0.040	<0.040	RPD-NA	mg/kg wwt	N/A	40	29-OCT-14
WG1979546-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg wwt		0.4	29-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg wwt		0.002	29-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg wwt		0.004	29-OCT-14
Barium (Ba)-Total			<0.010		mg/kg wwt		0.01	29-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg wwt		0.002	29-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg wwt		0.002	29-OCT-14
Boron (B)-Total			<0.20		mg/kg wwt		0.2	29-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg wwt		0.001	29-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg wwt		4	29-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg wwt		0.001	29-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg wwt		0.01	29-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg wwt		0.004	29-OCT-14
Copper (Cu)-Total			<0.020		mg/kg wwt		0.02	29-OCT-14
Iron (Fe)-Total			<0.60		mg/kg wwt		0.6	29-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg wwt		0.004	29-OCT-14
Lithium (Li)-Total			<0.10		mg/kg wwt		0.1	29-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg wwt		0.4	29-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg wwt		0.01	29-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg wwt		0.004	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-1 MB								
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	29-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	29-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	29-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
WG1979546-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	29-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	29-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	29-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1979546-2 MB								
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	29-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	29-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	29-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
WG1980627-1 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	29-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	29-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	29-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA		Tissue						
Batch	R3034499							
WG1980627-1 MB								
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	29-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	29-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	29-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
WG1980627-2 MB								
Aluminum (Al)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Antimony (Sb)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Arsenic (As)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Barium (Ba)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Beryllium (Be)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Bismuth (Bi)-Total			<0.0020		mg/kg ww		0.002	29-OCT-14
Boron (B)-Total			<0.20		mg/kg ww		0.2	29-OCT-14
Cadmium (Cd)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Calcium (Ca)-Total			<4.0		mg/kg ww		4	29-OCT-14
Cesium (Cs)-Total			<0.0010		mg/kg ww		0.001	29-OCT-14
Chromium (Cr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Cobalt (Co)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Copper (Cu)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Iron (Fe)-Total			<0.60		mg/kg ww		0.6	29-OCT-14
Lead (Pb)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Lithium (Li)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Magnesium (Mg)-Total			<0.40		mg/kg ww		0.4	29-OCT-14
Manganese (Mn)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Molybdenum (Mo)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-WET-CCMS-VA Tissue								
Batch R3034499								
WG1980627-2 MB								
Nickel (Ni)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
Phosphorus (P)-Total			<2.0		mg/kg ww		2	29-OCT-14
Potassium (K)-Total			<4.0		mg/kg ww		4	29-OCT-14
Rubidium (Rb)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Selenium (Se)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Sodium (Na)-Total			<4.0		mg/kg ww		4	29-OCT-14
Strontium (Sr)-Total			<0.010		mg/kg ww		0.01	29-OCT-14
Tellurium (Te)-Total			<0.0040		mg/kg ww		0.004	29-OCT-14
Thallium (Tl)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Tin (Sn)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Uranium (U)-Total			<0.00040		mg/kg ww		0.0004	29-OCT-14
Vanadium (V)-Total			<0.020		mg/kg ww		0.02	29-OCT-14
Zinc (Zn)-Total			<0.10		mg/kg ww		0.1	29-OCT-14
Zirconium (Zr)-Total			<0.040		mg/kg ww		0.04	29-OCT-14
Batch R3038188								
WG1979546-5 CRM								
Chromium (Cr)-Total		VA-NIST-1547	70.4		%		70-130	30-OCT-14
MOISTURE-TISS-VA Tissue								
Batch R2945177								
WG1949006-1 DUP								
% Moisture		L1497000-114	48.8	47.7	%	2.3	20	10-SEP-14
Batch R2947092								
WG1951267-1 DUP								
% Moisture		L1497000-147	56.8	56.7	%	0.2	20	12-SEP-14
Batch R2949429								
WG1951598-1 DUP								
% Moisture		L1497000-25	58.2	59.5	%	2.2	20	15-SEP-14
WG1951598-2 DUP								
% Moisture		L1497000-42	47.3	47.6	%	0.5	20	15-SEP-14
WG1951598-3 DUP								
% Moisture		L1497000-60	84.0	83.9	%	0.2	20	15-SEP-14

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MOISTURE-TISS-VA		Tissue						
Batch	R2949430							
WG1951989-1	DUP	L1497000-40						
% Moisture		86.1	86.3		%	0.3	20	15-SEP-14
Batch	R2952106							
WG1954015-1	DUP	L1497000-127						
% Moisture		62.7	60.3		%	3.8	20	17-SEP-14
PAH-T-DRY-SOX-MS-VA		Tissue						
Batch	R2961535							
WG1956818-3	DUP	L1497000-76						
Acenaphthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Acenaphthylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Benzo(b)fluoranthene		<0.060	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Benzo(k)fluoranthene		<0.060	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Fluorene		<0.20	<0.20	RPD-NA	mg/kg	N/A	50	30-SEP-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Phenanthrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	30-SEP-14
WG1956818-1	MB							
Acenaphthene			<0.050		mg/kg		0.05	26-SEP-14
Acenaphthylene			<0.050		mg/kg		0.05	26-SEP-14
Anthracene			<0.050		mg/kg		0.05	26-SEP-14
Benz(a)anthracene			<0.050		mg/kg		0.05	26-SEP-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	26-SEP-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	26-SEP-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	26-SEP-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	26-SEP-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-DRY-SOX-MS-VA Tissue								
Batch	R2961535							
WG1956818-1 MB								
Chrysene			<0.050		mg/kg		0.05	26-SEP-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	26-SEP-14
Fluoranthene			<0.050		mg/kg		0.05	26-SEP-14
Fluorene			<0.050		mg/kg		0.05	26-SEP-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	26-SEP-14
2-methylnaphthalene			<0.050		mg/kg		0.05	26-SEP-14
Naphthalene			<0.050		mg/kg		0.05	26-SEP-14
Phenanthrene			<0.050		mg/kg		0.05	26-SEP-14
Pyrene			<0.050		mg/kg		0.05	26-SEP-14
Batch	R2966732							
WG1959808-3 DUP		L1497000-124						
Acenaphthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Acenaphthylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(b)fluoranthene		<0.20	<0.20	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Fluorene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Phenanthrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
WG1960949-3 DUP		L1497000-145						
Acenaphthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Acenaphthylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(b)fluoranthene		<0.080	<0.080	RPD-NA	mg/kg	N/A	50	01-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch	R2966732							
WG1960949-3 DUP		L1497000-145						
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Benzo(k)fluoranthene		<0.080	<0.060	RPD-NA	mg/kg	N/A	50	01-OCT-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Fluorene		<0.30	<0.30	RPD-NA	mg/kg	N/A	50	01-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Phenanthrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	01-OCT-14
WG1959808-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	01-OCT-14
Acenaphthylene			<0.050		mg/kg		0.05	01-OCT-14
Anthracene			<0.050		mg/kg		0.05	01-OCT-14
Benz(a)anthracene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Chrysene			<0.050		mg/kg		0.05	01-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	01-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Fluorene			<0.050		mg/kg		0.05	01-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	01-OCT-14
2-methylnaphthalene			<0.050		mg/kg		0.05	01-OCT-14
Naphthalene			<0.050		mg/kg		0.05	01-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	01-OCT-14
Pyrene			<0.050		mg/kg		0.05	01-OCT-14
WG1960949-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	01-OCT-14
Acenaphthylene			<0.050		mg/kg		0.05	01-OCT-14
Anthracene			<0.050		mg/kg		0.05	01-OCT-14
Benz(a)anthracene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	01-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch R2966732								
WG1960949-1 MB								
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	01-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Chrysene			<0.050		mg/kg		0.05	01-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	01-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	01-OCT-14
Fluorene			<0.050		mg/kg		0.05	01-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	01-OCT-14
2-methylnaphthalene			<0.050		mg/kg		0.05	01-OCT-14
Naphthalene			<0.050		mg/kg		0.05	01-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	01-OCT-14
Pyrene			<0.050		mg/kg		0.05	01-OCT-14
Batch R2980188								
WG1958761-3 DUP		L1497000-115						
Acenaphthene		<0.070	<0.20	RPD-NA	mg/kg	N/A	50	10-OCT-14
Acenaphthylene		<0.060	<0.070	RPD-NA	mg/kg	N/A	50	10-OCT-14
Anthracene		<0.050	<0.070	RPD-NA	mg/kg	N/A	50	10-OCT-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Benzo(g,h,i)perylene		<0.20	<0.050	DUP-H	mg/kg	N/A	50	10-OCT-14
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Fluorene		<0.050	<0.090	RPD-NA	mg/kg	N/A	50	10-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
Phenanthrene		<0.70	<2.0	RPD-NA	mg/kg	N/A	50	10-OCT-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	10-OCT-14
WG1958761-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	10-OCT-14
Acenaphthylene			<0.050		mg/kg		0.05	10-OCT-14
Anthracene			<0.050		mg/kg		0.05	10-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch	R2980188							
WG1958761-1 MB								
Benz(a)anthracene			<0.050		mg/kg		0.05	10-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	10-OCT-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	10-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	10-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	10-OCT-14
Chrysene			<0.050		mg/kg		0.05	10-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	10-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	10-OCT-14
Fluorene			<0.050		mg/kg		0.05	10-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	10-OCT-14
2-methylnaphthalene			<0.050		mg/kg		0.05	10-OCT-14
Naphthalene			<0.050		mg/kg		0.05	10-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	10-OCT-14
Pyrene			<0.050		mg/kg		0.05	10-OCT-14
Batch	R3033228							
WG1979522-3 DUP		L1497000-40						
Acenaphthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Acenaphthylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(a)pyrene		<0.050	<0.060	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Fluorene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Phenanthrene		<0.20	<0.050	DUP-H	mg/kg	N/A	50	29-OCT-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
WG1979522-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	29-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch	R3033228							
WG1979522-1 MB								
Acenaphthylene			<0.050		mg/kg		0.05	29-OCT-14
Anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benz(a)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Chrysene			<0.050		mg/kg		0.05	29-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Fluorene			<0.050		mg/kg		0.05	29-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	29-OCT-14
2-methylnaphthalene			<0.050		mg/kg		0.05	29-OCT-14
Naphthalene			<0.050		mg/kg		0.05	29-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	29-OCT-14
Pyrene			<0.050		mg/kg		0.05	29-OCT-14
Batch	R3033331							
WG1981723-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	29-OCT-14
Acenaphthylene			<0.050		mg/kg		0.05	29-OCT-14
Anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benz(a)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Chrysene			<0.050		mg/kg		0.05	29-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Fluorene			<0.050		mg/kg		0.05	29-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	29-OCT-14
2-methylnaphthalene			<0.050		mg/kg		0.05	29-OCT-14
Naphthalene			<0.050		mg/kg		0.05	29-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	29-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch R3033331								
WG1981723-1 MB								
Pyrene			<0.050		mg/kg		0.05	29-OCT-14
Batch R3033395								
WG1980496-3 DUP								
		L1497000-82						
Acenaphthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Acenaphthylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benz(a)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(a)pyrene		<0.30	<0.30	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Benzo(k)fluoranthene		<0.20	<0.20	RPD-NA	mg/kg	N/A	50	29-OCT-14
Chrysene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Dibenz(a,h)anthracene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Fluoranthene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Fluorene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
2-methylnaphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Naphthalene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
Phenanthrene		<0.20	<0.050	DUP-H	mg/kg	N/A	50	29-OCT-14
Pyrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	29-OCT-14
WG1980496-1 MB								
Acenaphthene			<0.050		mg/kg		0.05	29-OCT-14
Acenaphthylene			<0.050		mg/kg		0.05	29-OCT-14
Anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benz(a)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(a)pyrene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(b)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(g,h,i)perylene			<0.050		mg/kg		0.05	29-OCT-14
Benzo(k)fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Chrysene			<0.050		mg/kg		0.05	29-OCT-14
Dibenz(a,h)anthracene			<0.050		mg/kg		0.05	29-OCT-14
Fluoranthene			<0.050		mg/kg		0.05	29-OCT-14
Fluorene			<0.050		mg/kg		0.05	29-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.050		mg/kg		0.05	29-OCT-14

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PAH-T-DRY-SOX-MS-VA Tissue								
Batch R3033395								
WG1980496-1 MB								
2-methylnaphthalene			<0.050		mg/kg		0.05	29-OCT-14
Naphthalene			<0.050		mg/kg		0.05	29-OCT-14
Phenanthrene			<0.050		mg/kg		0.05	29-OCT-14
Pyrene			<0.050		mg/kg		0.05	29-OCT-14
PAH-T-WET-SOX-MS-VA Tissue								
Batch R2961555								
WG1956818-3 DUP L1497000-76								
Acenaphthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Acenaphthylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Benzo(b)fluoranthene		<0.030	<0.030	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Benzo(k)fluoranthene		<0.030	<0.010	DUP-H	mg/kg wwt	N/A	50	30-SEP-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Dibenz(a,h)anthracene		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Fluorene		<0.080	<0.070	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
2-methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	30-SEP-14
WG1956818-1 MB								
Acenaphthene			<0.010		mg/kg		0.01	26-SEP-14
Acenaphthylene			<0.010		mg/kg		0.01	26-SEP-14
Anthracene			<0.010		mg/kg		0.01	26-SEP-14
Benz(a)anthracene			<0.010		mg/kg		0.01	26-SEP-14
Benzo(a)pyrene			<0.010		mg/kg		0.01	26-SEP-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	26-SEP-14
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	26-SEP-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	26-SEP-14
Chrysene			<0.010		mg/kg		0.01	26-SEP-14

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PAH-T-WET-SOX-MS-VA Tissue								
Batch	R2961555							
WG1956818-1 MB								
Dibenz(a,h)anthracene			<0.010		mg/kg		0.01	26-SEP-14
Fluoranthene			<0.010		mg/kg		0.01	26-SEP-14
Fluorene			<0.010		mg/kg		0.01	26-SEP-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	26-SEP-14
2-methylnaphthalene			<0.010		mg/kg		0.01	26-SEP-14
Naphthalene			<0.010		mg/kg		0.01	26-SEP-14
Phenanthrene			<0.010		mg/kg		0.01	26-SEP-14
Pyrene			<0.010		mg/kg		0.01	26-SEP-14
Batch	R2966743							
WG1959808-3 DUP		L1497000-124						
Acenaphthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Acenaphthylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(b)fluoranthene		<0.040	<0.030	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(g,h,i)perylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Dibenz(a,h)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Fluorene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
2-methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Phenanthrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
WG1960949-3 DUP		L1497000-145						
Acenaphthene		<0.020	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Acenaphthylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Anthracene		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(a)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(b)fluoranthene		<0.040	<0.040	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Benzo(g,h,i)perylene		<0.020	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-WET-SOX-MS-VA Tissue								
Batch	R2966743							
WG1960949-3 DUP		L1497000-145						
Benzo(k)fluoranthene		<0.030	<0.030	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Dibenz(a,h)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Fluorene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
2-methylnaphthalene		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Phenanthrene		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	01-OCT-14
WG1959808-1 MB								
Acenaphthene			<0.010		mg/kg		0.01	01-OCT-14
Acenaphthylene			<0.010		mg/kg		0.01	01-OCT-14
Anthracene			<0.010		mg/kg		0.01	01-OCT-14
Benz(a)anthracene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(a)pyrene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	01-OCT-14
Chrysene			<0.010		mg/kg		0.01	01-OCT-14
Dibenz(a,h)anthracene			<0.010		mg/kg		0.01	01-OCT-14
Fluoranthene			<0.010		mg/kg		0.01	01-OCT-14
Fluorene			<0.010		mg/kg		0.01	01-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	01-OCT-14
2-methylnaphthalene			<0.010		mg/kg		0.01	01-OCT-14
Naphthalene			<0.010		mg/kg		0.01	01-OCT-14
Phenanthrene			<0.010		mg/kg		0.01	01-OCT-14
Pyrene			<0.010		mg/kg		0.01	01-OCT-14
WG1960949-1 MB								
Acenaphthene			<0.010		mg/kg		0.01	01-OCT-14
Acenaphthylene			<0.010		mg/kg		0.01	01-OCT-14
Anthracene			<0.010		mg/kg		0.01	01-OCT-14
Benz(a)anthracene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(a)pyrene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	01-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-WET-SOX-MS-VA Tissue								
Batch	R2966743							
WG1960949-1 MB								
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	01-OCT-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	01-OCT-14
Chrysene			<0.010		mg/kg		0.01	01-OCT-14
Dibenz(a,h)anthracene			<0.010		mg/kg		0.01	01-OCT-14
Fluoranthene			<0.010		mg/kg		0.01	01-OCT-14
Fluorene			<0.010		mg/kg		0.01	01-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	01-OCT-14
2-methylnaphthalene			<0.010		mg/kg		0.01	01-OCT-14
Naphthalene			<0.010		mg/kg		0.01	01-OCT-14
Phenanthrene			<0.010		mg/kg		0.01	01-OCT-14
Pyrene			<0.010		mg/kg		0.01	01-OCT-14
Batch	R2980219							
WG1958761-3 DUP		L1497000-115						
Acenaphthene		<0.050	<0.10	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Acenaphthylene		<0.040	<0.050	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Anthracene		<0.030	<0.050	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Benzo(a)pyrene		<0.020	<0.020	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Benzo(b)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Benzo(g,h,i)perylene		<0.20	<0.010	DUP-H	mg/kg wwt	N/A	50	10-OCT-14
Benzo(k)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Dibenz(a,h)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Fluorene		<0.010	<0.070	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.020	<0.030	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
2-methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Phenanthrene		<0.50	<0.80	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	10-OCT-14
WG1958761-1 MB								
Acenaphthene			<0.010		mg/kg		0.01	10-OCT-14
Acenaphthylene			<0.010		mg/kg		0.01	10-OCT-14
Anthracene			<0.010		mg/kg		0.01	10-OCT-14
Benz(a)anthracene			<0.010		mg/kg		0.01	10-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-WET-SOX-MS-VA Tissue								
Batch	R2980219							
WG1958761-1 MB								
Benzo(a)pyrene			<0.010		mg/kg		0.01	10-OCT-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	10-OCT-14
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	10-OCT-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	10-OCT-14
Chrysene			<0.010		mg/kg		0.01	10-OCT-14
Dibenz(a,h)anthracene			<0.010		mg/kg		0.01	10-OCT-14
Fluoranthene			<0.010		mg/kg		0.01	10-OCT-14
Fluorene			<0.010		mg/kg		0.01	10-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	10-OCT-14
2-methylnaphthalene			<0.010		mg/kg		0.01	10-OCT-14
Naphthalene			<0.010		mg/kg		0.01	10-OCT-14
Phenanthrene			<0.010		mg/kg		0.01	10-OCT-14
Pyrene			<0.010		mg/kg		0.01	10-OCT-14
Batch	R3033349							
WG1981723-1 MB								
Acenaphthene			<0.010		mg/kg wwt		0.01	29-OCT-14
Acenaphthylene			<0.010		mg/kg wwt		0.01	29-OCT-14
Anthracene			<0.010		mg/kg wwt		0.01	29-OCT-14
Benz(a)anthracene			<0.010		mg/kg wwt		0.01	29-OCT-14
Benzo(a)pyrene			<0.010		mg/kg wwt		0.01	29-OCT-14
Benzo(b)fluoranthene			<0.010		mg/kg wwt		0.01	29-OCT-14
Benzo(g,h,i)perylene			<0.010		mg/kg wwt		0.01	29-OCT-14
Benzo(k)fluoranthene			<0.010		mg/kg wwt		0.01	29-OCT-14
Chrysene			<0.010		mg/kg wwt		0.01	29-OCT-14
Dibenz(a,h)anthracene			<0.010		mg/kg wwt		0.01	29-OCT-14
Fluoranthene			<0.010		mg/kg wwt		0.01	29-OCT-14
Fluorene			<0.010		mg/kg wwt		0.01	29-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg wwt		0.01	29-OCT-14
2-methylnaphthalene			<0.010		mg/kg wwt		0.01	29-OCT-14
Naphthalene			<0.010		mg/kg wwt		0.01	29-OCT-14
Phenanthrene			<0.010		mg/kg wwt		0.01	29-OCT-14
Pyrene			<0.010		mg/kg wwt		0.01	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-WET-SOX-MS-VA Tissue								
Batch	R3033393							
WG1980496-3 DUP		L1497000-82						
Acenaphthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Acenaphthylene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Anthracene		<0.020	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Benz(a)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Benzo(a)pyrene		<0.30	<0.30	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Benzo(b)fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Benzo(g,h,i)perylene		<0.040	<0.010	DUP-H	mg/kg wwt	N/A	50	29-OCT-14
Benzo(k)fluoranthene		<0.20	<0.20	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Chrysene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Dibenz(a,h)anthracene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Fluoranthene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Fluorene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Indeno(1,2,3-c,d)pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
2-methylnaphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Naphthalene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
Phenanthrene		<0.20	<0.010	DUP-H	mg/kg wwt	N/A	50	29-OCT-14
Pyrene		<0.010	<0.010	RPD-NA	mg/kg wwt	N/A	50	29-OCT-14
WG1980496-1 MB								
Acenaphthene			<0.010		mg/kg		0.01	29-OCT-14
Acenaphthylene			<0.010		mg/kg		0.01	29-OCT-14
Anthracene			<0.010		mg/kg		0.01	29-OCT-14
Benz(a)anthracene			<0.010		mg/kg		0.01	29-OCT-14
Benzo(a)pyrene			<0.010		mg/kg		0.01	29-OCT-14
Benzo(b)fluoranthene			<0.010		mg/kg		0.01	29-OCT-14
Benzo(g,h,i)perylene			<0.010		mg/kg		0.01	29-OCT-14
Benzo(k)fluoranthene			<0.010		mg/kg		0.01	29-OCT-14
Chrysene			<0.010		mg/kg		0.01	29-OCT-14
Dibenz(a,h)anthracene			<0.010		mg/kg		0.01	29-OCT-14
Fluoranthene			<0.010		mg/kg		0.01	29-OCT-14
Fluorene			<0.010		mg/kg		0.01	29-OCT-14
Indeno(1,2,3-c,d)pyrene			<0.010		mg/kg		0.01	29-OCT-14
2-methylnaphthalene			<0.010		mg/kg		0.01	29-OCT-14
Naphthalene			<0.010		mg/kg		0.01	29-OCT-14
Phenanthrene			<0.010		mg/kg		0.01	29-OCT-14

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-T-WET-SOX-MS-VA	Tissue							
Batch	R3033393							
WG1980496-1	MB							
Pyrene			<0.010		mg/kg		0.01	29-OCT-14

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
A	Method Blank exceeds ALS DQO. Refer to narrative comments for further information.
DLM	Detection Limit Adjusted due to sample matrix effects.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.
J,R	The analyte was detected below the calibrated range but above the EDL, and the ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
M,J	A peak has been manually integrated, and the analyte was detected below the calibrated range but above the EDL.
M,J,R	A peak has been manually integrated, the analyte was detected below the calibrated range but above the EDL, and the ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
M,U	A peak has been manually integrated, and the analyte was not detected above the EDL.
RM-H	Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRU	Reported Result is Uncertain due to proximity to the estimated Method Detection Limit.
[J]	The analyte was detected below the calibrated range but above the EDL.
[U]	The analyte was not detected above the EDL.

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Moisture content							
	1	29-JUL-14 10:39	20-AUG-14 11:31	14	22	days	EHT
	7	29-JUL-14 13:10	20-AUG-14 11:31	14	22	days	EHT
	13	29-JUL-14 13:10	20-AUG-14 11:31	14	22	days	EHT
	19	29-JUL-14 15:13	20-AUG-14 11:31	14	22	days	EHT
	24	29-JUL-14 15:13	20-AUG-14 11:31	14	22	days	EHT
	26	30-JUL-14 09:00	20-AUG-14 11:31	14	21	days	EHT
	32	30-JUL-14 12:15	20-AUG-14 11:31	14	21	days	EHT
	36	30-JUL-14 12:45	20-AUG-14 11:31	14	21	days	EHT
	39	30-JUL-14 13:54	20-AUG-14 11:31	14	21	days	EHT
	45	31-JUL-14 08:50	20-AUG-14 11:31	14	20	days	EHT
	46	31-JUL-14 08:50	20-AUG-14 11:31	14	20	days	EHT
	52	31-JUL-14 10:25	20-AUG-14 11:31	14	20	days	EHT
	59	31-JUL-14 12:15	20-AUG-14 11:31	14	20	days	EHT
	75	31-JUL-14 12:40	20-AUG-14 11:31	14	20	days	EHT
	78	31-JUL-14 13:49	20-AUG-14 11:31	14	20	days	EHT
	84	01-AUG-14 08:12	20-AUG-14 11:31	14	19	days	EHT
	88	01-AUG-14 08:40	20-AUG-14 11:31	14	19	days	EHT
	91	01-AUG-14 09:36	20-AUG-14 11:31	14	19	days	EHT
	96	01-AUG-14 10:15	20-AUG-14 11:31	14	19	days	EHT
	110	01-AUG-14 11:15	20-AUG-14 11:31	14	19	days	EHT
	111	01-AUG-14 11:15	20-AUG-14 11:31	14	19	days	EHT
	117	01-AUG-14 13:03	20-AUG-14 11:31	14	19	days	EHT
	123	02-AUG-14 08:20	20-AUG-14 11:31	14	18	days	EHT
	129	02-AUG-14 08:20	20-AUG-14 11:31	14	18	days	EHT
	134	02-AUG-14 10:30	20-AUG-14 11:31	14	18	days	EHT
	139	02-AUG-14 11:00	20-AUG-14 11:31	14	18	days	EHT
	142	02-AUG-14 12:30	20-AUG-14 11:31	14	18	days	EHT

Polycyclic Aromatic Hydrocarbons

PAH - Rotary Extraction (Hexane/Acetone)

	1	29-JUL-14 10:39	20-AUG-14 22:00	14	22	days	EHT
	7	29-JUL-14 13:10	20-AUG-14 22:00	14	22	days	EHT
	13	29-JUL-14 13:10	20-AUG-14 22:00	14	22	days	EHT
	19	29-JUL-14 15:13	20-AUG-14 22:00	14	22	days	EHT
	24	29-JUL-14 15:13	20-AUG-14 22:00	14	22	days	EHT
	26	30-JUL-14 09:00	20-AUG-14 22:00	14	22	days	EHT
	32	30-JUL-14 12:15	20-AUG-14 22:00	14	21	days	EHT
	36	30-JUL-14 12:45	20-AUG-14 22:00	14	21	days	EHT
	39	30-JUL-14 13:54	20-AUG-14 22:00	14	21	days	EHT
	45	31-JUL-14 08:50	20-AUG-14 22:00	14	21	days	EHT
	46	31-JUL-14 08:50	20-AUG-14 22:00	14	21	days	EHT
	52	31-JUL-14 10:25	20-AUG-14 22:00	14	20	days	EHT
	59	31-JUL-14 12:15	20-AUG-14 22:00	14	20	days	EHT
	75	31-JUL-14 12:40	20-AUG-14 22:00	14	20	days	EHT
	78	31-JUL-14 13:49	20-AUG-14 22:00	14	20	days	EHT
	84	01-AUG-14 08:12	20-AUG-14 22:00	14	20	days	EHT
	88	01-AUG-14 08:40	20-AUG-14 22:00	14	20	days	EHT
	91	01-AUG-14 09:36	20-AUG-14 22:00	14	20	days	EHT
	96	01-AUG-14 10:15	20-AUG-14 22:00	14	19	days	EHT
	110	01-AUG-14 11:15	20-AUG-14 22:00	14	19	days	EHT
	111	01-AUG-14 11:15	20-AUG-14 22:00	14	19	days	EHT
	117	01-AUG-14 13:03	20-AUG-14 22:00	14	19	days	EHT
	123	02-AUG-14 08:20	20-AUG-14 22:00	14	19	days	EHT
	129	02-AUG-14 08:20	20-AUG-14 22:00	14	19	days	EHT
	134	02-AUG-14 10:30	20-AUG-14 22:00	14	18	days	EHT
	139	02-AUG-14 11:00	20-AUG-14 22:00	14	18	days	EHT
	142	02-AUG-14 12:30	20-AUG-14 22:00	14	18	days	EHT

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Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.

Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1497000 were received on 05-AUG-14 13:18.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

10- 365162

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Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)		
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)		
Contact: STEPHANIE KO			Select: PDF ☒ Excel ☒ Digital ☐ Fax			Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT		
Address: 500-4260 STILL CREEK DRIVE			Email 1: stephanie.ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT		
BURNABY, BC V5C 7K6			Email 2: thalia.zis@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT		
Phone: 604- Fax:						Analysis Request		
Invoice To Same as Report? (circle) Yes or No (if No, provide details)			Client / Project Information			(Indicate Filtered or Preserved, F/P)		
Copy of Invoice with Report? (circle) Yes or No			Job #: 14-07256/7044/30					
Company:			PO / AFE:					
Contact:			LSD:					
Address:								
Phone: Fax:			Quote #:					
Lab Work Order # (lab use only) W497000			ALS Contact: A. SPRINGER			Sampler: SK/DB		
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type				
	14-DDR-06-S-01	29-JUL-14	1039	SOIL				
	14-DDR-06-BERRY-01	"	1039	TISSUE				
	14-DDR-06-BR-01	"	"	TISSUE				
	14-DDR-06-WL-01	"	"	TISSUE				
	14-DDR-06-LI-01	"	"	TISSUE				
	14-DDR-06-GR-01	"	"	TISSUE				
	14-DDR-07-S-01	"	1310	SOIL				
	14-DDR-07-BERRY-01	"	"	TISSUE				
	14-DDR-07-WL-01	"	"	"				
	14-DDR-07-LI-01	"	"	"				
	14-DDR-07-LI-01	"	"	"				
	14-DDR-07-GR-01	"	"	"				
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details								
CONTACT S.KO FOR INSTRUCTIONS. KEEP COOL								
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.								
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.								
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:
	Aug 5/14	13:18		Aug 5 th 2014	1:18pm	Cooled 1 Max 12 Avg 10 °C		
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION			WHITE - LABORATORY COPY			YELLOW - CLIENT COPY		
Aug 6 19ms 6.3/184/7.9/6.9/1.8/10.0			codes 2: Max 13 Avg 12			Max 13 Avg 11		
GENF 18.01 Front								

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

4C Aug 6 19:25 6.3/18.4/7.9/6.9/14.8/100 C1: Max 12 Aug 10 WHITE - LABORATORY COPY YELLOW - CLIENT COPY
Cooler 2: Max 13 Aug 12 Max 13 Aug 11

REFER TO BACK PAGE FOR AIS LOCATIONS AND SAMPLING INFORMATION

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GENF 18.01 Front

Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)		
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)		
Contact: 1500-4200 STILL CREEK DRIVE			Select: PDF ☒ Excel ☒ Digital ☐ Fax ☐			Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT		
Address: STEPHANIE KO			Email 1: stephanie-ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT		
BURNABY BC V5C 6C6			Email 2: thalia-zis@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT		
Phone: 604-296-4355 Fax:						Analysis Request		
Invoice To Same as Report? (circle) ☒ Yes or No (if No, provide details)			Client / Project Information			(Indicate Filtered or Preserved, F/P)		
Copy of Invoice with Report? (circle) ☒ Yes or No			Job #: 404256 / 7044 / 30			 L1497000-COFC		
Company:			PO / AFE:					
Contact:			LSD:					
Address:			Quote #:					
Phone: Fax:			ALS Contact: A. SPRINGER Sampler: SK / DB					
Lab Work Order # (lab use only) L1497000								

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type											Number of Containers	
	14-DDR-14B-BERRY-01	30-JUL-14	1245	TISSUE												1
	14-DDR-14B-LI-01		"	↓												1
	14-DDR-12-S-01		1354	SOIL												2
	14-DDR-12-BERRY-01			TISSUE												1
	14-DDR-12-WL-01															1
	14-DDR-12-LT-01															1
	14-DDR-12-LI-01															1
	14-DDR-12-FR-01															1
	14-DDR-24-S-01	31-JUL-14	0850	SOIL												2
	14-DDR-24-S-02			↓												3
	14-DDR-24-BERRY-01			TISSUE												1
	14-DDR-24-WL-01			↓												1

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

CONTACT SKO FOR INSTRUCTIONS. KEEP COOL

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
				Aug 5 2014	1:18pm	°C				



Environmental

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10-365158

Page 5 of 11

Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)				
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)				
Contact: STEPHANIE KO			Select: PDF ☒ Excel ☒ Digital Fax			Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT				
Address: 500-4260 STILL CREEK DR			Email 1: stephanie_ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT				
BURNABY BC V5C 6C6			Email 2: halla-315@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT				
Phone: 604-296-4358 Fax:						Analysis Request				
Invoice To Same as Report? (circle) (Yes) or No (if No, provide details)			Client / Project Information			(Indicate Filtered or Preserved, F/P)				
Copy of Invoice with Report? (circle) (Yes) or No			Job #: 1407256/7094/30							
Company:			PO / AFE:							
Contact:			LSD:							
Address:										
Phone: Fax:			Quote #:							
Lab Work Order # (lab use only) L1497000			ALS A SPRINGER			Samples SK / DB				
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type					Number of Containers	
	14-DDR-24-BR-01	31-JUL-14	0850	TISSUE						
	14-DDR-24-LI-01									
	14-DDR-24-GR-01									
	14-DDR-26-B5-01		1025	SOIL						
	14-DDR-26-BERRY-01			TISSUE						
	14-DDR-26-BERRY-02									
	14-DDR-26-WL-01									
	14-DDR-26-LI-01									
	14-DDR-26-GR-01									
	14-DDR-30A-S-01		1215	SOIL						
	14-DDR-30A-BERRY-01			TISSUE						
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details										
CONTACT SKO FOR INSTRUCTIONS. KEEP COOL										
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.										
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.										
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			<i>[Signature]</i>	Aug 5 2014	1:18pm	cool dry Max 12°C				

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GENF 18.01 Front

4L Aug 6 1945 6.3/18 4/7.9/ 6.9/14.8/160 cool 2: Max 13 Aug 12 cooler 3: Max 13 Aug 11

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ALS Environmental

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Page 7 of 11

Report To			Report Format / Distribution			Service Request (Rush subject to availability - Contact ALS to confirm TAT)				
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)				
Contact: STEPHANIE KO			Select: PDF ☒ Excel ☒ Digital ☒ Fax			Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT				
Address: 500-4260 STILL CREEK DR			Email 1: stephanie-ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT				
BURNABY, BC V5C 6C6			Email 2: thalia-zis@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT				
Phone: 604-296-4358 Fax:										
Invoice To Same as Report? (circle) (Yes) or No (if No, provide details)			Client / Project Information			Analysis Request				
Copy of Invoice with Report? (circle) (Yes) or No			Job #: 140256/7074/30			(Indicate Filtered or Preserved, F/P)				
Company:			PO / A/E:			 L1497000-COFC				
Contact:			LSD:							
Address:			Quote #:							
Phone: Fax:			ALS A. SPRINGER Contact:							
Lab Work Order # (lab use only)			Sampler: SK (DB)			Number of Containers				
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type						
	14-DDR-10A-WL-01	01 AUG 14	0812	TISSUE				1		
	14-DDR-10A-LT-01		↓	↓				1		
	14-DDR-10A-LI-01		↓	↓				1		
	14-DDR-10B-S-01		0840	SOIL				2		
	14-DDR-10B-BERRY-01		↓	TISSUE				1		
	14-DDR-10B-GR-01		↓	↓				1		
	14-DDR-02A-S-01		0936	SOIL				2		
	14-DDR-02A-BERRY-01		↓	TISSUE				1		
	14-DDR-02A-LT-01		↓	↓				1		
	14-DDR-02A-LI-01		↓	↓				1		
	14-DDR-02A-GR-01		↓	↓				1		
	14-DDR-02B-S-01		1015	SOIL				3		
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier.1-Natural/ETC) / Hazardous Details										
CONTACT S.KO FOR INSTRUCTIONS. KEEP COOL										
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.										
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.										
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			<i>[Signature]</i>	Aug 3 2014	1:18pm	cooler 1: max 12 Aug 11 °C				

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GENF 18.01 Front

UC Aug 6 19:15 6/3/18 4/7.9/6.9/1.8/1.0
 cooler 2. Max 12 Aug 11

cooler 3.

 Max 13
 Aug 11

Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)		
Company: <u>GOLDER ASSOCIATES LTD</u>			Standard: ☒ <u>Standard</u> Other (specify):			☒ <u>Regular</u> (Standard Turnaround Times - Business Days)		
Contact: <u>STEPHANIE KO</u>			Select: PDF ☒ Excel ☒ Digital ☐ Fax ☐			Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT		
Address: <u>500-4260 STILLCREEK DR</u>			Email 1: <u>Stephanie-ko@golder.com</u>			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT		
<u>BURNABY, BC V5L 6C6</u>			Email 2: <u>thalib_zis@golder.com</u>			Same Day or Weekend Emergency - Contact ALS to confirm TAT		
Phone: <u>604-296-4358</u> Fax:								
Invoice To Same as Report ? (circle) <u>(Yes)</u> or No (If No, provide details)			Client / Project Information			Analysis Request		
Copy of Invoice with Report? (circle) <u>(Yes)</u> or No			Job #: <u>145256 / 7044 / 30</u>			(Indicate Filtered or Preserved, F/P)		
Company:			PO / AFE:			L 1497000-COFC		
Contact:			LSD:					
Address:			Quote #:					
Phone: Fax:			ALS A SPRINGER					
Lab Work Order # (lab use only)			Contact:			Sampler: <u>SK/DB</u>		
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type				Number of Containers
	<u>14-DDR-02B-WL-01</u>	<u>01 AUG 14</u>	<u>10:15</u>	<u>TISSUE</u>				
	<u>14-DDR-03-S-01</u>		<u>11:15</u>	<u>SOIL</u>				<u>32</u>
	<u>14-DDR-03-S-02</u>			<u>↓</u>				<u>28</u>
	<u>14-DDR-03-BERRY-01</u>			<u>TISSUE</u>				
	<u>14-DDR-03-WL-01</u>							
	<u>14-DDR-03-LT-01</u>							
	<u>14-DDR-03-LI-01</u>							
	<u>14-DDR-03-GR-01</u>							
	<u>14-DDR-09-S-01</u>		<u>13:03</u>	<u>SOIL</u>				<u>3</u>
	<u>14-DDR-09-BERRY-01</u>			<u>TISSUE</u>				
	<u>14-DDR-09-WL-01</u>							
	<u>14-DDR-09-LT-01</u>							
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details								
<u>CONTACT S.KO FOR INSTRUCTIONS. KEEP COOL</u>								
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.								
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.								
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:
			<u>32</u>	<u>Aug 5</u>	<u>1:18</u>	<u>COOLER 1</u> <u>Max 12 °C</u> <u>Aug 11</u>		
								Observations: Yes / No ? If Yes add SIF



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Report To <u>GOLDER ASSOCIATES LTD</u>			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)		
Company:			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)		
Contact: <u>STEPHANIE KO</u>			Select: PDF ☒ Excel ☒ Digital ☐ Fax ☐			Priority: (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT		
Address: <u>500-4260 STILL CREEK DR</u> <u>BURNABY BC V5C 6C6</u>			Email 1: <u>stephanie.ko@golder.com</u>			Emergency: (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT		
Phone: <u>604-296-4325</u> Fax:			Email 2: <u>thalia.zis@golder.com</u>			Same Day or Weekend Emergency: - Contact ALS to confirm TAT		
Invoice To Same as Report? (circle) <u>Yes</u> or No (If No, provide details)			Client / Project Information			Analysis Request		
Copy of Invoice with Report? (circle) <u>Yes</u> or No			Job #: <u>145250/7044/30</u>			(Indicate Filtered or Preserved, F/P)		
Company:			PO / AFE:			1497000-COFC Number of Containers		
Contact:			LSD:					
Address:			Quote #:					
Phone: Fax:			ALS A SPRINGER					
Lab Work Order # (lab use only)			Contact:			Sampler: <u>SK/DB</u>		
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type				
	14-DDR-09-LI-01	01 AUG 14	1303	TISSUE				
	14-DDR-09-GR-01	↓	1303	↓				
	14-DDR-05-S-01	02 AUG 14	0820	SOIL				
	14-DDR-05-BERRY-01			TISSUE				
	14-DDR-05-WL-01							
	14-DDR-05-LI-01							
	14-DDR-05-LI-01							
	14-DDR-05-GR-01							
	14-DDR-05-S-01-DUP			SOIL				
	14-DDR-05-BERRY-01-DUP			TISSUE				
	14-DDR-05-WL-01-DUP							
	14-DDR-05-LI-01-DUP							
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details								
<u>CONTACT S.KO FOR INSTRUCTIONS. KEEP COOL</u>								
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.								
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.								
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:
				Aug 5 2014	1:18pm	100% Max 12 Min 2 °C		
								Observations: Yes / No ? If Yes add SIF

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GENF 18.01 Front

42 Aug 6 19:25 613/184/29/69/184/184
Cooler 2: Max 13 3 Max 12
Aug 12 3 Aug 11

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Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)														
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)														
Contact: STEPHANIE KO			Select: PDF ☒ Excel ☒ Digital ☐ Fax ☐			Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT														
Address: 500-4260 STILLCREEK DR			Email 1: stephanie.ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT														
BURNABY BC V2E 6C6			Email 2: thalia.zis@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT														
Phone: 604 296 9325 Fax:						Analysis Request														
Invoice To Same as Report? (circle) Yes or No (if No, provide details)			Client / Project Information			(Indicate Filtered or Preserved, F/P)														
Copy of Invoice with Report? (circle) Yes or No			Job #: 457256/7044/30																	
Company:			PO / AFE:																	
Contact:			LSD:																	
Address:																				
Phone: Fax:			Quote #:																	
Lab Work Order # (lab use only)			ALS Contact: A SPRINGER			Sampler: SK/DB														
Sample #	Sample Identification (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type													Number of Containers		
	14-DDR-05-LI-01-DUP		02-AUG-14	0820	TISSUE														1	
	14-DDR-16A-S-01			1030	SOIL														3	
	14-DDR-16A-BERRY-01				TISSUE														1	
	14-DDR-16A-WL-01																		1	
	14-DDR-16A-BR-01																		1	
	14-DDR-16A-LI-01																		1	
	14-DDR-16B-S-01			1100	SOIL														2	
	14-DDR-16B-GR-01				TISSUE														1	
	14-DDR-16B-GR-01-DUP																		1	
	14-DDR-28-S-01			1230	SOIL														3	
	14-DDR-28-BERRY-01				TISSUE														1	
	14-DDR-28-WL-01																		1	
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/etc) / Ha:																				
CONTACT S.KO FOR INSTRUCTIONS. KEEP COOL.																				
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																				
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white -																				
SHIPMENT RELEASE (client use)					SHIPMENT RECEPTION (lab use only)					SHIPMENT										
Released by:		Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:											
				<i>3e</i>	Aug 5 2014	1:18pm	max 13°C Aug 22													

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GENF 18.01 Front

4C Aug 6 19:25 6.3/18.4/7.9/6.9/14.8/10.0 cooler 2:

Report To			Report Format / Distribution			Service Request: (Rush subject to availability - Contact ALS to confirm TAT)											
Company: GOLDER ASSOCIATES LTD			Standard: ☒ Other (specify):			☒ Regular (Standard Turnaround Times - Business Days)											
Contact: STEPHANIE KO			Select: ☒ PDF ☒ Excel ☐ Digital ☐ Fax			Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT											
Address: 500 4260 STILL CREEK DR			Email 1: stephanie-ko@golder.com			Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT											
BURNABY BC V5C 6C6			Email 2: thalia-zis@golder.com			Same Day or Weekend Emergency - Contact ALS to confirm TAT											
Phone: 604-296-9325 Fax:						Analysis Request											
Invoice To Same as Report ? (circle) (Yes) or No (if No, provide details)			Client / Project Information			(Indicate Filtered or Preserved, F/P)											
Copy of Invoice with Report? (circle) (Yes) or No			Job #: 1407256 7044 30														
Company:			PO / AFE:														
Contact:			LSD:														
Address:																	
Phone: Fax:			Quote #:														
Lab Work Order # (lab use only)			ALS A. SPRINGER Contact:			Sampler: SK/DB											
Sample #	Sample Identification (This description will appear on the report)		Date (dd-mm-yy)	Time (hh:mm)	Sample Type												
	14-DDR-28-BR-01		02-AUG-14	1230	TISSUE												
	14-DDR-28-L1-01		↓	↓	↓	↑ HOLD ↓											
	14-DDR-28-GR-01																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
	~~14-DDR-~~																
Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Materials																	
CONTACT SKO FOR INSTRUCTIONS. KEEP COOL																	
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																	
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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)											
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:							
			<i>3C</i>	<i>Aug 5 2014</i>	<i>1:18 PM</i>	<i>Cooler 1 Max 12°C</i>											

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ATTACHMENT A2

DATA SCREEN FOR HUMAN HEALTH



Table A2-1 Human Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part A

Parameter	CCME	Notes	US EPA RSL	Selected Value	Concentrations [dry weight]													
					14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01
Conventional																		
% Moisture	-		-	-	76.6	12.1	8.58	43.1	13.2	13	34.5	8.92	8.08	12.2	13.2	80.5	69.4	19.9
pH (1:2 soil:water)	6 - 8		-	6 - 8	4.00	5.04	5.57	4.14	5.35	5.35	4.06	5.47	5.42	4.80	5.18	4.04	3.89	6.29
% Total Organic Carbon	-		-	-	35.6	0.60	0.34	17.5	0.52	0.46	12.1	0.31	0.38	0.71	0.66	43.6	48.8	0.62
Metals [mg/kg]																		
Aluminum (Al)	-		15,400	15,400	4,390	6,450	10,700	15,400	11,400	10,800	5,420	6,550	6,210	10,900	15,600	3,690	4,210	21,300
Antimony (Sb)	20	G	-	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	12	SI	-	12	2.78	3.91	5.27	8.45	10.2	10	2.32	2.19	2.12	5.49	13.8	4.77	2.41	5.67
Barium (Ba)	6,800	DC	-	6,800	91.8	37.1	68.7	100	73.6	71.4	86.2	36	36.4	68.4	91.8	27.5	174	145
Beryllium (Be)	4	G	-	4	0.2	0.22	0.3	0.49	0.45	0.43	0.26	0.36	0.34	0.35	0.37	<0.20	0.46	0.83
Bismuth (Bi)	-		-	-	<0.20	<0.20	0.22	0.36	0.23	0.24	<0.20	<0.20	<0.20	0.24	0.24	<0.20	0.68	0.89
Cadmium (Cd)	1.4	SI	-	1.4	0.709	<0.050	0.121	0.354	<0.050	<0.050	0.225	<0.050	<0.050	<0.050	<0.050	0.183	0.176	0.053
Calcium (Ca)	-		-	-	1,910	1,230	2,160	1,920	1,500	1,340	2,210	1,330	1,070	1,340	1,180	749	1,270	2,360
Chromium (Cr)	220	SI	-	220	6.88	21.6	37	47.6	41.3	40.3	15.1	17.2	16.7	36.8	63.4	7.82	10.1	82.1
Cobalt (Co)	50	G	-	50	11.7	4.44	7.91	11.6	8.15	7.38	4.91	3.73	3.44	5.49	10.1	4.06	4.03	15.1
Copper (Cu)	1,100	SI	-	1,100	12.6	9.86	16	28.3	16.8	15.8	13.4	6.1	5.48	9.59	30.6	47.2	119	32.6
Iron (Fe)	-		11,000	11,000	7,500	9,650	16,300	21,500	16,100	15,200	6970	9920	9150	14400	22200	4770	6270	30600
Lead (Pb)	140	SI	-	140	2.52	2.52	3.74	4.59	3.67	3.52	3.69	2.86	2.71	3.31	3.39	1.84	4.39	5.59
Lithium (Li)	-		32	32	<5.0	20	26.3	30.2	32.7	30	12.8	26.8	24.3	29.8	32.9	<5.0	<5.0	68
Magnesium (Mg)	-		-	-	1,050	3,380	5,450	6,790	5,310	5,040	2530	3090	2990	5190	8460	503	660	11700
Manganese (Mn)	-		360	360	19.6	95.4	171	180	160	149	137	99.1	88.2	133	190	11.8	4.5	346
Mercury (Hg)	6.6	SI	-	6.6	0.128	<0.0050	<0.0050	0.0867	0.0051	0.0053	0.164	<0.0050	<0.0050	0.0058	0.0094	0.12	0.145	0.0063
Molybdenum (Mo)	10	G	-	10	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	1.08	0.68	0.56
Nickel (Ni)	50	G	-	50	25.6	13.5	19.5	28.3	22.1	20.4	13.7	8.82	8.63	16.7	32.1	15.8	38.5	48.1
Phosphorus (P)	-		-	-	1070	511	652	517	507	486	814	417	378	445	480	1,030	858	569
Potassium (K)	-		-	-	910	1,790	2,730	2,980	3,120	2,900	1,630	2,100	1,890	3,010	4,310	490	240	8,090
Selenium (Se)	80	DC	-	80	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.35	0.58	<0.20
Silver (Ag)	20	G	-	20	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.2	<0.10
Sodium (Na)	-		-	-	<100	<100	190	290	150	200	<100	150	<100	150	160	<100	<100	380
Strontium (Sr)	-		9,400	9,400	24.7	3.97	11.4	17.9	6.35	5.69	15.5	5.91	4.85	6.56	4.87	9.21	33.9	15.1
Thallium (Tl)	1	P/SI	-	1	<0.050	0.099	0.173	0.274	0.16	0.161	0.152	0.164	0.147	0.181	0.189	<0.050	<0.050	0.457
Tin (Sn)	50	G	-	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	-		28,000 TiCl4	28,000	132	387	703	778	778	721	254	494	464	713	750	73.9	139	1,560
Uranium (U)	23	DC	-	23	1.3	1.45	3.09	4.6	1.77	1.79	1.28	2.42	2.33	1.94	1.21	2.01	8.22	3.41
Vanadium (V)	130	G	-	130	5.45	18.9	31.8	39.6	35	32.1	12.5	19	15.8	30.8	44.9	6.4	8.49	66.1
Zinc (Zn)	200	G	-	200	28.9	23.4	38.4	55.9	34.4	33.4	38.3	26	24.3	33.9	43.4	8.7	3.4	80.9
Polycyclic Aromatic Hydrocarbons [mg/kg]																		
Acenaphthene	-		700	700	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.020	<0.0050
Acenaphthylene	-		-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050
Anthracene	-		3,400	3400	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0090	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0080	<0.0040
Benz(a)anthracene	-		-	B(a)P TPE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
Benzo(a)pyrene	-		-	B(a)P TPE	<0.050	<0.010	<0.010	<0.20	<0.010	<0.010	<0.050	<0.010	<0.010	<0.010	<0.010	<0.040	<0.80	<0.010
Benzo(b)fluoranthene	-		-	B(a)P TPE	<0.080	<0.010	<0.010	<0.010	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.060	<0.040	<0.010
Benzo(b+j+k)fluoranthene	-		-	B(a)P TPE	<0.085	<0.015	<0.015	<0.015	<0.015	<0.015	<0.071	<0.015	<0.015	<0.015	<0.015	<0.061	<0.050	<0.015
Benzo(g,h,i)perylene	-		-	B(a)P TPE	<0.20	<0.010	<0.010	<0.040	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.020	<0.090	<0.010
Benzo(k)fluoranthene	-		-	B(a)P TPE	<0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010
Chrysene	-		-	B(a)P TPE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
Dibenz(a,h)anthracene	-		-	B(a)P TPE	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050
Fluoranthene	-		460	460	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010

Table A2-1 Human Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part A

Parameter	CCME	Notes	US EPA RSL	Selected Value	Concentrations [dry weight]													
					14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01
Fluorene	-		460	460	0.174	<0.010	<0.010	<0.060	<0.010	<0.010	<0.20	<0.010	<0.010	<0.010	<0.010	<0.090	<0.40	<0.010
Indeno(1,2,3-c,d)pyrene	-		-	B(a)P TPE	<0.010	<0.010	<0.010	<0.20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.030	<0.010
2-Methylnaphthalene	-		46	46	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010
Naphthalene	-		26	26	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
Phenanthrene	-		-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
Pyrene	-		340	340	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
B(a)P Total Potency Equivalent	5.3		-	5.3	<0.035	<0.020	<0.020	<0.11	<0.020	<0.020	<0.033	<0.020	<0.020	<0.020	<0.020	<0.029	<0.42	<0.020
Dioxins and Furans [ng/kg]																		
2,3,7,8-TCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8-PeCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-TCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-PeCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-HxCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-HpCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,7,8-TCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8-PeCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,7,8-PeCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	PCDD/F-TEQ		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-TCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-PeCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total-HpCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

- CCME - Canadian Council of Ministers of the Environment Residential Guidelines, Canadian Environmental Quality Guidelines, 1999; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.; US EPA RSL - United States Environmental Protection Agency Regional Screening Levels for residential Soil, May 2014. Non-cancer RSL values were adjusted from an HQ = 1.0 to an HQ = 0.2 by dividing the RSL by 5. RSL values for carcinogens were adjusted to reflect an incremental lifetime cancer risk of 1 in 100,000 by multiplying by 10. CCME guideline was used as screening value. If no CCME guideline was available, US EPA RSL value was used.
- Grey highlight and bold** = indicates value exceeds selected screening value.
- TCDD/TCDF = Tetrachlorodibenzodioxin/furan; PeCDD/F = Pentachlorodibenzodioxin/furan; HxCDD/F = Hexachlorodibenzodioxin/furan; HpCDD/F = Heptachlorodibenzodioxin/furan; OCDD/F = Octachlorodibenzodioxin/furan.
- PCDD/F TEQ = polychlorinated dibenzodioxins/furans toxicity equivalent, which is the sum of estimated potencies relative to 2,3,7,8-TCDD (for dioxins) and 2,3,7,8-TCDF (for furans).
- B(a)P TPE = Benzo(a)pyrene Total Potency Equivalents, which is the sum of estimated cancer potencies relative to B(a)P for all potentially carcinogenic unsubstituted PAHs multiplied by the soil concentration of each PAH listed below. B(a)P Potency Equivalence Factors: Benz(a)anthracene = 0.1, Benzo(a)pyrene = 1.0, Benzo(b+j+k)fluoranthene = 0.1, Benzo(g,h,i)perylene = 0.01, Chrysene = 0.01, Dibenz(a,h)anthracene = 1.0, and Indeno(1,2,3-cd)pyrene = 0.1.
- TEQ = concentration of the mixture of congeners, expressed as toxic equivalent of 2,3,7,8-TCDD; upper bound = full detection limits are used for non-detects.

< = below laboratory detection limit; % = percent; cm bgs = centimetres below ground surface; DC = Direct contact; FDA/FD = Field duplicate available/field duplicate; G = Generic; HxCDD Mix = hexachlorodibenzo-p-dioxin mixture; mg/kg dwt = milligrams per kilogram in dry weight; ng/kg dwt = nanograms per kilogram in dry weight; QA/QC = Quality assurance/quality control; P = Provisionary; SI = Soil ingestion; TEQ = Toxic Equivalency; TiCl4 = titanium tetrachloride.



Table A2-1 Human Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part B

Parameter	CCME	Notes	US EPA RSL	Selected Value¹	Concentrations [dry weight]												
					14-DDR-12-S-01	14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01
Conventional																	
% Moisture	-		-	-	7.99	84.2	8.86	8.79	69.4	71.8	9.07	22.2	8.68	7.26	10.0	78.8	59.9
pH (1:2 soil:water)	6 - 8		-	6 - 8	6.05	3.59	5.58	5.20	3.98	3.63	5.70	4.06	4.72	4.91	5.28	4.01	4.27
% Total Organic Carbon	-		-	-	0.39	45.4	0.31	0.53	41.1	39.1	0.30	11.6	1.02	0.60	0.29	41.9	37.3
Metals [mg/kg]																	
Aluminum (Al)	-		15,400	15,400	10,700	303	8,230	9,960	3,100	4,450	11,600	6,570	8,570	1,2100	9,130	5,030	10,700
Antimony (Sb)	20	G	-	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	12	SI	-	12	4.71	0.482	4.21	4.42	2.33	2.17	3.67	3.44	6.19	7.72	6.33	1.6	4.21
Barium (Ba)	6,800	DC	-	6,800	61.5	12.7	50.4	70.6	96.3	101	68.4	70.8	53.8	98.4	62.3	61.5	47.4
Beryllium (Be)	4	G	-	4	0.31	<0.20	0.27	0.25	<0.20	<0.20	0.24	<0.20	0.2	0.3	0.29	0.26	0.38
Bismuth (Bi)	-		-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	0.77
Cadmium (Cd)	1.4	SI	-	1.4	<0.050	0.167	<0.050	<0.050	0.47	0.576	<0.050	0.21	<0.050	<0.050	<0.050	1.02	0.504
Calcium (Ca)	-		-	-	1,660	1,400	1,590	1,350	2,950	1,440	1,870	881	954	1,060	1,460	1,530	1,020
Chromium (Cr)	220	SI	-	220	36	0.91	25.7	38.4	8.12	8.35	43.7	23.4	33.3	49.4	36.1	3.26	10.8
Cobalt (Co)	50	G	-	50	8.27	1.07	5.8	7.54	9.42	8.65	8.15	5.95	5.74	9.02	6.68	5.43	5.42
Copper (Cu)	1,100	SI	-	1,100	11.3	3.68	9.57	11.6	9.93	13.7	14.1	9.45	12.4	21.6	13.7	11.8	19.1
Iron (Fe)	-		11,000	11,000	16,000	397	12,800	14,500	3,800	4,500	16,200	9,820	13,400	17,500	13,600	5,880	12,400
Lead (Pb)	140	SI	-	140	3.69	1.52	3.61	2.56	2.15	1.24	3.48	2.02	2.24	3.78	2.77	3.1	8.62
Lithium (Li)	-		32	32	29.5	<5.0	23.9	31.2	<5.0	<5.0	35.3	9.7	22.1	32.8	26	<5.0	<5.0
Magnesium (Mg)	-		-	-	5,670	613	4,140	5,290	1,570	1,130	6,040	2,640	4,560	6,490	4,880	513	839
Manganese (Mn)	-		360	360	218	45.8	151	154	112	15.8	176	61.1	120	174	131	19.9	22.1
Mercury (Hg)	6.6	SI	-	6.6	0.0056	0.0958	<0.0050	0.0053	0.227	0.202	<0.0050	0.11	0.008	0.0055	<0.0050	0.145	0.183
Molybdenum (Mo)	10	G	-	10	<0.50	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	0.52	<0.50	0.51	<0.50	0.77	1.24
Nickel (Ni)	50	G	-	50	18.3	2.73	13.9	18.4	11.8	17.5	22.9	12.9	17.2	24.6	18.4	9.1	9.81
Phosphorus (P)	-		-	-	421	559	567	465	821	860	677	644	319	362	464	1,100	1,420
Potassium (K)	-		-	-	2,690	620	2,620	3,460	1,120	940	4,810	1,440	2,170	4,050	2,620	660	710
Selenium (Se)	80	DC	-	80	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	0.42
Silver (Ag)	20	G	-	20	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	0.27
Sodium (Na)	-		-	-	300	120	130	120	<100	<100	230	<100	110	160	110	<100	<100
Strontium (Sr)	-		9,400	9,400	9.22	7.99	6.54	5.47	30.6	18.3	7.25	10.7	4.48	5.22	5.87	20.3	13.9
Thallium (Tl)	1	P/SI	-	1	0.158	<0.050	0.162	0.188	0.083	<0.050	0.242	0.092	0.103	0.186	0.13	0.056	0.081
Tin (Sn)	50	G	-	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	-		28,000 ^{TiCl4}	28,000	688	9.7	641	700	106	125	902	340	504	877	583	50.4	137
Uranium (U)	23	DC	-	23	2.14	0.067	2.57	1.09	0.873	0.708	2.39	0.905	0.718	1.55	1.12	5.5	11.4
Vanadium (V)	130	G	-	130	30.4	0.67	23.8	30.5	5.89	5.95	34.5	17.5	28.2	40.2	29	1.88	9.65
Zinc (Zn)	200	G	-	200	35.6	42.5	32.5	32.4	32.1	44.8	38.8	18.7	25.7	36.5	30.8	27.4	18.5
Polycyclic Aromatic Hydrocarbons [mg/kg]																	
Acenaphthene	-		700	700	<0.0050	<0.0090	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	-		-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.030	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.040	<0.0050
Anthracene	-		3,400	3,400	<0.0040	<0.0040	<0.0040	<0.0040	<0.020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.020	<0.0040
Benz(a)anthracene	-		-	B(a)P TPE	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	-		-	B(a)P TPE	<0.010	<0.050	<0.010	<0.010	<0.50	<0.050	<0.010	<0.030	<0.010	<0.010	<0.010	<0.20	<0.060
Benzo(b)fluoranthene	-		-	B(a)P TPE	<0.010	<0.080	<0.010	<0.010	<0.020	<0.070	<0.010	<0.040	<0.010	<0.010	<0.010	<0.30	<0.10
Benzo(b+j+k)fluoranthene	-		-	B(a)P TPE	<0.015	<0.085	<0.015	<0.015	<0.073	<0.073	<0.015	<0.045	<0.015	<0.015	<0.015	<2.0	<0.10
Benzo(g,h,i)perylene	-		-	B(a)P TPE	<0.010	<0.080	<0.010	<0.010	<0.090	<0.40	<0.010	<0.060	<0.010	<0.010	<0.010	<0.30	<0.20
Benzo(k)fluoranthene	-		-	B(a)P TPE	<0.010	<0.030	<0.010	<0.010	<0.070	<0.020	<0.010	<0.020	<0.010	<0.010	<0.010	<2.0	<0.030
Chrysene	-		-	B(a)P TPE	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.010
Dibenz(a,h)anthracene	-		-	B(a)P TPE	<0.0050	<0.0050	<0.0050	<0.0050	<0.0060	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050
Fluoranthene	-		460	460	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010
Fluorene	-		460	460	<0.010	<0.20	<0.010	<0.010	<0.20	<0.20	<0.010	<0.040	<0.010	<0.010	<0.010	<0.20	<0.20
Indeno(1,2,3-c,d)pyrene	-		-	B(a)P TPE	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.010



Table A2-1 Human Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part B

Parameter	CCME	Notes	US EPA RSL	Selected Value ¹	Concentrations [dry weight]												
					14-DDR-12-S-01	14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01
2-Methylnaphthalene	-		46	46	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	-		26	26	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	-		-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	-		340	340	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.040	<0.010
B(a)P Total Potency Equivalent	5.3		-	5.3	<0.020	<0.035	<0.020	<0.020	<0.26	<0.035	<0.020	<0.022	<0.020	<0.020	<0.020	<0.24	<0.041
Dioxins and Furans [ng/kg]																	
2,3,7,8-TCDD	PCDD/F-TEQ		-	-	<0.019	<0.25	<0.072	-	-	<0.31	<0.056	<0.11	<0.029	-	-	-	-
1,2,3,7,8-PeCDD	PCDD/F-TEQ		-	-	<0.026	<0.22	<0.061	-	-	<0.21	<0.036	<0.048	<0.018	-	-	-	-
1,2,3,4,7,8-HxCDD	PCDD/F-TEQ		-	-	<0.024	<0.28	<0.052	-	-	<0.20	<0.023	<0.029	<0.023	-	-	-	-
1,2,3,6,7,8-HxCDD	PCDD/F-TEQ		-	-	<0.022	<0.27	<0.048	-	-	<0.18	<0.022	<0.027	<0.022	-	-	-	-
1,2,3,7,8,9-HxCDD	PCDD/F-TEQ		-	-	<0.023	<0.27	<0.050	-	-	<0.19	<0.022	<0.028	<0.022	-	-	-	-
1,2,3,4,6,7,8-HpCDD	PCDD/F-TEQ		-	-	0.031	1.50	<0.058	-	-	2.37	<0.048	0.130	0.070	-	-	-	-
OCDD	-		-	-	0.146	24.1	0.22	-	-	14.2	0.130	0.440	0.687	-	-	-	-
Total-TCDD	-		-	-	<0.019	<0.25	<0.072	-	-	<0.31	<0.056	<0.11	<0.029	-	-	-	-
Total-PeCDD	-		-	-	<0.026	<0.22	<0.061	-	-	0.32	<0.036	0.731	<0.018	-	-	-	-
Total-HxCDD	-		-	-	<0.024	<0.28	<0.052	-	-	<0.20	<0.023	0.056	<0.023	-	-	-	-
Total-HpCDD	-		-	-	0.054	1.73	<0.058	-	-	4.23	<0.048	<0.033	0.136	-	-	-	-
2,3,7,8-TCDF	PCDD/F-TEQ		-	-	<0.022	0.92	<0.069	-	-	<0.40	<0.040	<0.089	<0.032	-	-	-	-
1,2,3,7,8-PeCDF	PCDD/F-TEQ		-	-	<0.020	<0.21	<0.034	-	-	<0.14	<0.027	<0.055	<0.020	-	-	-	-
2,3,4,7,8-PeCDF	PCDD/F-TEQ		-	-	<0.018	<0.19	<0.029	-	-	<0.13	<0.025	<0.051	<0.018	-	-	-	-
1,2,3,4,7,8-HxCDF	PCDD/F-TEQ		-	-	<0.017	0.120	<0.036	-	-	<0.10	<0.020	<0.027	<0.013	-	-	-	-
1,2,3,6,7,8-HxCDF	PCDD/F-TEQ		-	-	<0.014	<0.080	<0.029	-	-	<0.084	<0.017	<0.022	<0.011	-	-	-	-
1,2,3,7,8,9-HxCDF	PCDD/F-TEQ		-	-	<0.027	0.32	<0.059	-	-	0.18	<0.040	<0.034	0.035	-	-	-	-
2,3,4,6,7,8-HxCDF	PCDD/F-TEQ		-	-	<0.017	<0.088	<0.036	-	-	<0.092	<0.021	<0.021	<0.013	-	-	-	-
1,2,3,4,6,7,8-HpCDF	PCDD/F-TEQ		-	-	<0.012	<0.39	<0.026	-	-	<0.19	<0.018	<0.037	<0.018	-	-	-	-
1,2,3,4,7,8,9-HpCDF	PCDD/F-TEQ		-	-	<0.022	<0.76	<0.048	-	-	0.72	<0.045	<0.063	<0.033	-	-	-	-
OCDF	-		-	-	<0.035	1.07	<0.060	-	-	<0.31	<0.050	<0.041	<0.036	-	-	-	-
Total-TCDF	-		-	-	0.434	2.08	<0.069	-	-	2.69	0.149	1.59	0.121	-	-	-	-
Total-PeCDF	-		-	-	0.274	<0.21	<0.034	-	-	2.67	0.381	1.14	0.333	-	-	-	-
Total-HxCDF	-		-	-	0.078	0.43	<0.059	-	-	0.55	0.068	0.163	0.082	-	-	-	-
Total-HpCDF	-		-	-	<0.022	<0.76	<0.048	-	-	<0.41	<0.045	<0.063	<0.033	-	-	-	-
Upper Bound PCDD/F TEQ	4		-	-	0.068	0.803	0.182	-	-	0.743	0.122	0.205	0.072	-	-	-	-

Notes:

1. CCME - Canadian Council of Ministers of the Environment Residential Guidelines, Canadian Environmental Quality Guidelines, 1999; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.; US EPA RSL - United States Environmental Protection Agency Regional Screening Levels for residential Soil, May 2014. Non-cancer RSL values were adjusted from an HQ = 1.0 to an HQ = 0.2 by dividing the RSL by 5. RSL values for carcinogens were adjusted to reflect an incremental lifetime cancer risk of 1 in 100,000 by multiplying by 10. CCME guideline was used as screening value. If no CCME guideline was available, US EPA RSL value was used.

2. **Grey highlight and bold** = indicates value exceeds selected screening value.

3. TCDD/TCDF = Tetrachlorodibenzodioxin/furan; PeCDD/F = Pentachlorodibenzodioxin/furan; HxCDD/F = Hexachlorodibenzodioxin/furan; HpCDD/F = Heptachlorodibenzodioxin/furan; OCDD/F = Octachlorodibenzodioxin/furan.

4. PCDD/F TEQ = polychlorinated dibenzodioxins/furans toxicity equivalent, which is the sum of estimated potencies relative to 2,3,7,8-TCDD (for dioxins) and 2,3,7,8-TCDF (for furans).

5. B(a)P TPE = Benzo(a)pyrene Total Potency Equivalents, which is the sum of estimated cancer potencies relative to B(a)P for all potentially carcinogenic unsubstituted PAHs multiplied by the soil concentration of each PAH listed below. B(a)P Potency Equivalence Factors: Benz(a)anthracene = 0.1, Benzo(a)pyrene = 1.0, Benzo(b+j+k)fluoranthene = 0.1, Benzo(g,h,i)perylene = 0.01, Chrysene = 0.01, Dibenzo(a,h)anthracene = 1.0, and Indeno(1,2,3-cd)pyrene = 0.1.

6. TEQ = concentration of the mixture of congeners, expressed as toxic equivalent of 2,3,7,8-TCDD; upper bound = full detection limits are used for non-detects.

< = below laboratory detection limit; % = percent; cm bgs = centimetres below ground surface; DC = Direct contact; FDA/FD = Field duplicate available/field duplicate; G = Generic; HxCDD Mix = hexachlorodibenzo-p-dioxin mixture; mg/kg dwt = milligrams per kilogram in dry weight; ng/kg dwt = nanograms per kilogram in dry weight; QA/QC = Quality assurance/quality control; P = Provisionary; SI = Soil ingestion; TEQ = Toxic Equivalency; TiCl4 = titanium tetrachloride.



ATTACHMENT A3

DATA SCREEN FOR WILDLIFE HEALTH



Table A3-1 Wildlife Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part A

Parameter	CCME	Notes	US EPA Eco-SSL		Selected Value	Concentrations [dry weight]														
			Avian	Mammals		14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01	14-DDR-12-S-01
Conventional																				
% Moisture	-		-	-	-	76.6	12.1	8.58	43.1	13.2	13	34.5	8.92	8.08	12.2	13.2	80.5	69.4	19.9	7.99
pH (1:2 soil:water)	6 - 8		-	-	6 - 8	4.00	5.04	5.57	4.14	5.35	5.35	4.06	5.47	5.42	4.80	5.18	4.04	3.89	6.29	6.05
% Total Organic Carbon	-		-	-	-	35.6	0.60	0.34	17.5	0.52	0.46	12.1	0.31	0.38	0.71	0.66	43.6	48.8	0.62	0.39
Metals [mg/kg]																				
Aluminum (Al)	-		-	-	-	4,390	6,450	10,700	15,400	11,400	10,800	5,420	6,550	6,210	10,900	15,600	3,690	4,210	21,300	10,700
Antimony (Sb)	20	G	-	0.27	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	17	SC	43	46	17	2.78	3.91	5.27	8.45	10.2	10.0	2.32	2.19	2.12	5.49	13.8	4.77	2.41	5.67	4.71
Barium (Ba)	750	G	-	2,000	750	91.8	37.1	68.7	100	73.6	71.4	86.2	36	36.4	68.4	91.8	27.5	174	145	61.5
Beryllium (Be)	4	G	-	21	4	0.2	0.22	0.3	0.49	0.45	0.43	0.26	0.36	0.34	0.35	0.37	<0.20	0.46	0.83	0.31
Bismuth (Bi)	-		-	-	-	<0.20	<0.20	0.22	0.36	0.23	0.24	<0.20	<0.20	<0.20	0.24	0.24	<0.20	0.68	0.89	<0.20
Cadmium (Cd)	3.8	SFI	0.77	0.36	3.8	0.709	<0.050	0.121	0.354	<0.050	<0.050	0.225	<0.050	<0.050	<0.050	<0.050	0.183	0.176	0.053	<0.050
Calcium (Ca)	-		-	-	-	1,910	1,230	2,160	1,920	1,500	1,340	2,210	1,330	1,070	1,340	1,180	749	1,270	2,360	1,660
Chromium (Cr)	64	SC	26 ^{Cr3}	34 ^{Cr3} , 130 ^{Cr6}	64	6.88	21.6	37	47.6	41.3	40.3	15.1	17.2	16.7	36.8	63.4	7.82	10.1	82.1	36
Cobalt (Co)	40	G	120	230	40	11.7	4.44	7.91	11.6	8.15	7.38	4.91	3.73	3.44	5.49	10.1	4.06	4.03	15.1	8.27
Copper (Cu)	63	SC	28	49	63	12.6	9.86	16	28.3	16.8	15.8	13.4	6.1	5.48	9.59	30.6	47.2	119	32.6	11.3
Iron (Fe)	-		-	-	-	7,500	9,650	16,300	21,500	16,100	15,200	6,970	9,920	9,150	14,400	22,200	4,770	6,270	30,600	16,000
Lead (Pb)	70	SFI	11	56	70	2.52	2.52	3.74	4.59	3.67	3.52	3.69	2.86	2.71	3.31	3.39	1.84	4.39	5.59	3.69
Lithium (Li)	-		-	-	-	<5.0	20.0	26.3	30.2	32.7	30.0	12.8	26.8	24.3	29.8	32.9	<5.0	<5.0	68.0	29.5
Magnesium (Mg)	-		-	-	-	1,050	3,380	5,450	6,790	5,310	5,040	2,530	3,090	2,990	5,190	8,460	503	660	11,700	5,670
Manganese (Mn)	-		4,300	4,000	4000	19.6	95.4	171	180	160	149	137	99.1	88.2	133	190	11.8	4.5	346	218
Mercury (Hg)	12	SC	-	-	12	0.128	<0.0050	<0.0050	0.0867	0.0051	0.0053	0.164	<0.0050	<0.0050	0.0058	0.0094	0.12	0.145	0.0063	0.0056
Molybdenum (Mo)	5	G	-	-	5	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.77	1.08	0.68	0.56	<0.50
Nickel (Ni)	50	SC	210	130	50	25.6	13.5	19.5	28.3	22.1	20.4	13.7	8.82	8.63	16.7	32.1	15.8	38.5	48.1	18.3
Phosphorus (P)	-		-	-	-	1,070	511	652	517	507	486	814	417	378	445	480	1030	858	569	421
Potassium (K)	-		-	-	-	910	1,790	2,730	2,980	3,120	2,900	1,630	2,100	1,890	3,010	4,310	490	240	8,090	2,690
Selenium (Se)	1	SC	1.2	0.63	1	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.35	0.58	<0.20	<0.20
Silver (Ag)	20	G	4.2	14	20	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.2	<0.10	<0.10
Sodium (Na)	-		-	-	-	<100	<100	190	290	150	200	<100	150	<100	150	160	<100	<100	380	300
Strontium (Sr)	-		-	-	-	24.7	3.97	11.4	17.9	6.35	5.69	15.5	5.91	4.85	6.56	4.87	9.21	33.9	15.1	9.22
Thallium (Tl)	1	SFI	-	-	1	<0.050	0.099	0.173	0.274	0.16	0.161	0.152	0.164	0.147	0.181	0.189	<0.050	<0.050	0.457	0.158
Tin (Sn)	5	G	-	-	5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	-		-	-	-	132	387	703	778	778	721	254	494	464	713	750	73.9	139	1560	688
Uranium (U)	33	SFI	-	-	33	1.3	1.45	3.09	4.6	1.77	1.79	1.28	2.42	2.33	1.94	1.21	2.01	8.22	3.41	2.14
Vanadium (V)	130	SC	7.8	280	130	5.45	18.9	31.8	39.6	35	32.1	12.5	19	15.8	30.8	44.9	6.4	8.49	66.1	30.4
Zinc (Zn)	200	SC	46	79	200	28.9	23.4	38.4	55.9	34.4	33.4	38.3	26	24.3	33.9	43.4	8.7	3.4	80.9	35.6
Polycyclic Aromatic Hydrocarbons [mg/kg]																				
Acenaphthene	21.5	SFI	-	-	21.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.020	<0.0050	<0.0050
Acenaphthylene	-		-	-	LMW PAHs	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050
Anthracene	2.5	SC	-	-	2.5	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0090	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0080	<0.0040	<0.0040
Benz(a)anthracene	6.2	SFI	-	-	6.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Benzo(a)pyrene	0.6	SFI	-	-	0.6	<0.050	<0.010	<0.010	<0.20	<0.010	<0.010	<0.050	<0.010	<0.010	<0.010	<0.010	<0.040	<0.80	<0.010	<0.010
Benzo(b)fluoranthene	6.2	SFI	-	-	6.2	<0.080	<0.010	<0.010	<0.010	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.060	<0.040	<0.010	<0.010
Benzo(b+j+k)fluoranthene	6.2	B(b)F	-	-	6.2	<0.085	<0.015	<0.015	<0.015	<0.015	<0.015	<0.071	<0.015	<0.015	<0.015	<0.015	<0.061	<0.050	<0.015	<0.015
Benzo(g,h,i)perylene	-		-	-	HMW PAHs	<0.20	<0.010	<0.010	<0.040	<0.010	<0.010	<0.070	<0.010	<0.010	<0.010	<0.010	<0.020	<0.090	<0.010	<0.010
Benzo(k)fluoranthene	6.2	SFI	-	-	6.2	<0.030	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010	<0.010
Chrysene	6.2	SFI	-	-	6.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Dibenz(a,h)anthracene	0.1	I	-	-	0.1	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.020	<0.0050	<0.0050
Fluoranthene	15.4	SFI	-	-	15.4	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Fluorene	15.4	SFI	-	-	15.4	0.174	<0.010	<0.010	<0.060	<0.010	<0.010	<0.20	<0.010	<0.010	<0.010	<0.010	<0.090	<0.40	<0.010	<0.010

**Table A3-1 Wildlife Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part A**

Parameter	CCME	Notes	US EPA Eco-SSL		Selected Value	Concentrations [dry weight]														
			Avian	Mammals		14-DDR-02A-S-01	14-DDR-02B-S-01	14-DDR-03-S-01	14-DDR-03-S-02	14-DDR-05-S-01	14-DDR-05-S-01-DUP	14-DDR-06-S-01	14-DDR-07-S-01	14-DDR-07-S-01-DUP	14-DDR-09-S-01	14-DDR-10A-S-01	14-DDR-10B-S-01	14-DDR-11A-S-01	14-DDR-11B-S-01	14-DDR-12-S-01
Indeno(1,2,3-c,d)pyrene	0.1	I	-	-	0.1	<0.010	<0.010	<0.010	<0.20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.030	<0.010	<0.010
2-Methylnaphthalene	8.8	Nap	-	-	8.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010	<0.010
Naphthalene	8.8	SFI	-	-	8.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Phenanthrene	43	SFI	-	-	43	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Pyrene	7.7	SFI	-	-	7.7	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
Low Molecular Weight (LMW) PAHs	-		-	100	100	0.228	<0.064	<0.064	<0.114	<0.064	<0.064	<0.259	<0.064	<0.064	<0.064	<0.064	<0.149	<0.538	<0.064	<0.064
High Molecular Weight (HMW) PAHs	-		-	1.1	1.1	0.49	<0.1	<0.1	<0.51	<0.1	<0.1	<0.316	<0.1	<0.1	<0.1	<0.1	<0.276	<1.12	<0.1	<0.1
Dioxins and Furans [ng/kg]																				
2,3,7,8-TCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.019
1,2,3,7,8-PeCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.026
1,2,3,4,7,8-HxCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.024
1,2,3,6,7,8-HxCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022
1,2,3,7,8,9-HxCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.023
1,2,3,4,6,7,8-HpCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.031
OCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.146
Total-TCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.019
Total-PeCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.026
Total-HxCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.024
Total-HpCDD	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.054
2,3,7,8-TCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022
1,2,3,7,8-PeCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.020
2,3,4,7,8-PeCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.018
1,2,3,4,7,8-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.017
1,2,3,6,7,8-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.014
1,2,3,7,8,9-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.027
2,3,4,6,7,8-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.017
1,2,3,4,6,7,8-HpCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.012
1,2,3,4,7,8,9-HpCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022
OCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.035
Total-TCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.434
Total-PeCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.274
Total-HxCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.078
Total-HpCDF	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.022
Upper Bound PCDD/F TEQ	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.068

Notes:

1. CCME - Canadian Council of Ministers of the Environment Agricultural Guidelines, Canadian Environmental Quality Guidelines, 1999; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.
 2. US EPA Eco-SSL - United States Environmental Protection Agency Ecological Soil Screening Level (US EPA 2010).
 3. **Grey highlight and bold** = indicates value exceeds selected screening value.
 4. *Italicize* = Detection limit greater than selected screening value.
 5. LMW PAHs = low molecular weight polycyclic aromatic hydrocarbons. Calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene.
 6. HMW PAHs = high molecular weight polycyclic aromatic hydrocarbons. Calculated as the sum of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(b+j+k)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene and pyrene.
 7. TEQ = concentration of the mixture of congeners, expressed as toxic equivalent of 2,3,7,8-TCDD; upper bound = full detection limits are used for non-detects.
 - a. CCME guideline was used as screening value. If no CCME guideline was available, US EPA Eco-SSL value was used.
- < = below laboratory detection limit; % = percent; B(b)F = Benzo(b)fluoranthene; cm bgs = centimetres below ground surface; Cr3 = trivalent chromium; Cr6 = hexavalent chromium; FDA/FD = Field duplicate available/field duplicate; G = Generic; I = interim; mg/kg dwt = milligrams per kilogram in dry weight; Nap = naphthalene; ng/kg dwt = nanograms per kilogram in dry weight; QA/QC = Quality assurance/quality control; SC = Soil contact; SFI = Soil and food ingestion.

Table A3-1 Wildlife Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part B

Parameter	CCME	Notes	US EPA Eco-SSL		Selected Value	Concentrations [dry weight]											
			Avian	Mammals		14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01
Conventional																	
% Moisture	-		-	-	-	84.2	8.86	8.79	69.4	71.8	9.07	22.2	8.68	7.26	10.0	78.8	59.9
pH (1:2 soil:water)	6 - 8		-	-	6 - 8	3.59	5.58	5.20	3.98	3.63	5.70	4.06	4.72	4.91	5.28	4.01	4.27
% Total Organic Carbon	-		-	-	-	45.4	0.31	0.53	41.1	39.1	0.30	11.6	1.02	0.60	0.29	41.9	37.3
Metals [mg/kg]																	
Aluminum (Al)	-		-	-	-	303	8,230	9,960	3,100	4,450	11,600	6,570	8,570	12,100	9,130	5,030	1,0700
Antimony (Sb)	20	G	-	0.27	20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	17	SC	43	46	17	0.482	4.21	4.42	2.33	2.17	3.67	3.44	6.19	7.72	6.33	1.60	4.21
Barium (Ba)	750	G	-	2,000	750	12.7	50.4	70.6	96.3	101	68.4	70.8	53.8	98.4	62.3	61.5	47.4
Beryllium (Be)	4	G	-	21	4	<0.20	0.27	0.25	<0.20	<0.20	0.24	<0.20	0.2	0.3	0.29	0.26	0.38
Bismuth (Bi)	-		-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	0.77
Cadmium (Cd)	3.8	SFI	0.77	0.36	3.8	0.167	<0.050	<0.050	0.47	0.576	<0.050	0.21	<0.050	<0.050	<0.050	1.02	0.504
Calcium (Ca)	-		-	-	-	1,400	1,590	1,350	2,950	1,440	1,870	881	954	1,060	1,460	1,530	1,020
Chromium (Cr)	64	SC	26 ^{Cr3}	34 ^{Cr3} , 130 ^{Cr6}	64	0.91	25.7	38.4	8.12	8.35	43.7	23.4	33.3	49.4	36.1	3.26	10.8
Cobalt (Co)	40	G	120	230	40	1.07	5.8	7.54	9.42	8.65	8.15	5.95	5.74	9.02	6.68	5.43	5.42
Copper (Cu)	63	SC	28	49	63	3.68	9.57	11.6	9.93	13.7	14.1	9.45	12.4	21.6	13.7	11.8	19.1
Iron (Fe)	-		-	-	-	397	12,800	14,500	3,800	4,500	16,200	9,820	13,400	17,500	13,600	5,880	12,400
Lead (Pb)	70	SFI	11	56	70	1.52	3.61	2.56	2.15	1.24	3.48	2.02	2.24	3.78	2.77	3.1	8.62
Lithium (Li)	-		-	-	-	<5.0	23.9	31.2	<5.0	<5.0	35.3	9.7	22.1	32.8	26.0	<5.0	<5.0
Magnesium (Mg)	-		-	-	-	613	4,140	5,290	1,570	1,130	6,040	2,640	4,560	6,490	4,880	513	839
Manganese (Mn)	-		4,300	4,000	4,000	45.8	151	154	112	15.8	176	61.1	120	174	131	19.9	22.1
Mercury (Hg)	12	SC	-	-	12	0.0958	<0.0050	0.0053	0.227	0.202	<0.0050	0.11	0.008	0.0055	<0.0050	0.145	0.183
Molybdenum (Mo)	5	G	-	-	5	<0.50	<0.50	<0.50	0.95	<0.50	<0.50	0.52	<0.50	0.51	<0.50	0.77	1.24
Nickel (Ni)	50	SC	210	130	50	2.73	13.9	18.4	11.8	17.5	22.9	12.9	17.2	24.6	18.4	9.1	9.81
Phosphorus (P)	-		-	-	-	559	567	465	821	860	677	644	319	362	464	1100	1420
Potassium (K)	-		-	-	-	620	2,620	3,460	1,120	940	4,810	1,440	2,170	4,050	2,620	660	710
Selenium (Se)	1	SC	1.2	0.63	1	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	0.42
Silver (Ag)	20	G	4.2	14	20	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	0.27
Sodium (Na)	-		-	-	-	120	130	120	<100	<100	230	<100	110	160	110	<100	<100
Strontium (Sr)	-		-	-	-	7.99	6.54	5.47	30.6	18.3	7.25	10.7	4.48	5.22	5.87	20.3	13.9
Thallium (Tl)	1	SFI	-	-	1	<0.050	0.162	0.188	0.083	<0.050	0.242	0.092	0.103	0.186	0.13	0.056	0.081
Tin (Sn)	5	G	-	-	5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	-		-	-	-	9.7	641	700	106	125	902	340	504	877	583	50.4	137
Uranium (U)	33	SFI	-	-	33	0.067	2.57	1.09	0.873	0.708	2.39	0.905	0.718	1.55	1.12	5.5	11.4
Vanadium (V)	130	SC	7.8	280	130	0.67	23.8	30.5	5.89	5.95	34.5	17.5	28.2	40.2	29	1.88	9.65
Zinc (Zn)	200	SC	46	79	200	42.5	32.5	32.4	32.1	44.8	38.8	18.7	25.7	36.5	30.8	27.4	18.5
Polycyclic Aromatic Hydrocarbons [mg/kg]																	
Acenaphthene	21.5	SFI	-	-	21.5	<0.0090	<0.0050	<0.0050	<0.020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	-		-	-	LMW PAHs	<0.0050	<0.0050	<0.0050	<0.030	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.040	<0.0050
Anthracene	2.5	SC	-	-	2.5	<0.0040	<0.0040	<0.0040	<0.020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.020	<0.0040
Benz(a)anthracene	6.2	SFI	-	-	6.2	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.090	<0.010
Benzo(a)pyrene	0.6	SFI	-	-	0.6	<0.050	<0.010	<0.010	<0.50	<0.050	<0.010	<0.030	<0.010	<0.010	<0.010	<0.20	<0.060
Benzo(b)fluoranthene	6.2	SFI	-	-	6.2	<0.080	<0.010	<0.010	<0.020	<0.070	<0.010	<0.040	<0.010	<0.010	<0.010	<0.30	<0.10
Benzo(b+j+k)fluoranthene	6.2	B(b)F	-	-	6.2	<0.085	<0.015	<0.015	<0.073	<0.073	<0.015	<0.045	<0.015	<0.015	<0.015	<2.0	<0.10
Benzo(g,h,i)perylene	-		-	-	HMW PAHs	<0.080	<0.010	<0.010	<0.090	<0.40	<0.010	<0.060	<0.010	<0.010	<0.010	<0.30	<0.20
Benzo(k)fluoranthene	6.2	SFI	-	-	6.2	<0.030	<0.010	<0.010	<0.070	<0.020	<0.010	<0.020	<0.010	<0.010	<0.010	<2.0	<0.030
Chrysene	6.2	SFI	-	-	6.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.010
Dibenz(a,h)anthracene	0.1	I	-	-	0.1	<0.0050	<0.0050	<0.0050	<0.0060	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050
Fluoranthene	15.4	SFI	-	-	15.4	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010
Fluorene	15.4	SFI	-	-	15.4	<0.20	<0.010	<0.010	<0.20	<0.20	<0.010	<0.040	<0.010	<0.010	<0.010	<0.20	<0.20

**Table A3-1 Wildlife Health Soil Screening for Measured Baseline Soil Chemistry Data, Jay Project
Part B**

Parameter	CCME	Notes	US EPA Eco-SSL		Selected Value	Concentrations [dry weight]											
			Avian	Mammals		14-DDR-14A-S-01	14-DDR-14B-S-01	14-DDR-16A-S-01	14-DDR-16B-S-01	14-DDR-19-S-01	14-DDR-23-S-01	14-DDR-24-S-01	14-DDR-24-S-02	14-DDR-26-S-01	14-DDR-28-S-01	14-DDR-30A-S-01	14-DDR-30B-S-01
Indeno(1,2,3-c,d)pyrene	0.1	I	-	-	0.1	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.010
2-Methylnaphthalene	8.8	Nap	-	-	8.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	8.8	SFI	-	-	8.8	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	43	SFI	-	-	43	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	7.7	SFI	-	-	7.7	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.040	<0.010
Low Molecular Weight (LMW) PAHs	-		-	100	100	<0.258	<0.064	<0.064	<0.31	<0.254	<0.064	<0.094	<0.064	<0.064	<0.064	<0.325	<0.254
High Molecular Weight (HMW) PAHs	-		-	1.1	1.1	<0.38	<0.1	<0.1	<0.809	<0.658	<0.1	<0.24	<0.1	<0.1	<0.1	<5.34	<0.535
Dioxins and Furans [ng/kg]																	
2,3,7,8-TCDD	-		-	-	-	<0.25	<0.072	-	-	<0.31	<0.056	<0.11	<0.029	-	-	-	-
1,2,3,7,8-PeCDD	-		-	-	-	<0.22	<0.061	-	-	<0.21	<0.036	<0.048	<0.018	-	-	-	-
1,2,3,4,7,8-HxCDD	-		-	-	-	<0.28	<0.052	-	-	<0.20	<0.023	<0.029	<0.023	-	-	-	-
1,2,3,6,7,8-HxCDD	-		-	-	-	<0.27	<0.048	-	-	<0.18	<0.022	<0.027	<0.022	-	-	-	-
1,2,3,7,8,9-HxCDD	-		-	-	-	<0.27	<0.050	-	-	<0.19	<0.022	<0.028	<0.022	-	-	-	-
1,2,3,4,6,7,8-HpCDD	-		-	-	-	1.50	<0.058	-	-	2.37	<0.048	0.130	0.070	-	-	-	-
OCDD	-		-	-	-	24.1	0.22	-	-	14.2	0.130	0.440	0.687	-	-	-	-
Total-TCDD	-		-	-	-	<0.25	<0.072	-	-	<0.31	<0.056	<0.11	<0.029	-	-	-	-
Total-PeCDD	-		-	-	-	<0.22	<0.061	-	-	0.32	<0.036	0.731	<0.018	-	-	-	-
Total-HxCDD	-		-	-	-	<0.28	<0.052	-	-	<0.20	<0.023	0.056	<0.023	-	-	-	-
Total-HpCDD	-		-	-	-	1.73	<0.058	-	-	4.23	<0.048	<0.033	0.136	-	-	-	-
2,3,7,8-TCDF	-		-	-	-	0.92	<0.069	-	-	<0.40	<0.040	<0.089	<0.032	-	-	-	-
1,2,3,7,8-PeCDF	-		-	-	-	<0.21	<0.034	-	-	<0.14	<0.027	<0.055	<0.020	-	-	-	-
2,3,4,7,8-PeCDF	-		-	-	-	<0.19	<0.029	-	-	<0.13	<0.025	<0.051	<0.018	-	-	-	-
1,2,3,4,7,8-HxCDF	-		-	-	-	0.120	<0.036	-	-	<0.10	<0.020	<0.027	<0.013	-	-	-	-
1,2,3,6,7,8-HxCDF	-		-	-	-	<0.080	<0.029	-	-	<0.084	<0.017	<0.022	<0.011	-	-	-	-
1,2,3,7,8,9-HxCDF	-		-	-	-	0.32	<0.059	-	-	0.18	<0.040	<0.034	0.035	-	-	-	-
2,3,4,6,7,8-HxCDF	-		-	-	-	<0.088	<0.036	-	-	<0.092	<0.021	<0.021	<0.013	-	-	-	-
1,2,3,4,6,7,8-HpCDF	-		-	-	-	<0.39	<0.026	-	-	<0.19	<0.018	<0.037	<0.018	-	-	-	-
1,2,3,4,7,8,9-HpCDF	-		-	-	-	<0.76	<0.048	-	-	0.72	<0.045	<0.063	<0.033	-	-	-	-
OCDF	-		-	-	-	1.07	<0.060	-	-	<0.31	<0.050	<0.041	<0.036	-	-	-	-
Total-TCDF	-		-	-	-	2.08	<0.069	-	-	2.69	0.149	1.59	0.121	-	-	-	-
Total-PeCDF	-		-	-	-	<0.21	<0.034	-	-	2.67	0.381	1.14	0.333	-	-	-	-
Total-HxCDF	-		-	-	-	0.43	<0.059	-	-	0.55	0.068	0.163	0.082	-	-	-	-
Total-HpCDF	-		-	-	-	<0.76	<0.048	-	-	<0.41	<0.045	<0.063	<0.033	-	-	-	-
Upper Bound PCDD/F TEQ	4		-	-	-	0.803	0.182	-	-	0.743	0.122	0.205	0.072	-	-	-	-

Notes:

- CCME - Canadian Council of Ministers of the Environment Agricultural Guidelines, Canadian Environmental Quality Guidelines, 1999; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.
 - US EPA Eco-SSL - United States Environmental Protection Agency Ecological Soil Screening Level (US EPA 2010).
 - Grey highlight and bold** = indicates value exceeds selected screening value.
 - Italicize* = Detection limit greater than selected screening value.
 - LMW PAHs = low molecular weight polycyclic aromatic hydrocarbons. Calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene and phenanthrene.
 - HMW PAHs = high molecular weight polycyclic aromatic hydrocarbons. Calculated as the sum of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(b+j+k)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene and pyrene.
 - TEQ = concentration of the mixture of congeners, expressed as toxic equivalent of 2,3,7,8-TCDD; upper bound = full detection limits are used for non-detects.
- a. CCME guideline was used as screening value. If no CCME guideline was available, US EPA Eco-SSL value was used.
- < = below laboratory detection limit; % = percent; B(b)F = Benzo(b)fluoranthene; cm bgs = centimetres below ground surface; Cr3 = trivalent chromium; Cr6 = hexavalent chromium; FDA/FD = Field duplicate available/field duplicate; G = Generic; I = interim; mg/kg dwt = milligrams per kilogram in dry weight; Nap = naphthalene; ng/kg dwt = nanograms per kilogram in dry weight; QA/QC = Quality assurance/quality control; SC = Soil contact; SFI = Soil and food ingestion.



APPENDIX B

AIR QUALITY SCREENING

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Abbreviations

Abbreviation	Definition
-	No value
AAQC	Ambient Air Quality Criteria
ADJ	Adjusted
AQMS	Air Quality Management System
As ₂ O ₃	Arsenic trioxide
ATSDR	Agency for Toxic Substances and Disease Registry
BMC	Benchmark concentration
BMCL	Benchmark concentration lower confidence limit
BMD	Benchmark dose
BMDL	Benchmark dose level
CAAQS	Canadian Ambient Air Quality Standard
Cal EPA	California Environmental Protection Agency
Cal OEHHA	California Office of Environmental Health Hazard Assessment
CCME	Canadian Council of Ministers of the Environment
C	Carcinogenic
CNS	Central nervous system
CO	Carbon monoxide
COPC	Constituent of potential concern
Cr(0)	Zero valent chromium
Cr(II)	Divalent chromium
Cr(III)	Trivalent chromium
Cr(VI)	Hexavalent chromium
DAF	Dosimetric adjustment factor
e.g.	<i>exempli gratia</i> (for example)
ENR	Environment and Natural Resources
ESL	Effects Screening Level
F ₁	Filial generation 1 (offspring)
FEV ₁	Forced expiratory volume in one second
FVC	Forced vital capacity
GNWT	Government of Northwest Territories
HEC	Human equivalent concentration
HpCDD	Heptachlorodibenzo-p-dioxin
HpCDF	Hexachlorodibenzofuran
HQ	Hazard quotient
HxCDD	Hexachlorodibenzo-p-dioxin
HxCDF	Hexachlorodibenzofuran
i.e.	<i>id est</i> (that is)
ILCR	Incremental lifetime cancer risk
IQ	Intelligence quotient
IUR	Inhalation unit risk

Abbreviation	Definition
LOAEL	Lowest Observed Adverse Effect Level
MnO ₂	Manganese dioxide
MRL	Minimal Risk Levels
n	Number of samples/subjects
NC	Non-carcinogenic
NAAQO	National Ambient Air Quality Objectives
NAAQS	National Ambient Air Quality Standards
Ni(OH) ₂	Nickel (II) hydroxide
NiO	Nickel oxide
NiSO ₄	Nickel sulphate
NO ₂	Nitrogen dioxide
NOAEL/UF	No observed adverse effect level/uncertainty factor
NWT	Northwest Territories
O ₃	Ozone
OCDD	Octachlorodibenzodioxin
OCDF	Octachlorodibenzofuran
OMOE	Ontario Ministry of the Environment
PBPK	Physiologically based pharmacokinetic modelling
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated dibenzofuran
PEF	Potency equivalence factor
PM _{2.5}	Particulate matter with a mean aerodynamic diameter of 2.5 microns (µm) or smaller
PM ₁₀	Particulate matter with a mean aerodynamic diameter of 10 microns (µm) or smaller
POD	Point of departure
PPRTV	Provisional peer reviewed toxicity values
RDDR	Regional deposited dose ratio
RGDR	Regional gas dose ratio
REL	Reference Exposure Level
RfC	Reference concentration
RSL	Regional Screening Level
SO ₂	Sulphur dioxide
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofuran
TCEQ	Texas Commission on Environmental Quality
TEF	Toxic equivalency factor
TERA	Toxicology Excellence for Risk Assessment
TSP	Total suspended particulate
US	United States
US EPA	United States Environmental Protection Agency
WHO	World Health Organization

Units of Measure

Unit	Definition
~	Approximately
=	Equals
>	Greater than
%	Percent
±	Plus/minus
µg/dL	Microgram per decilitre
µg/kg/day	Microgram per kilogram per day
µg/L	Microgram per litre
µg/m ³	Microgram per cubic metre
g/mol	Gram per mol
kg	Kilogram
m ³	Cubic metre
mg/kg/day	Milligram per kilogram per day
mg/m ³	Milligram per cubic metre
ng/kg	Nanogram per kilogram
ng/m ³	Nanogram per cubic metre
pg/kg/day	Picogram per kilogram per day
ng/m ³	Picogram per cubic metre
ppb	Parts per billion
ppm	Parts per million

B1 INTRODUCTION

This appendix provides the screening values used in the chemical screening process to identify constituents of potential concern (COPCs) in support of the acute and chronic inhalation assessments as part of the human health risk assessment for the Environmental Assessment for the Jay Project. The results of the air quality screening are also provided in this appendix.

B2 SCREENING VALUES USED IN THE HUMAN HEALTH AIR QUALITY RISK ASSESSMENT

B2.1 Air Quality Assessment – Acute Inhalation Thresholds

As part of the short-term human health inhalation risk assessment screening process, predicted 1-hour and 24-hour concentrations of substances expected to be emitted by the Project during construction (Construction Case) and operations (Application Case) were compared to selected 1-hour and 24-hour health-based thresholds, respectively. The 1-hour and 24-hour health-based thresholds were preferentially obtained from the following agencies:

- Northwest Territories (NWT) Ambient Air Quality Guidelines;
- Canadian Council of Ministers of the Environment (CCME);
- Agency for Toxic Substances and Disease Registry (ATSDR);
- US EPA National Ambient Air Quality Standards (NAAQS); and,
- World Health Organization (WHO).

The lowest health-based threshold with supporting information was generally selected for use in the screening process. Consideration was also given to relevant species (i.e., human data versus animal data), study endpoint, quality and date of the study.

Where a health-based screening threshold was not available from the agencies listed above, available health-based thresholds from the following agencies were used:

- Ontario Ministry of the Environment (OMOE);
- California Office of Environmental Health Hazard Assessment (Cal OEHHA); and,
- Texas Commission on Environmental Quality (TCEQ).

Priority was given to health-based screening levels that had supporting documentation.

Further information on the thresholds used in the screening process is provided below.



Northwest Territories

The NWT Department of Environment and Natural Resources (ENR) has developed a 'Guideline for Ambient Air Quality Standards in the Northwest Territories', dated February 2014, which includes standards for the following substances: carbon monoxide (CO), fine particulate matter (PM_{2.5}), ground level ozone (O₃), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and total suspended particulate (TSP). The Guideline was established under the Government of the Northwest Territories' (GNWT) Environmental Protection Act, and sets ambient air standards for the maximum concentrations of CO, PM_{2.5}, O₃, NO₂, SO₂, and TSP acceptable in the NWT. The standards are established at levels intended to protect human health and the environment; however, ENR indicates that due to the non-threshold nature of O₃ and PM_{2.5}, the standards for those contaminants are not to be considered as completely protective of human health (GNWT-ENR 2014). The standards are to be used to determine the acceptability of emissions from proposed and existing developments, and for reporting on the state of air quality in the NWT (GNWT-ENR 2014).

The SO₂, CO, NO₂, and TSP standards were adopted from the Canadian National Ambient Air Quality Objectives (NAAQO; described below), while the O₃ and PM_{2.5} standards were adopted from the Canadian Ambient Air Quality Standards (CAAQS).

Canadian Council of Ministers of the Environment

Air quality in Canada is regulated by standards set by the CCME, an inter-governmental body of federal, provincial, and territorial ministers responsible for the environment. In 2012, a Canada-wide Air Quality Management System (AQMS), an approach for reducing air pollution in Canada, was implemented, and is the product of collaboration by the federal, provincial, and territorial governments and stakeholders. The CAAQS, which are established as objectives under the Canadian Environmental Protection Act (1999), have been developed for PM_{2.5} and O₃, and in May 2013, replaced the Canada-wide Standards for Particulate Matter and Ozone.

The CCME has developed NAAQOs, which are health-based air quality objectives for pollutant concentrations in outdoor air. NAAQOs have been developed for CO, NO₂, and SO₂ (CCME 1999). Three levels of NAAQOs have been established: 1) maximum desirable levels (long-term goal for air quality and a basis for an anti-degradation policy for the unpolluted parts of the country and for the continuing development of control technology); 2) maximum acceptable levels (intended to provide adequate protection against adverse effects on soil, water, vegetation, materials, animals, visibility, personal comfort, and well-being); and, 3) maximum tolerable levels (air contaminant concentrations that require mitigation to avoid further deterioration to an air quality that endangers the prevailing Canadian lifestyle, or that pose a substantial risk to human health) (Health Canada 1994).

Agency for Toxic Substances and Disease Registry

The ATSDR is a federal public health agency of the US Department of Health and Human Services. The ATSDR derives Minimal Risk Levels (MRLs) for non-carcinogenic health effects (ATSDR 2013). The MRLs are based on data that identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration for a given route of exposure to the substance. The ATSDR generally uses the No Observed Adverse Effect Level/Uncertainty Factor (NOAEL/UF) approach to derive MRLs. Physiologically based pharmacokinetic (PBPK) modelling and benchmark dose (BMD) modelling have also been used in deriving MRLs. The MRLs are set below levels that may cause adverse health effects in sensitive subpopulations of people. The acute MRLs are derived for exposure durations of 1 to 14 days.

The ATSDR MRLs are generally based on the most sensitive endpoint considered to be of relevance to humans. The ATSDR applies a protective approach (i.e., application of margins of safety) to address uncertainty in particular for people who might be most sensitive (e.g., infants, elderly and nutritionally or immunologically compromised). Supporting documentation was available for the MRLs used in this assessment.

United States Environmental Protection Agency National Ambient Air Quality Standards

The US EPA has developed NAAQS for widespread pollutants that are considered harmful to human health as part of the Clean Air Act. The six criteria pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM_{2.5} and PM₁₀), and sulphur dioxide. A primary and/or secondary standard is set for each of the criteria pollutants. Primary standards are intended to protect sensitive populations, including children, the elderly, and those with pre-disposed respiratory illnesses (e.g., asthma). Secondary standards are intended to be protective of public welfare (e.g., damage to animals, crops, vegetation, and buildings).

World Health Organization

The WHO has developed air quality guidelines to provide a basis for protecting public health from adverse effects of air pollution. The guidelines are intended to provide background information and guidance to governments in making risk management decisions, particularly in setting standards. These guidelines are also used in planning processes and various kinds of management decisions at a community or regional level. Supporting documentation was provided for all WHO guidelines.

The WHO air quality guidelines are provided in the following documents:

- WHO (2000) – Air quality guidelines for Europe, 2nd Edition. WHO Regional Publications, European Series, No. 91.
- WHO (2006) - Air Quality Guidelines. Global Update 2005. Particulate matter, ozone, nitrogen dioxide, and sulfur dioxide.

Ontario Ministry of the Environment

In the province of Ontario, the OMOE has developed Ambient Air Quality Criteria (AAQC; OMOE 2012), which may be used in environmental assessments to assess air quality. An AAQC is a desirable concentration of a contaminant in air, based on protection against adverse effects on health or the environment. The AAQC are set with different averaging times (e.g., 24-hour, 1-hour and 10 minutes) appropriate for the effect that they are intended to protect against. The effects considered may be health, odour, vegetation, soiling, visibility, corrosion, or other effects.

The OMOE has also derived air quality standards used to assess emissions from non-mobile sources of air pollution in Ontario. The Ontario air quality standards are desirable concentrations of air contaminants set at levels protective of the natural environment and sensitive populations (e.g., children, the elderly). The OMOE considers available toxicological information and supporting environmental information to establish effects-based air standards based on the limiting or critical effect(s) (health or environmental considerations) of that chemical.

California Office of Environmental Health Hazard Assessment

The Cal OEHHA Reference Exposure Levels (RELs) are concentrations of a chemical at or below which adverse non-carcinogenic health effects are not anticipated to occur for a specified exposure duration (Cal OEHHA 2014a). The RELs are used in risk assessments to evaluate the potential for adverse non-carcinogenic public health effects from facility emissions or similar localized sources in the Air Toxics Hot Spots Program, and from widespread exposures in the Toxic Air Contaminants program. The REL is an exposure at or below which adverse non-carcinogenic health effects are not expected to occur in a human population, including sensitive subgroups (e.g., infants and children). Supporting documentation was available for most of the RELs.

Texas Commission on Environmental Quality

The TCEQ has developed acute (1-hour) Effects Screening Levels (ESLs) that are used in the air permitting process to evaluate short-term emissions predicted by air dispersion modelling. The TCEQ has developed a guidance document titled "TCEQ Guidelines to Develop Toxicity Factors" (TCEQ 2012a) that outlines the approach and methods used to derive the ESLs, and their application. The short-term ESLs are based on health effects, the potential for odours to be a nuisance, effects on vegetation, and corrosive effects. The ESLs are used in the air permit review process, for review of air permit applications, where emissions of one constituent from one site are evaluated at a time (emissions from multiple sites or multiple chemicals are not evaluated). Health-based ESLs are typically set based on occupational exposure limits divided by safety factors to protect the general population. If occupational exposure limits were not available, chemical-specific ESLs are derived using standard toxicity methods or based on structural similarity to chemicals with existing ESLs.

TCEQ adjusts short-term reference values to a hazard quotient (HQ) of 0.3 to derive ESLs protective of cumulative and aggregate exposure. Other jurisdictions do not typically use an HQ approach in their derivation of short-term exposure limits or thresholds. The TCEQ ESLs (which are based on an HQ of 0.3) were conservatively used in the screening process without HQ adjustment (to an HQ of 1.0). However, in cases where TCEQ used the same primary study as another jurisdiction in their derivation of an ESL, preference was given to screening thresholds that had not been HQ adjusted.

The TCEQ has also developed acute (24-hour) reference values for benzene, 1,3-butadiene and formaldehyde, for evaluating 24-hour air monitoring data for possible health concerns. The TCEQ has developed a guidance document titled “TCEQ Guidelines to Develop 24-Hour Inhalation Reference Values” (TCEQ 2014a) that outlines the approach and methods used to derive the 24-hour reference values and their application (TCEQ 2014a). The 24-hour reference values are derived for the protection of human health associated with threshold dose-response relationships (typically effects other than cancer) and are defined as “an estimate of an inhalation exposure concentration that is likely to be without an appreciable risk of adverse effects to the human population (including susceptible subgroups) for a single 24-hour exposure” (TCEQ 2014a).

Selected Screening Thresholds and Constituent of Potential Concern Screening Process

The available acute inhalation 1-hour and 24-hour health-based thresholds and the basis of these thresholds are presented in Tables B-1 and B-2, respectively. The thresholds selected for use in the screening process are bolded and shaded in the tables.

The COPCs were identified as those substances in the Application Case that both exceeded the acute inhalation threshold and exhibited a 10% or greater increase above the baseline concentration at any location evaluated in the acute inhalation assessment.

Comparison to regulatory threshold values was considered to represent a conservative evaluation of the potential for the predicted concentrations to elicit adverse effects. Comparison to 10% above baseline concentrations was considered to represent a conservative evaluation of whether a measureable project-related impact on environmental quality was likely to occur. Given temporal variability, variability in sampling and laboratory methods, and the uncertainty inherent in estimates from air quality models, a predicted increase of less than 10% above baseline concentrations was considered unlikely to reflect a meaningful project-related change in environmental quality.

The baseline and predicted 1-hour and 24-hour air concentrations for the Construction Case and Application Case and results of the screening process, are provided in Table B-3 (1-hour Construction Case), Table B-4 (1-hour Application Case), Table B-5 (24-hour Construction Case), and Table B-6 (24-hour Application Case).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Acid Gases and Particulate Matter											
Carbon monoxide (CO)	15,000	15,000	35,000	-	-	40,000 (35 ppm)	30,000	36,200	23,000	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
											CCME NAAQO: Supporting documentation not available.
											US NAAQS: Threshold based on clinical evidence relating carboxyhemoglobin (carbon monoxide bound to blood hemoglobin) levels to various adverse health endpoints. The NAAQS of 35 ppm was converted to µg/m³ using a molecular weight of 28.01 g/mol.
											WHO: Threshold based on a maximum concentration of 2.5% carboxyhemoglobin in blood to protect non-smoking, middle-aged and elderly population groups with coronary artery disease, and to protect fetuses of non-smoking pregnant women.
											OMOE: Threshold based on a health endpoint (supporting document not available).
											Cal OEHHA: Threshold based on effects of angina in people with known cardiovascular diseases that are exercising heavily.
Nitrogen dioxide (NO₂)	400	-	400	1000	-	190 (100 ppb)	200	400	470	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
											CCME NAAQO: Supporting documentation not available.
											US NAAQS: Threshold based on 3-year average of the 98th percentile of yearly 1-hour daily maximum concentrations. The NAAQS is protective of a broad range of respiratory effects in sensitive populations, such as those with asthma and those who spend time near major roadways. The NAAQS of 100 ppb was converted to µg/m³ using a molecular weight of 46.01 g/mol.
											WHO: Threshold based on studies of bronchial responsiveness among asthmatics.
											OMOE: Threshold based on a health endpoint (supporting document not available).
Sulphur dioxide (SO₂) (10-minute)	-	-	-	-	26 (0.01 ppm)	-	500	-	-	-	ATSDR: The minimal risk level was based on a minimal lowest observable adverse effect level (LOAEL) of 0.1 ppm for bronchoconstriction in exercising asthmatics (Sheppard et al., 1981; as cited in ATSDR 1998). Uncertainty factors of 3 for use of LOAEL and 3 for human variability were applied to derive the minimal risk level. The minimal risk level of 0.01 ppm was converted to µg/m³ using a molecular weight of 64.07 g/mol. The minimal risk level for a 10 minute averaging time.
											WHO: Threshold based on changes in pulmonary function and respiratory symptoms in exercising asthmatics after periods of exposure as short as 10 minutes. WHO recommends that a value of 0.5 mg/m³ not be exceeded over a 10-minute averaging time. WHO considered the minimum concentration associated with adverse effects in 'extreme' circumstances (i.e., asthmatic patients exercising in chambers). The WHO threshold was selected because it was health based and considered several studies in sensitive individuals, was derived more recently than the ATSDR value, and considered the results of the study used in the derivation of the ATSDR value.
Sulphur dioxide (SO₂) (1-hour)	450	450	900	-	-	200 (75 ppb)	-	690	660	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
											CCME NAAQO: Supporting documentation not available.
											US NAAQS: Threshold based on epidemiological evidence of increased emergency department visits and hospitalizations associated with sulphur dioxide concentrations in the range of 75 to 150 ppb. The NAAQS of 75 ppb was converted to µg/m³ using a molecular weight of 64.07 g/mol.
											OMOE: Threshold based on health and vegetation endpoints (supporting document not available).
											Cal OEHHA: Threshold based on impairment of airway function (bronchoconstriction) especially in asthmatics. After reviewing human several studies on acute exposures of normal, asthmatic, and atopic individuals to low concentrations of SO₂ (0.25 - 2.0 ppm), Cal OEHHA staff concluded that exposure to 0.25 ppm, the California Ambient Air Quality Standard (CAAQS) for SO₂, would not result in respiratory effects causing discomfort in sensitive individuals exposed for one hour. The CAAQS for SO₂ is intended to protect sensitive individuals (i.e., exercising asthmatics) from lower respiratory effects of acute exposure. The Cal OEHHA staff concluded that an exposure concentration of 0.25 ppm SO₂ for 1-hour is comparable to a NOAEL in sensitive individuals. It was determined by CalOEHHA that the NOAEL would be protective of asthmatic individuals because adverse effects are consistently observed only at higher concentrations with participants undertaking moderate exercise and there is also an inconsistency in response to SO₂ exposure at lower concentrations.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Metals											
Aluminum	-	-	-	-	-	-	-	-	-	20; 50	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as aluminum soluble salts and aluminum chloride in PM ₁₀ .
Antimony	-	-	-	-	-	-	-	-	-	5	TCEQ: Threshold based on health (interim, supporting documentation not available), as PM ₁₀ .
Arsenic	-	-	-	-	-	-	-	-	0.2	3	Cal OEHHA: Threshold based on a study by Nagymajtenyi et. al. (1985; as cited in Cal OEHHA 2014b) which found decreased fetal weight in mice following maternal inhalation of As₂O₃ for 4 hours/day during gestation days 9 to 12. A LOAEL of 0.26 mg/m³ and an uncertainty factor of 1,000 (10 for no NOAEL value, 10 for interspecies differences between mice and humans, and 10 for human interindividual differences) were used. TCEQ: Threshold based on a study by Holson (1999; as cited in TCEQ 2012b) which found maternal toxicity (rales which are an abnormal respiratory sound) in female rats exposed to arsenic trioxide via inhalation for 6 hours/day from gestation days 6 to 15. The NOAEL was 3,000 µg/m³, extrapolated to a 1-hour exposure (5,451 µg/m³), and adjusted for a human equivalent concentration (HEC) (3,891 µg/m³). An uncertainty factor of 300 (3 for interspecies variation, 10 for intraspecies variation and 10 for an incomplete database) was applied. The health-based threshold was adjusted for arsenic because arsenic trioxide was the exposure chemical. The threshold was multiplied by the molecular weight fraction of arsenic in As₂O₃ (76%; As = 2 × 74.9 g/mol, As₂O₃ = 197.8 g/mol; 9.86 µg/m³) and divided by 3.3 to adjust to an HQ of 0.3. A peer review organized by Toxicology Excellence for Risk Assessment (TERA; 2009) suggests that the study by Nagymajtenyi et al. (1985) from which the most conservative threshold of 0.2 µg/m³ was derived, is not an adequate study from which to develop an acute threshold. The panel cited a lack of reliability in the study design as well as a lack of adequate documentation in Nagymajtenyi et al. (1985). The panel instead supports the use of the Holson (1999) study in deriving the 1-hour arsenic threshold. Therefore, based on the TERA (2009) review, the TCEQ threshold which was derived from the Holson (1999) study was used in this assessment.
Barium	-	-	-	-	-	-	-	-	-	5	TCEQ: Threshold based on health (interim, supporting documentation not available), for barium and compounds as PM ₁₀ .
Beryllium	-	-	-	-	-	-	-	-	-	0.02	TCEQ: Threshold based on health (interim, supporting documentation not available), for beryllium as a particulate.
Cadmium	-	-	-	-	-	-	-	-	-	0.1	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as cadmium and compounds in PM ₁₀ .
Chromium	-	-	-	-	-	-	-	-	-	Cr(III) = 3.6	TCEQ: Threshold of 3.6 µg/m ³ for trivalent chromium based on increased acid phosphatase activity in lavage fluid and increased acid phosphatase and beta-glucuronidase activity in lung tissue (precursor to adverse effects) in hamsters exposed to chromium chloride (via inhalation) for 30 minutes. The NOAEL was 77 mg/m ³ and extrapolated to a 1-hour exposure (38.5 mg/m ³). The human equivalent concentration was 10.82 mg/m ³ , adjusted to an HQ = 0.3, and an uncertainty factor of 300 (3 for interspecies variability, 10 for intraspecies variability and 10 for an incomplete database) was applied.
										Cr(VI) = 0.1	TCEQ: Threshold of 0.1 µg/m ³ for hexavalent chromium is based on a health endpoint (under review, supporting documentation not available). In the absence of speciation information for the chromium emitted by the Project, it was conservatively assumed that chromium was in the hexavalent form, and therefore, predicted concentrations were screened against the threshold for hexavalent chromium.
Cobalt	-	-	-	-	-	-	-	-	-	0.2	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as cobalt and inorganic compounds in PM ₁₀ .
Copper	-	-	-	-	-	-	-	-	100	10	Cal OEHHA: Threshold based NOAEL of 1 mg copper/m³ in a study where workers indicated exposure to copper dust was detectable by taste but no other symptoms occurred following exposure to 1 to 3 mg/m³ copper for an unspecified amount of time (Whitman 1957; as cited in Cal OEHHA 2008). No time extrapolation was applied because the exposure duration was not clearly specified in the reports. An uncertainty factor for intraspecies variability (10) was applied. TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as copper dusts and mists.
Iron	-	-	-	-	-	-	-	-	-	50; 10	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as iron oxide (50 µg/m ³) and as iron (III) sulfate (10 µg/m ³ , as soluble iron salt) in PM ₁₀ .
Lead	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold is not available. Acute exposure will be assessed under the 24-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Manganese	-	-	-	-	-	-	-	-	-	2	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as dust and inorganic compounds in PM ₁₀ .

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Mercury	-	-	-	-	-	-	-	-	0.6	0.25	Cal OEHHA: Threshold based on central nervous system (CNS) disturbances in rat offspring. Maternal rats were exposed to metallic mercury vapour (1.8 mg/m³) for 3 hours/day during gestation. The offspring displayed significant dose-dependent deficits in behaviour 3 to 7 months after birth compared to controls. The behaviours measured included spontaneous motor activity, performance of a spatial learning task, and habituation to the automated test chamber. An uncertainty factor of 3000 (10 for using LOAEL for moderate to severe effects in the absence of a NOAEL, 3 for interspecies toxicokinetic differences, 10 for interspecies toxicodynamic differences, 3 for individual variability, and 3 for intraspecies differences in age differences) was used. TCEQ: Threshold based on a health effects (interim, supporting documentation not available) as mercury metal and inorganic mercury forms in PM₁₀).
Molybdenum	-	-	-	-	-	-	-	-	-	30	TCEQ: Threshold based on health (interim, supporting documentation not available) as molybdenum in PM₁₀.
Nickel	-	-	-	-	-	-	-	-	0.2	0.33	Cal OEHHA: Threshold based on a mild effect of depressed antibody response in mice, exposed for 2 hours to nickel and nickel compounds. The 2-hour benchmark dose level (BMDL) was 165 µg/m³ and was extrapolated to a 1 hour concentration of 233 µg/m³. An uncertainty factor of 1,000 (3 for benchmark response uncertainty, 10 for interspecies differences, and 30 for intraspecies differences) was applied. TCEQ: Threshold based on significant bronchial constriction in 12 metal plating factory workers with occupational asthma exposed to an aerosol of 0.3 mg/m³ of nickel sulfate (67 µg nickel/m³) for 30 minutes. The exposure concentration was extrapolated to 1 hour (33.5 µg nickel/m³) and an uncertainty factor of 30 (10 for using a LOAEL and 3 for an incomplete database) was applied. The resulting concentration (1.1 µg nickel/m³) was divided by 3.3 to adjust to an HQ = 0.3. The TCEQ value was selected preferentially over the Cal OEHHA value because the threshold is based on a human study.
Selenium	-	-	-	-	-	-	-	-	-	2	TCEQ: Threshold based on health (interim, supporting documentation not available), as selenium and compounds in PM₁₀
Silver	-	-	-	-	-	-	-	-	-	0.1	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as silver metal and compounds in PM₁₀.
Strontium	-	-	-	-	-	-	-	-	-	20	TCEQ: Threshold based on health (interim, supporting documentation not available) as strontium and compounds in PM₁₀.
Tellurium	-	-	-	-	-	-	-	-	-	1	TCEQ: Threshold based on health (interim, supporting documentation not available) based on tellurium and compounds, as PM₁₀.
Thallium	-	-	-	-	-	-	-	-	-	1	TCEQ: Threshold based on health (interim, supporting documentation not available), as thallium and compounds in PM₁₀.
Titanium	-	-	-	-	-	-	-	-	-	50	TCEQ: Threshold based on health (interim, supporting documentation not available), as PM₁₀.
Tungsten	-	-	-	-	-	-	-	-	-	50; 10	TCEQ: Threshold based on health (interim, supporting documentation not available) as insoluble particulate tungsten compounds (50 µg/m³) and soluble particulate tungsten compounds (10 µg/m³).
Uranium	-	-	-	-	-	-	-	-	-	2; 0.5	TCEQ: Threshold based on health (interim, supporting documentation not available), 0.002 mg/m³ as insoluble uranium compounds and 0.0005 mg/m³ as soluble uranium compounds (both as PM₁₀).
Vanadium	-	-	-	-	-	-	-	-	30	0.5	Cal OEHHA: Threshold based on respiratory effects (increased respiratory mucus production that was cleared by coughing) in humans exposed to vanadium pentoxide for 8 hours. The LOAEL was 0.25 mg/m³ and the NOAEL was 0.1 mg/m³. The equivalent 1-hour concentration determined to be 0.3 mg/m³ using the following equation: C² = [0.1 mg/m³]² * 8 hours/1 hour). An uncertainty factor of 10 was applied (1 for use of a LOAEL, 1 for interspecies variation, and 10 for intraspecies variation). TCEQ: Threshold based on health effects (interim, supporting documentation not available), as vanadium and compounds (vanadium pentoxide) in PM₁₀.
Zinc	-	-	-	-	-	-	-	-	-	20	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as zinc and compounds in PM₁₀.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Polycyclic Aromatic Hydrocarbons											
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	30	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	30	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
1-Methylphenanthrene Surrogate: phenanthrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on phenanthrene as a surrogate.
2-Methylphenanthrene Surrogate: phenanthrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on phenanthrene as a surrogate.
3-Methylphenanthrene Surrogate: phenanthrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on phenanthrene as a surrogate.
4-Methylphenanthrene (surrogate: phenanthrene)	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on phenanthrene as a surrogate.
9-Methylphenanthrene (surrogate: phenanthrene)	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on phenanthrene as a surrogate.
1-Nitropyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylanthracene Surrogate: anthracene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on anthracene as a surrogate.
2-Methylfluorene Surrogate: fluorene	-	-	-	-	-	-	-	-	-	10	TCEQ: Threshold based on fluorene as a surrogate.
2-Methylpyrene Surrogate: pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on pyrene as a surrogate.
3-Methyldibenzothiophene Surrogate: dibenzothiophene	-	-	-	-	-	-	-	-	-	25	TCEQ: Threshold based on dibenzothiophene as a surrogate.
4-Methyldibenzothiophene Surrogate: dibenzothiophene	-	-	-	-	-	-	-	-	-	25	TCEQ: Threshold based on dibenzothiophene as a surrogate.
Acenaphthene	-	-	-	-	-	-	-	-	-	1	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Acenaphthylene Surrogate: acenaphthene	-	-	-	-	-	-	-	-	-	1	TCEQ: Threshold based on acenaphthene as a surrogate.
Acephenanthrylene Surrogate: benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on benzo(b)fluoranthene as a surrogate.
Anthracene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Benz(a)anthracene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Benzo(a)fluorene Surrogate: chrysene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on chrysene as a surrogate.
Benzo(a)pyrene	-	-	-	-	-	-	-	-	-	0.03	TCEQ: Threshold based on a health endpoint (under review, supporting documentation not available) in PM ₁₀ .
Benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Benzo(e)pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Benzo(g,h,i)fluoranthene Surrogate: benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on benzo(g,h,i)perylene as a surrogate.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Benzo(k)fluoranthene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Chrysene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Coronene Surrogate: benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on benzo(g,h,i)perylene as a surrogate.
Cyclopenta(c,d)pyrene Surrogate: benzo(a)pyrene	-	-	-	-	-	-	-	-	-	0.03	TCEQ: Threshold based on benzo(a)pyrene as a surrogate.
Dibenzo(a,h)anthracene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Dibenzothiophene	-	-	-	-	-	-	-	-	-	25	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Fluoranthene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Fluorene	-	-	-	-	-	-	-	-	-	10	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Indeno(1,2,3-cd)fluoranthene Surrogate: indeno(1,2,3-cd)pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint, as indeno(1,2,3-cd)pyrene (interim, supporting documentation not available).
Indeno(1,2,3-cd)pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on health (interim, supporting documentation not available).
Indeno(1,2,3-W)pyrene Surrogate: indeno(1,2,3-cd)pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint, as indeno(1,2,3-cd)pyrene (interim, supporting documentation not available).
Naphthalene Surrogate: 2-methyl naphthalene	-	-	-	-	-	-	-	-	-	30	TCEQ: Threshold based on a health endpoint, as 2-methylnaphthalene (interim, supporting documentation not available). A 1-hour threshold for naphthalene was available but based on an odour endpoint.
Perylene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) in PM ₁₀ .
Phenanthrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Picene Surrogate: dibenzo(a,h)anthracene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on dibenzo(a,h)anthracene as a surrogate.
Pyrene	-	-	-	-	-	-	-	-	-	0.5	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Biphenyl (surrogate: methyl biphenyl)	-	-	-	-	-	-	-	-	-	10	TCEQ: Threshold based on health, as methyl biphenyl (interim, supporting documentation not available).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Volatile Organic Compounds											
Benzene	-	-	-	-	-	-	-	-	27	170	Cal OEHHA: Threshold based on decreased early nucleated red cell counts in pregnant female mice exposed to benzene via inhalation for 6 hours/day for 10 days during days 6-15 of gestation). The LOAEL was 16 mg/m³ (5 ppm) and an uncertainty factor of 600 (10 for LOAEL to NOAEL conversion, 2 for interspecies differences and 30 for intraspecies differences) was applied. TCEQ: Threshold based on depressed peripheral lymphocytes and depressed mitogen-induced blastogenesis of femoral B-lymphocytes in mice exposed to benzene for 6 hours/day for 6 days via inhalation. The LOAEL was 10.2 ppm (32.6 mg/m³) and adjusted for a 1-hour exposure (18.5 ppm or 59.1 mg/m³). The human equivalent concentration (HEC) was 18.5 ppm (59.1 mg/m³) and an uncertainty factor of 100 (3 for interspecies extrapolation, 10 for intraspecies variation and 3 for using a LOAEL) was applied, resulting in a value of about 180 ppb or 0.58 mg/m³ (HQ = 1.0). The value for HQ = 0.3 is shown (170 µg/m³) and was derived by dividing the concentration of 0.58 mg/m³ by 3.3.
Ethylbenzene	-	-	-	-	-	-	-	-	-	26,000	TCEQ: Threshold based on ototoxicity (damage to the ear) in rats exposed to ethylbenzene for 8 hours/day for 5 days. The NOAEL was 1,303 mg/m³ (300 ppm) and the 1-hour point of departure [human equivalent concentration] (POD_{HEC}) was 2,605 mg/m³ (600 ppm). An uncertainty factor of 30 (3 for interspecies differences and 10 for intraspecies differences) was applied to derive a threshold of 86.8 mg/m³ (HQ = 1). The concentration was divided by 3.3 to adjust to an HQ = 0.3.
n-Propylbenzene Surrogate: ethylbenzene	-	-	-	-	-	-	-	-	-	26,000	TCEQ: Threshold based on ethylbenzene as a surrogate.
1,2,4-Trimethylbenzene	-	-	-	-	-	-	-	-	-	1250	TCEQ: Threshold based on a health endpoint, as trimethylbenzene (interim, supporting documentation not available).
1,3,5-Trimethylbenzene Surrogate: trimethylbenzene	-	-	-	-	-	-	-	-	-	1250	TCEQ: Threshold based on a health endpoint, as trimethylbenzene (interim, supporting documentation not available).
Indanone (surrogate: indane)	-	-	-	-	-	-	-	-	-	480	TCEQ: Threshold based a health endpoint, as indane (interim, supporting documentation not available).
Toluene	-	-	-	-	-	-	-	-	37,000	4,500	Cal OEHHA: Threshold based on impaired reaction time and symptoms of headaches, dizziness and a feeling of intoxication, and slight eye and nose irritation. Sixteen young, healthy males exposed to 369 mg/m³ (98 ppm) for 6 hours experienced impaired reaction time and symptoms of headache, dizziness, a feeling of intoxication, and slight eye and nose irritation. The LOAEL was determined to be 100 ppm (377 mg/m³) and the NOAEL to be 40 ppm (151 mg/m³). An uncertainty factor of 10 (1 for using a LOAEL, 1 for interspecies variability, and 10 for intraspecies variability) was applied. TCEQ: Threshold based on eye and nose irritation, increased occurrence of headache, dizziness, and intoxication in human male volunteers exposed to toluene for 6 hours/day for 4 days. The NOAEL was 150.7 mg/m³ (40 ppm) and the extrapolated 1-hour concentration was also 150.7 mg/m³ (40 ppm). An uncertainty factor of 10 (intraspecies differences) was applied. The resulting concentration (15 mg/m³; HQ = 1.0) was adjusted to an HQ = 0.3 by dividing it by 3.3, resulting in a threshold of 4.5 mg/m³. (A 1-hour threshold of 3.5 mg/m³ is available for toluene, but it is based on odour, not on health effects.)The TCEQ threshold is based on the same study as that which the Cal OEHHA used to derive the REL; however, the threshold was derived using an HQ of 0.3 and a NOAEL instead of a LOAEL. While preference is given to a threshold derived based on an HQ of 1.0 when different agencies use the same principal study, the TCEQ value was chosen because it was based on a NOAEL rather than a LOAEL.
m-Ethyltoluene	-	-	-	-	-	-	-	-	-	89	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
p-Ethyltoluene (surrogate: m-ethyltoluene)	-	-	-	-	-	-	-	-	-	89	TCEQ: Threshold based on m-ethyltoluene as a surrogate. (The 1-hour threshold for p-ethyltoluene is based on an odour endpoint.)
Ethylene	-	-	-	-	-	-	-	-	-	170,000	TCEQ: Threshold based on hepatic effects to male rats following 4 hours of exposure. A free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 57,400 mg/m³ (50,000 ppm) was adjusted for human equivalency and a total uncertainty factor of 100 (3 for interspecies variability, 10 for intraspecies variability, and 3 for an incomplete database) was applied. The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 570,000 µg/m³ (500,000 ppb) by 3.3, resulting in a value of 170,000 µg/m³ (150,000 ppb).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
1,1,1-Trichloroethane (methyl chloroform)	-	-	-	-	10,900 (2 ppm)	-	-	-	68,000	2,800	ATSDR: Threshold based on neurological effects (decreased performance in psychomotor tests) in 12 male volunteers exposed to 1,1,1-trichloroethane for 3.5 hours. Impairment of psychomotor performance was detected as soon as 20 minutes after exposure. A LOAEL of 175 ppm (955 mg/m³) was not adjusted for continuous exposure (as blood levels of 1,1,1-trichloroethane approach a steady state during 2 hours of continuous exposure in humans) but an uncertainty factor of 100 (10 for using a LOAEL and 10 for human variability) was applied. The minimal risk level of 2 ppm was converted to µg/m³ using a molecular weight of 133.4 g/mol. Cal OEHHA: Threshold based on human volunteers exposed for 30 minutes and a reduced performance in manual dexterity, perceptual speed and reaction time. The NOAEL was 250 ppm (1,364 mg/m³) and adjusted for a 1-hour exposure (682 mg/m³). An uncertainty factor of 10 (for intraspecies variability) was applied. TCEQ: Threshold based on impaired psychomotor performance in 12 adult volunteers exposed for 3.5 hours. Impaired psychomotor performance was observed around 20 to 45 minutes. The LOAEL was 175 ppm (955 mg/m³). The extrapolated 1-hour concentration was 175 ppm (exposure duration adjustment from 20 - 45 minutes to 1 hour was not conducted). An uncertainty factor of 100 (10 for intraspecies variation and 10 for using a LOAEL) was applied to the LOAEL. The resulting threshold was 1,700 ppb (9.5 mg/m³; HQ = 1.0). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 9.5 mg/m³ by 3.3, resulting in a value of 2.8 mg/m³ (510 ppb). The TCEQ threshold is based on the same study as that for which ATSDR derived a minimal risk level; however, the TCEQ threshold was derived using an HQ of 0.3. In cases where TCEQ used the same primary study as another jurisdiction in their derivation of an effects screening level, preference was given to screening thresholds derived based on an HQ of 1.0.
1,3-Butadiene	-	-	-	-	-	-	-	-	660	1,100 (6-hour)	Cal OEHHA: Threshold based on lowered male fetal weight at gestation day 18 when pregnant mice were exposed to 1,3-butadiene during gestation days 6 to 15. The NOAEL was 40 ppm (88.5 mg/m³) and the BMCL₀₅ (benchmark concentration level lower confidence limit corresponding to 5% incidence of effect level) was 17.7 ppm (39.2 mg/m³). The exposure duration was not adjusted but the human equivalent concentration (HEC) was calculated to be 29.7 ppm (65.7 mg/m³). An uncertainty factor of 100 (3 for uncertainty in interspecies toxicodynamics, 10 for uncertainty in intraspecies toxicokinetics and 3 for uncertainty in intraspecies toxicodynamics) was applied. TCEQ: Threshold based on a reduction in extragestational weight gain and fetal body weight in mice exposed on gestation days 6 to 15 for 6 hours/day. The point of departure (POD) was defined as the benchmark concentration level corresponding to the lower confidence limit (one standard deviation; BMCL_{1SD}) which was 113.5 mg/m³ (51.3 ppm) and was not adjusted for a 1-hour exposure because the critical effect was a maternal/developmental endpoint. The 6-hour human equivalent POD was 113.5 mg/m³ (51.3 ppm). An uncertainty factor of 30 (3 for interspecies differences and a 10 for intraspecies differences) was applied, resulting in a value of 3.7 mg/m³ (HQ = 1.0). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 3.7 mg/m³ by 3.3, resulting in a value of 1.1 mg/m³ (510 ppb). A 1-hour threshold of 0.51 mg/m³ was available but not used because it is based on an odour endpoint, not a health endpoint. The TCEQ threshold is based on the same study as that for which the Cal OEHHA derived a minimal risk level; however, the TCEQ threshold was derived using a different BMC model. To be conservative, preference was given to the lowest derived value.
2,2,4-Trimethylpentane Surrogate: 2,3,4-trimethylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on 2,3,4-trimethylpentane as a surrogate.
2,3,4-Trimethylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2,2-Dimethylbutane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2,3-Dimethylbutane Surrogate: 2,2-dimethylbutane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on 2,2-dimethylbutane as a surrogate. (The 1-hour threshold for 2,3-dimethylbutane is based on an odour endpoint.)
2,3-Dimethylhexane Surrogate: dimethylhexane, all isomers	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).
2,4-Dimethylhexane Surrogate: dimethylhexane, all isomers	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
2,5-Dimethylhexane Surrogate: dimethylhexane, all isomers	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).
2,3-Dimethylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2,4-Dimethylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methyl-1-butene Surrogate: 1-butene	-	-	-	-	-	-	-	-	-	19,000	TCEQ: Threshold based on 1-butene as a surrogate. Rats were exposed to 1-butene for 6 hours/day, 7 days/week for approximately 42 days and no health effects were observed in the parental or offspring generation. The free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 18,900 mg/m ³ (8,271 ppm) was adjusted using an uncertainty factor of 300 (3 for interspecies variation, 10 for intraspecies variation, and 10 for an incomplete database). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 62 mg/m ³ (27 ppm) by 3.3, resulting in a value of 19 mg/m ³ (8.1ppm).
3-Methyl-1-butene Surrogate: 1-butene	-	-	-	-	-	-	-	-	-	19,000	TCEQ: Threshold based on 1-butene as a surrogate. Supporting information on the study and threshold is provided above for 2-Methyl-1-butene.
2-Methyl-2-pentene	-	-	-	-	-	-	-	-	-	1,800	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylhexane Surrogate: 3-methylhexane	-	-	-	-	-	-	-	-	-	3,070	TCEQ: Threshold based on 3-methylhexane as a surrogate.
3-Methylhexane	-	-	-	-	-	-	-	-	-	3,070	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (under review, supporting documentation not available).
3-Methylpentane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
3-Ethylhexane Surrogate: ethylhexane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as ethylhexane (interim, supporting documentation not available).
Butane	-	-	-	-	-	-	-	-	-	66,000	TCEQ: Threshold based on a NOAEL where rats were exposed for 6 hours/day, 7 days/week for 2 weeks. A NOAEL of 9,197 ppm (21,862 mg/m ³) was identified and an uncertainty factor of 100 (3 for interspecies variability, 10 for intraspecies variability and 3 for an incomplete database) was applied to derive a threshold. The threshold was adjusted to an HQ = 0.3 by dividing the concentration by 3.3.
cis-2-Butene Surrogate: 2-butene	-	-	-	-	-	-	-	-	-	10,000	TCEQ: Threshold based on 2-butene as a surrogate. A NOAEL for decreased body weight was identified in female rats exposed to 2-butene for 6 hours/day, 7 days/week, for 39 to 46 days. The 6-hour NOAEL of 5682 mg/m ³ (2476 ppm) was adjusted to a 1-hour NOAEL of 10,320 mg/m ³ (4,499 ppm). An uncertainty factor of 300 (3 for interspecies variation, 10 for intraspecies variation, and 10 for an incomplete database) was applied and the resulting value was adjusted to an HQ = 0.3 by dividing the concentration by 3.3.
trans-2-Butene Surrogate: 2-butene	-	-	-	-	-	-	-	-	-	10,000	TCEQ: Threshold based on 2-butene as a surrogate. Threshold based on decreased body weight in female rats after exposure to 2-butene for 6 hours/day, 7 days/week, for 39 to 46 days. The 6-hour NOAEL of 5682 mg/m ³ (2476 ppm) was adjusted to a 1-hour NOAEL of 10,320 mg/m ³ (4,499 ppm). An uncertainty factor of 300 (3 for interspecies variation, 10 for intraspecies variation, and 10 for an incomplete database) was applied and adjusted to HQ = 0.3 by dividing the concentration by 3.3.
Isobutene	-	-	-	-	-	-	-	-	-	180,000	TCEQ: Threshold based on Wistar female rat exposure for 6 hours/day for 16 days during gestation days 5 to 21. No effects were observed in pregnant dams or fetuses and the free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 18,400 mg/m ³ (8,000 ppm) was adjusted with an uncertainty factor of 30 (3 for interspecies variation and 10 for intraspecies variation). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 620 mg/m ³ (270 ppm) by 3.3, resulting in a value of 180 mg/m ³ (81 ppm).
Cyclohexane	-	-	-	-	-	-	-	-	-	3,400	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Cyclopentane	-	-	-	-	-	-	-	-	-	3,400	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Dodecane (surrogate: isododecane)	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as isododecane (interim, supporting documentation not available).
Dodecylcyclohexane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
n-Eicosane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Farnesane (2,6,10-trimethyldodecane)	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Heneicosane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Heptadecane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Heptane Surrogate: octane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on octane as a surrogate.
2-Methylheptane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint and on 3-methylheptane as a surrogate (interim, supporting documentation not available).
n-Hexadecane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
cis-2-Hexene Surrogate: 4-methyl-2-pentene	-	-	-	-	-	-	-	-	-	1,000	TCEQ: Threshold based on a health endpoint using 4-methyl-2-pentene as a surrogate (interim, supporting documentation not available).
trans-2-Hexene Surrogate: 4-methyl-2-pentene	-	-	-	-	-	-	-	-	-	1,000	TCEQ: Threshold based on a health endpoint using 4-methyl-2-pentene as a surrogate (interim, supporting documentation not available).
Isopentane Surrogate: n-pentane	-	-	-	-	-	-	-	-	-	59,000	TCEQ: Threshold based n-pentane as a surrogate.
Methylcyclohexane Surrogate: cyclohexane	-	-	-	-	-	-	-	-	-	3,400	TCEQ: Threshold based cyclohexane as a surrogate.
Methylcyclopentane	-	-	-	-	-	-	-	-	-	2,600	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Nonadecane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Nonane	-	-	-	-	-	-	-	-	-	10,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Octadecane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Octane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Pentadecane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Pentane	-	-	-	-	-	-	-	-	-	59,000	TCEQ: Threshold based on a free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) resulting from a lack of clinical, motor activity and neurobehavioural effects observed in rats exposed to pentane for 8 hours/day for 3 days. The NOAEL was 20,000 mg/m ³ (6,756 ppm) and the point of departure [human equivalent concentration] (POD _{HEC}) was also 20,000 mg/m ³ (6,756 ppm). An uncertainty factor of 100 (3 for interspecies differences, 10 for intraspecies differences and 3 for database quality) was applied. The threshold of 59 mg/m ³ is for an HQ = 0.3.
Pentadecylcyclohexane Surrogate: aliphatics >C ₁₆ -C ₂₁	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .
trans-2-Pentene	-	-	-	-	-	-	-	-	-	13,000	TCEQ: Threshold based on data for 2-butene (see above for derivation). The threshold of 4,500 ppb (based on a HQ of 0.3) for 2-butene was used to derive the threshold for trans-2-pentene, after adjustment of concentration in ppb to µg/m ³ based on different molecular weights for 2-butene and pentene.
Pentylcyclohexane Surrogate: cyclohexane	-	-	-	-	-	-	-	-	-	3,400	TCEQ: Threshold based cyclohexane as a surrogate.
Pristane	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Tetradecylcyclohexane Surrogate: aliphatics >C ₁₆ -C ₂₁	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
n-Tetradecane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Tridecane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Tridecylcyclohexane Surrogate: aliphatics >C ₁₆ -C ₂₁	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .
o-Xylene Surrogate: xylenes	-	-	-	-	8,700 (2 ppm)	-	-	-	22,000	2,200	ATSDR, Cal OEHHA, and TCEQ: Threshold based on xylenes (total) as a surrogate.
Xylenes (Total)	-	-	-	-	8,700 (2 ppm)	-	-	-	22,000	2,200	ATSDR: Threshold based on a minimal LOAEL of 200 mg/m ³ (50 ppm) for slight respiratory effects (reduced forced vital capacity [FVC], increased discomfort in throat and airways in females, and breathing difficulty in both sexes) and subjective symptoms of neurotoxicity (headache, dizziness, a feeling of intoxication) in subjects exposed to m-xylene vapour for 2 hours. The LOAEL was considered minimal because the magnitude of the changes was small. A total uncertainty factor of 30 (3 for use of a minimal LOAEL and 10 for human variability) was applied to the LOAEL. The resulting minimal risk level of 2 ppm was converted to µg/m ³ using a molecular weight of 106.16 g/mol.
											Cal OEHHA: Threshold based on reports of eye, nose, and throat irritation in healthy human volunteers (n = 50) exposed to xylene (technical grade) for 30 minutes. The LOAEL was 200 ppm (860 mg/m ³) and the NOAEL was 100 ppm (430 mg/m ³). The NOAEL was extrapolated to an equivalent 1-hour concentration of 50 ppm (200 mg/m ³) using the following formula: (C ₁ * 60 minutes = 100 ppm * 30 minutes). An uncertainty factor of 10 (for intraspecies variability) was applied to the 1-hour concentration, resulting in a reference exposure level of 5 ppm (22 mg/m ³).
											TCEQ: Threshold based on a study where mild respiratory and subjective neurological effects were observed in volunteers exposed to mixed isomers of xylenes for 2 hours. The LOAEL was 50 ppm (200 mg/m ³) and was not extrapolated to a 1-hour exposure. A total uncertainty factor of 30 (10 for human variability and 3 for using a LOAEL) was applied, resulting in a value of 1700 ppb (7.4 mg/m ³ ; HQ = 1.0). The screening level was determined by converting to an HQ = 0.3, by dividing the adjusted LOAEL of 1700 ppb by 3.3, resulting in a value of 510 ppb (2,200 µg/m ³). The TCEQ threshold is based on the same study as that for which ATSDR derived a minimal risk level; however, the TCEQ threshold was derived using an HQ of 0.3. In cases where TCEQ used the same primary study as another jurisdiction in their derivation of an effects screening level, preference was given to screening thresholds derived based on an HQ of 1.0.
Aliphatics C2-C6 Surrogate: cyclohexane	-	-	-	-	-	-	-	-	-	3,400	TCEQ: Threshold based on cyclohexane as a surrogate.
Aliphatics >C6-C8 Surrogate: octane	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on octane as a surrogate.
Aliphatics >C8-C10 Surrogate: C4-C16 alkanes	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as C4-C16 alkanes (interim, supporting documentation not available).
Aliphatics >C10-C12 Surrogate: C4-C16 alkanes	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as C4-C16 alkanes (interim, supporting documentation not available).
Aliphatics >C12-C16 Surrogate: C4-C16 alkanes	-	-	-	-	-	-	-	-	-	3,500	TCEQ: Threshold based on a health endpoint, as C4-C16 alkanes (interim, supporting documentation not available).
Aliphatics >C16-C21 Surrogate: alkanes, C17 and higher	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .
Aromatics C6-C8 Surrogate: benzene	-	-	-	-	-	-	-	-	27	170	Cal OEHHA and TCEQ: Threshold based on benzene as a surrogate.
Aromatics >C8-C10 Surrogate: trimethylbenzene	-	-	-	-	-	-	-	-	-	1,250	TCEQ: Threshold based on a health endpoint, as trimethylbenzene (interim, supporting documentation not available).

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Aldehydes											
Methacrolein (2-Methyl-2-propenal)	-	-	-	-	-	-	-	-	-	16	TCEQ: Threshold based on increased eye blinking frequency in healthy human males exposed to methacrolein using an eye cup on the non-dominant eye for 20 minutes. The LOAEL was 286 ppb. The point of departure (POD) was a NOAEL of 189 ppb. An uncertainty factor of 10 was applied for intraspecies variability. The resulting value of 19 ppb was adjusted for an HQ of 0.3, resulting in a screening level of 5.7 ppb. This threshold was converted to µg/m ³ using a molecular weight of 70.09 g/mol.
Acrolein	-	-	-	-	7 (0.003 ppm)	-	-	4.5	2.5	3.2	ATSDR: The minimal risk level was derived based on a LOAEL of 0.3 ppm (0.7 mg/m ³) for nasal and throat irritation and decreased respiratory rate in volunteers exposed for one hour. An uncertainty factor of 100 was applied (10 for using a LOAEL and 10 for human variability). The minimal risk level of 0.003 ppm was converted to µg/m ³ using a molecular weight of 56.06 g/mol. The ATSDR threshold was selected as it was based on a more current study (1977) compared to the 1960 study that the OMOE and Cal OEHHA thresholds were based on. OMOE: Threshold based on eye irritation in human volunteers following an acute exposure (1-hour) to acrolein. A LOAEL of 137 µg/m ³ and an uncertainty factor of 30 (3 for LOAEL to NOAEL extrapolation and 10 for interspecies variability) was used. Cal OEHHA: Threshold based on eye irritation in humans in two studies. Two LOAEL values of 138 µg/m ³ (0.06 ppm) and 160 µg/m ³ were estimated and an uncertainty factor of 60 (6 for using LOAEL for mild effects in the absence of a NOAEL and 10 for greater sensitivity in children with asthma) was applied to both LOAELs, the average of the two were taken. TCEQ: Threshold based on eye, nose and throat irritation, and decreased respiratory rate in college students exposed to acrolein for 1-hour via inhalation. The LOAEL was 0.3 ppm (0.69 mg/m ³) and an uncertainty factor of 63 (10 for human variability and 6.3 for use of a LOAEL) was applied, resulting in a value of 4.8 ppb (11 µg/m ³ ; HQ = 1.0). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 11 µg/m ³ (4.8 ppb) by 3.3, resulting in a value of 3.2 µg/m ³ (1.4 ppb). The TCEQ threshold is based on the same study as that for which ATSDR derived a minimal risk level; however, the TCEQ threshold was derived using an HQ of 0.3. In cases where TCEQ used the same primary study as another jurisdiction in their derivation of an effects screening level, preference was given to screening thresholds derived based on an HQ of 1.0.
Benzaldehyde	-	-	-	-	-	-	-	-	-	90	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2,5-Dimethylbenzaldehyde Surrogate: benzaldehyde	-	-	-	-	-	-	-	-	-	90	TCEQ: Threshold based on health effects, as benzaldehyde (interim, supporting documentation not available).
Butyraldehyde (Butanal)	-	-	-	-	-	-	-	-	-	3,300	TCEQ: Threshold based on a 1957 study where 15 male volunteers inhaled 678 mg/m ³ (230 ppm) of butyraldehyde for 30 minutes. The NOAEL was 678 mg/m ³ (230 ppm) in the absence of sensory irritation. The concentration was not extrapolated to 1-hour and an uncertainty factor of 60 (10 for intraspecies uncertainty and 6 for an incomplete database) was applied. The resulting concentration of 3,800 ppb (11,000 µg/m ³) was adjusted to an HQ = 0.3, resulting in a value of 1,100 ppb (3,300 µg/m ³). The threshold of 1,100 ppb was converted to µg/m ³ using a molecular weight of 72.11 g/mol.
Formaldehyde	-	-	-	-	50 (0.04 ppm)	-	100 (30 minutes)	-	55	15	WHO: Threshold based on a LOAEL of 0.1 mg/m ³ for throat and nose irritation. Since this value is over one order of magnitude lower than a presumed threshold for cytotoxic damage to the nasal mucosa, the guideline can also represents an exposure concentration at which there is a negligible risk of upper respiratory tract cancer in humans. Threshold based on a half-hour averaging time. ATSDR: Threshold based on LOAEL of 0.4 ppm (0.5 mg/m ³) for nasal and eye irritation in humans following a 2-hour exposure to 0.5 mg/m ³ formaldehyde (Pazdrak et al. 1993; as cited in ATSDR 1999). An uncertainty factor of 10 (3 for use of a LOAEL and 3 for human variability) was applied. The minimal risk level of 0.04 ppm was converted to µg/m ³ using a molecular weight of 30.03 g/mol. Cal OEHHA: Threshold based on mild and moderate eye irritation. Nineteen non-asthmatic, non-smoking humans exposed to 0.5 to 3.0 ppm (0.614 - 3.68 mg/m ³ ; single exposure per concentration) for 3-hours experienced mild and moderate eye irritation. The LOAEL was determined to be 1 ppm (1.23 mg/m ³) and the NOAEL to be 0.5 ppm (0.614 mg/m ³). An uncertainty factor of 10 (1 for interspecies variability, 1 for intraspecies variability, and 10 for asthma exacerbation in children) was applied. TCEQ: Threshold based on eye and nose irritation, and symptoms of rhinitis in two studies where human volunteers were exposed to formaldehyde via inhalation (Pazdrak et al. (1993; as cited in TCEQ 2008) - 20 human volunteers, 9 with skin hypersensitivity to formaldehyde; Krakowiak et al. (1998; as cited in TCEQ 2008) - 20 human volunteers, 10 with bronchial asthma and suspected respiratory formaldehyde sensitization). The subjects were exposed to 0.5 mg/m ³ for two hours. The LOAEL was 0.5 mg/m ³ (0.4 ppm). An uncertainty factor of 10 (3 for intraspecies variation and 3 for using a LOAEL) was applied, resulting in a threshold of 0.05 mg/m ³ (HQ = 1.0). The threshold was derived by adjusting to an HQ = 0.3, by dividing the value of 50 µg/m ³ by 3.3, resulting in a value of 15 µg/m ³ (12 ppb). The TCEQ threshold is based on the same study as that for which ATSDR derived a minimal risk level; however, the TCEQ threshold was derived using an HQ of 0.3. In cases where TCEQ used the same primary study as another jurisdiction in their derivation of an effects screening level, preference was given to screening thresholds derived based on an HQ of 1.0.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Acetaldehyde	-	-	-	-	-	-	-	-	470	-	Cal OEHHA: Threshold based on a LOAEL of 142 mg/m ³ from a study where 61 adult asthmatic human volunteers exposed to acetaldehyde via inhalation by nebulizer for 2 to 4 minutes experienced bronchoconstriction (a 20% drop in forced expiratory volume). Uncertainty factors applied were 10 for use of a LOAEL and 30 for asthma exacerbation in children and hyper-responsiveness to methacholine (challenge with methacholine is used as an asthma identification test).
Propanal (Propionaldehyde) Surrogate: Acetaldehyde	-	-	-	-	-	-	-	-	470	-	Cal OEHHA: Threshold based on acetaldehyde as a surrogate.
Crotonaldehyde	-	-	-	-	-	-	-	-	-	8.6	TCEQ: Threshold based on a LOAEL of 0.56 ppm (1.6 mg/m ³) for intermittent minor eye irritation in occupationally exposed workers exposed to an average crotonaldehyde concentration of 0.56 ppm (1.6 mg/m ³). Since minor eye sensory irritation is a concentration-dependent effect, the LOAEL was not adjusted for duration. Uncertainty factors for interspecies variability (3), use of a LOAEL (3), and data deficiencies (6) were applied. The resulting threshold of 29 µg/m ³ (10 ppb) was based on an HQ = 1.0. The threshold was derived by adjusting to an HQ = 0.3, by dividing the value of 29 µg/m ³ by 3.3, resulting in a value of 8.6 µg/m ³ (3 ppb).
Hexanal (Hexaldehyde) Surrogate: decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on decanal as a surrogate.
Heptanal (Heptaldehyde) Surrogate: decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on decanal as a surrogate.
Octanal Surrogate: decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on decanal as a surrogate.
Nonanal (Nonyl aldehyde)	-	-	-	-	-	-	-	-	-	1,500	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Undecanal	-	-	-	-	-	-	-	-	-	100	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Dodecanal (Lauraldehyde) Surrogate: decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on decanal as a surrogate.
Tridecanal Surrogate: decanal	-	-	-	-	-	-	-	-	-	40	TCEQ: Threshold based on decanal as a surrogate.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
Ketones											
Acetone	-	-	-	-	62,000 (26 ppm)	-	-	-	-	7,800	ATSDR: Threshold based on neurological effects (increase in response and percent false negatives in auditory discrimination, increased anger and hostility) in humans exposed to a concentration of 237 ppm (563 mg/m ³) for four hours. A LOAEL of 563 mg/m ³ (237 ppm) was used and an uncertainty factor of 9 (3 for using a LOAEL and 3 for human variability) was applied to derive the minimal risk level. The minimal risk level of 26 ppm was converted to µg/m ³ using a molecular weight of 58.08 g/mol. TCEQ: Threshold based on mild effects on neurobehavioural performance in a study where 137 human volunteers were exposed for 1 to 2 hours at 539 mg/m ³ (227 ppm). The point of departure (POD) (227 ppm; based on neurobehavioral effects), was not adjusted and an uncertainty factor of 20 (10 for intraspecies differences and 2 for using a LOAEL) was applied, resulting in a value of 26 mg/m ³ (11 ppm; HQ = 1.0). The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 26 mg/m ³ by 3.3, resulting in a value of 7.8 mg/m ³ (3.3 ppm). The TCEQ threshold is based on the same study as that for which ATSDR derived a minimal risk level; however, the TCEQ threshold was derived using an HQ of 0.3. In cases where TCEQ used the same primary study as another jurisdiction in their derivation of an effects screening level, preference was given to screening thresholds derived based on an HQ of 1.0.
Acetophenone	-	-	-	-	-	-	-	1,167	-	490	OMOE: Threshold based on a health endpoint (supporting documentation not available). TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Methyl ethyl ketone	-	-	-	-	-	-	-	-	13,000	18,000	Cal OEHHA: Threshold based on eye, nose and throat irritation in human volunteers exposed for two hours. A LOAEL of 796 mg/m ³ (270 ppm) was used and an uncertainty factor of 60 (6 for LOAEL uncertainty and 10 for intraspecies variability) was applied. TCEQ: Threshold based on 24 human volunteers inhaling methyl ethyl ketone for 4 hours (200 ppm or 590 mg/m ³). Sensory irritation and neurological effects were reported and a NOAEL of 200 ppm (590 mg/m ³) was used. The NOAEL (590 mg/m ³) was adjusted to an HQ = 0.3 by dividing by 3.3 and an uncertainty factor of 10 (to account for variation in human sensitivity) was applied, resulting in a threshold of 18 mg/m ³ .
Dioxins and Furans											
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
1,2,3,4,6,7,8,9-Octachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
Octachlorodibenzo- <i>p</i> -dioxin (OCDD)	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24- hour exposure period.
Total Polychlorinated Dibenzodioxins (PCDD)	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24-hour exposure period.
2,3,7,8-Tetrachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.

Table B-1 Acute Inhalation Assessment – 1-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO ^(b)			ATSDR MRLs ^(c)	US NAAQS ^(d)	WHO Guidelines ^{(e),(f)}	Others			Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^(g)	Cal OEHHA RELs ^(h)	TCEQ ESLs ⁽ⁱ⁾	
1,2,3,7,8-Pentachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
2,3,4,7,8-Pentachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,4,7,8-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,6,7,8-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,7,8,9-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,4,6,7,8-Heptachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,4,7,8,9-Heptachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to furans is assessed under the 24- hour exposure period.
Total Polychlorinated Dibenzofurans (PCDF)	-	-	-	-	-	-	-	-	-	-	A 1-hour threshold was not available. Acute inhalation exposure to dioxins is assessed under the 24-hour exposure period.

Note:

a) NWT-ENR, 2014.

b) CCME, 1999.

c) ATSDR, 2013.

d) US EPA, 2011b.

e) WHO, 2006.

f) WHO, 2000.

g) OMOE, 2012.

h) Cal OEHHA, 2014a.

i) TCEQ, 2014e. The screening levels derived by TCEQ are based on an HQ = 0.3.

All values are in µg/m³, unless otherwise noted.

Concentrations in ppm were converted to mg/m³ by applying the formula: molecular weight (g/mol) x ppm / 24.45.

>= greater than; µg/m³= microgram per cubic metre; “ – ” = no value;% = percent; As₂O₃ = arsenic trioxide; ATSDR = Agency for Toxic Substances and Disease Registry; BMCL = benchmark concentration lower confidence limit; BMDL = benchmark dose level; Cal OEHHA = California Office of Environmental Health Hazard Assessment; i.e. = *id est* (that is); CCME = Canadian Council of Ministers of the Environment; CNS = central nervous system; ESL = Effects Screening Level; g/mol = gram per mol; HEC = human equivalent concentration; HQ = hazard quotient; LOAEL = Lowest Observable Adverse Effect Level; mg/m³ = milligram per cubic metre; MRL = Minimal Risk Level; n = number of samples/subjects; NAAQO = National Ambient Air Quality Objectives; NAAQS = National Ambient Air Quality Standard; NOAEL = No Observable Adverse Effect Level; OMOE = Ontario Ministry of Environment; NWT = Northwest Territories; PM₁₀ = particulate matter with a mean aerodynamic diameter of 10 microns (µm) or smaller; POD = point of departure; ppb = parts per billion; ppm = parts per million; REL = Reference Exposure Level; TCEQ = Texas Commission on Environmental Quality; TERA = Toxicology Excellence for Risk Assessment; US = United States; WHO = World Health Organization.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Acid Gases and Particulate Matter										
Carbon monoxide (CO)	6,000 (8 hour)	6,000 (8 hour)	15,000 (8 hour)	20,000 (8 hour)	-	10,300 (9 ppm) (8 hour)	10,000 (8 hour)	15,700 (8 hour)	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
										CCME NAAQO: Supporting documentation not available.
										US NAAQS: Threshold based on clinical evidence relating carboxyhemoglobin (carbon monoxide bound to blood hemoglobin) levels to various adverse health endpoints including hypoxia, cardiovascular disease related effects, reproductive effects, central nervous system effects, respiratory effects and impairment of prenatal development. The NAAQS of 9 ppm was converted to µg/m³ using a molecular weight of 28.01 g/mol.
										WHO: Threshold is a time-weighted average 8-hour exposure derived so that the carboxyhemoglobin (carbon monoxide bound to blood hemoglobin) level of 2.5% is not exceeded (threshold for human health effect).
										OMOE: Threshold based on a health endpoint (supporting document not available).
Nitrogen dioxide (NO ₂)	200	-	200	300	-	-	-	200	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
										CCME NAAQO: Supporting documentation not available.
										OMOE: Threshold based on health effects (supporting documentation not available).
Sulphur dioxide (SO ₂)	150	150	300	800	-	-	20	275	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
										CCME NAAQO: Supporting documentation not available.
										WHO: The WHO has adopted a guideline of 20 µg/m³ for SO ₂ .Various studies were reviewed by the WHO and are summarized below. One study concluded that a reduction in SO ₂ is linked to substantial reductions in health effects (Hedley et al. 2002; as cited in WHO 2006). A second reported that no health effects are associated with 24-hour SO ₂ concentrations ranging from 5 to 40 µg/m³ (Wong et al. 2002; as cited in WHO 2006). A third study indicated that 24-hour average SO ₂ concentrations of 5 µg/m³ are associated with daily mortality rates (Burnett et al. 2004; as cited in WHO, 2006). A fourth study reported significant associations between SO ₂ and mortality at mean SO ₂ concentrations of 18 µg/m³ and maximum SO ₂ concentrations of 85 µg/m³ (Pope et al. 2002; as cited in WHO 2006). The WHO concludes that there is uncertainty regarding whether SO ₂ is the primary pollutant responsible for the health effects because exposure is often in combination with other pollutants such as particulate matter. The WHO has applied a precautionary approach and set a 24-hour SO ₂ guideline to 20 µg/m³.
										OMOE: Threshold based on a health and vegetation endpoints (supporting document not available).
Total Suspended Particulates (TSP)	120	-	120	400	-	-	-	-	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
										CCME NAAQO: Supporting documentation not available.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
PM _{2.5}	28	28 (year 2015) 27 (year 2020)			-	35	25	30	-	NWT: The NWT standard is adopted from the Canadian AAQS (Ambient Air Quality Standards).
										CCME CAAQS and OMOE: Thresholds based on Canada Wide Standards, intended for the protection of respiratory effects. OMOE thresholds are based on the CCME Canadian Wide Standard for particulate matter (CCME 2012), which is protective of human health and the environment. The standard of 30 µg/m ³ was an achievement level (by the year 2010) to be based on the 98 th percentile ambient measurement annually, averaged over 3 consecutive years. CCME has recently updated the Canadian ambient air quality standard for PM _{2.5} , which is protective of human health and the environment, and is a value of 28 µg/m ³ proposed for the year 2015 (and 27 µg/m ³ for the year 2020). The metric is the 3-year average of the annual 98 th percentile of the daily 24-hour average concentrations
										US NAAQS: Threshold based on annual mean averaged over 3 years protective of increased health effects associated with short-term PM _{2.5} exposure, including premature mortality and increased hospital admissions and emergency department visits.
										WHO: The guideline is based on the same toxicological endpoint as PM ₁₀ where exposure is associated with a 0.46 to 0.62% increase in mortality per 10 µg/m ³ increase in PM ₁₀ . The PM ₁₀ guideline is converted using a PM _{2.5} :PM ₁₀ ratio of 0.5. This PM _{2.5} :PM ₁₀ ratio is typical of that found in urban areas of developing countries and is at the bottom of the range found in urban areas in developed countries (0.5 to 0.8).
PM ₁₀	-	-			-	150	50	50	-	US NAAQS: Threshold to protect against adverse health effects of inhalable airborne particles that can be deposited in the lower (thoracic) regions of the human respiratory tract. The standard is met when a 24-hr average PM ₁₀ concentration of 150 mg/m ³ is not exceeded more than one day per year, on average over a three-year period. .
										WHO: The guideline is based on a 0.46 to 0.62% increase in mortality per 10 µg/m ³ increase in PM ₁₀ . The guideline reflects the relationship between the distributions of 24-hour means (and its 99 th percentile) and annual average concentrations.
										OMOE: Interim ambient air quality criterion (supporting documentation not available)
Metals										
Aluminum	-	-	-	-	-	-	-	120	-	OMOE: Threshold for aluminum oxide, based on a health endpoint for chemical sorbed to particulates (supporting documentation not available).
Antimony	-	-	-	-	-	-	-	25	-	OMOE: Threshold for antimony and compounds, based on health endpoint (supporting documentation not available).
Arsenic	-	-	-	-	-	-	-	0.3	-	OMOE: Threshold based on a health endpoint (supporting document not available).
Barium	-	-	-	-	-	-	-	10	-	OMOE: Threshold based on a health endpoint (supporting document not available), for total water soluble barium.
Beryllium	-	-	-	-	-	-	-	0.01	-	OMOE: Threshold based on a health endpoint (supporting document not available), for beryllium and compounds.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Cadmium	-	-	-	-	0.03	-	-	0.025	-	ATSDR: Threshold based on a LOAEL of 0.088 mg/m³ for respiratory effects in rats exposed to cadmium oxide for 6.2 hours/day, 5 days/week for 2 weeks. The LOAEL was adjusted for continuous exposure (0.088 mg Cd/m³ x 6.2 hours/24 hours x 5 days/7 days) and for a regional deposited dose ratio (RDDR) in the pulmonary region of 0.617. An uncertainty factor of 300 (3 for extrapolating from animals to humans, 10 for a use of a LOAEL and 10 for human variability) was applied to the human equivalent concentration (0.01 mg/m³). OMOE: Threshold for cadmium and cadmium compounds, based on kidney effects and carcinogenicity associated with exposure to these compounds. A continuous lifetime exposure of 270 ng/m³ for the general population was derived from the cumulative occupational exposure of 100 µg/m³-years. The occupational exposure level was converted into an equivalent continuous lifetime exposure by extrapolating the occupational LOAEL from 8 hours to 24 hours, from 225 working days to 365 days and distributed over an average human lifetime of 75 years (100 µg/m³-years x 8/24 hours x 225/365 days x 1/75 years = 270 ng/m³), resulting in a value of 0.27 µg/m³. An uncertainty factor of 10 for intraspecies variability and a modifying uncertainty factor of 5 to address carcinogenicity (i.e., uncertainty and additional protection of human health), were applied, resulting in a chronic exposure of 5 ng/m³ (annual average) of cadmium in total suspended particulates. The OMOE used a factor of 5 to convert from an annual threshold to a 24-hour threshold.
Chromium	-	-	-	-	-	-	-	0.5	0.39	OMOE: Threshold (for metallic Cr(0), Cr(II) and Cr(III)) based on increased total lung and trachea weight relative to body weight in rats associated with exposure to Cr(III). Rats were exposed to chromium sulfate for 13 weeks (5 days/week, 6 hours/day). The point of departure (POD) was 3.45 mg/m³ (a benchmark concentration lower confidence limit corresponding to a 10% incidence of effect [BMCL₁₀]) was adjusted for continuous exposure (0.616 mg/m³) and regional deposited dose ratio (RDDR) (to account for differences in deposition pattern of inhaled particles in the respiratory tract in humans and test animals; 1.315 for the entire respiratory tract). The POD adjusted for a HEC (POD_{HEC}) was 0.8086 mg/m³. An uncertainty factor of 300 (10 for human variability, 10 for extrapolating from subchronic to chronic exposure, and 3 for extrapolation from animals to humans) was applied. TCEQ: Threshold based on a BMCL₁₀ (benchmark concentration lower confidence limit corresponding to the lower 10% incidence of effect) of 16.06 µg Cr(VI)/m³ for increased relative lung weight in rats exposed to 0, 50, 100, 200, or 400 µg Cr(VI)/m³, as sodium dichromate, for 22 hours/day for 7 days/week for 30 days. The BMCL₁₀ was not adjusted for continuous exposure because the study exposure duration of 22h/d, 7 d/wk for 30 days is much longer than the acute duration of interest (24-hr) and due to the magnitude of such an extrapolation, the TCEQ indicates that they do not have confidence to adjust the POD upwards with any toxicologically predictive manner. The BMCL₁₀ was adjusted for a human equivalent concentration (HEC) of 2.41. Uncertainty factors for interspecies variation (3) and intraspecies variation (10) were applied. The resulting threshold of 1.3 µg Cr(VI)/m³ was based on an HQ = 1.0. The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 1.3 µg Cr(VI)/m³ by 3.3, resulting in a value of 0.39 µg Cr(VI)/m³.
Cobalt	-	-	-	-	-	-	-	0.1	-	OMOE: Threshold based on a health endpoint (supporting document not available).
Copper	-	-	-	-	-	-	-	50	-	OMOE: Threshold based on a health endpoint (supporting document not available).
Iron	-	-	-	-	-	-	-	4	-	OMOE: Threshold for metallic iron based on a health endpoint (supporting document not available).
Lead	-	-	-	-	-	-	-	0.5	-	OMOE: Threshold based on neurological effects in children. The approach is based on Cal EPA (2001; as cited in OMOE 2007) where the airborne lead concentration is based on a 5% probability of children in a reference population exceeding the LOAEL.
Manganese	-	-	-	-	-	-	-	0.1	-	OMOE: Threshold for manganese as a metal/parameter in PM _{2.5} and based on an occupational study where workers were exposed to MnO ₂ dust for an average of 5.3 years in a dry-cell battery factory. The point of departure (POD) was selected as 84 µg/m ³ (benchmark concentration lower confidence limit corresponding to a 5% response level [BMCL ₀₅]) for a logistic dose-response model of eye-hand coordination scores. The POD was adjusted for continuous exposure (30 µg/m ³) and an uncertainty factor of 300 (10 for human variability, 3 for database limitations and differences in toxicity associated with different species of manganese, 3 for the vulnerability of the developing nervous system and 3 for subchronic to chronic exposure extrapolation) was applied.
Mercury	-	-	-	-	-	-	-	2	-	OMOE: Threshold based on a health endpoint (supporting document not available).

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Molybdenum	-	-	-	-	-	-	-	120	-	OMOE: Threshold based on a particulate endpoint (supporting document not available).
Nickel	-	-	-	-	-	-	-	0.1	-	OMOE: Threshold for nickel as a metal/parameter in PM ₁₀ . Based on carcinogenic and non-carcinogenic effects (supporting documentation available). The 24-hour screening value was derived from the annual screening value (0.02 µg/m ³) and a conversion factor of 5, which is based on empirical monitoring data, ratios of concentrations observed for different averaging times, and meteorological considerations.
Selenium	-	-	-	-	-	-	-	10	-	OMOE: Threshold based on a health endpoint (supporting document not available).
Silver	-	-	-	-	-	-	-	1	-	OMOE: Threshold based on a health endpoint (supporting document not available).
Strontium	-	-	-	-	-	-	-	120	-	OMOE: Threshold based on a health endpoint for chemical sorbed to particulates (supporting documentation not available).
Tellurium	-	-	-	-	-	-	-	10	-	OMOE: Threshold based on a health endpoint for tellurium (except as hydrogen telluride; supporting documentation not available).
Thallium	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Titanium	-	-	-	-	-	-	-	120	-	OMOE: Threshold based on a health endpoint for chemical sorbed to particulates (supporting documentation not available).
Tungsten	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Uranium	-	-	-	-	-	-	-	0.15	-	OMOE: Threshold based on a health endpoint (supporting documentation not available), as uranium in PM ₁₀ .
Vanadium	-	-	-	-	0.8	-	1	2	-	ATSDR: Threshold based on a LOAEL of 0.56 mg/m ³ for lung inflammation in rats exposed to vanadium pentoxide for 6 hours/day, 5 days/week for 13 days. The LOAEL was adjusted for continuous exposure (0.1 mg/m ³) and adjusted for the HEC (0.073 mg/m ³). An uncertainty factor of 90 (3 for using minimal LOAEL, 3 for animal to human extrapolation and 10 for human variability) was applied.
										WHO: Threshold based on human occupational studies suggesting that the LOAEL for vanadium can be assumed to be 20 µg/m ³ , based on chronic upper respiratory tract symptoms. The adverse nature of the observed effects including irritation, coughing, and effects on the pharynx, were minimal at 20 µg/m ³ compared to the higher exposures of 1 mg/m ³ where more serious effects such as chronic bronchitis and pneumonia were observed. A susceptible subpopulation was not identified and an uncertainty factor of 20 (to account for use of a concentration where only minimal effects to the respiratory tract were seen and for lack of identification of a susceptible subpopulation) was selected. The WHO value was selected because the threshold was based on a human study.
										OMOE: Threshold based on a health endpoint (supporting document not available).
Zinc	-	-	-	-	-	-	-	120	-	OMOE: Threshold based on a health endpoint for chemical sorbed to particulates (supporting documentation not available).
Polycyclic Aromatic Hydrocarbons										
1-Methylnaphthalene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylnaphthalene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
1-Methylphenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
2-Methylphenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Methylphenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
4-Methylphenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
9-Methylphenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
1-Nitropyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylanthracene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylfluorene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylpyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Methyldibenzothiophene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
4-Methyldibenzothiophene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Acenaphthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Acenaphthylene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Acephenanthrylene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Anthracene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benz(a)anthracene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(a)fluorene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(a)pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(e)pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Benzo(g,h,i)fluoranthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Benzo(k)fluoranthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Chrysene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Coronene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Cyclopenta(cd)pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Dibenzo(a,h)anthracene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Dibenzothiophene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Fluoranthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Fluorene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Indeno(1,2,3-cd)fluoranthene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Indeno(1,2,3-cd)pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Indeno(1,2,3-W)pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Naphthalene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Perylene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Phenanthrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Picene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Pyrene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Biphenyl	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Volatile Organic Compounds										
Benzene	-	-	-	-	29 (0.009 ppm)	-	-	2.3	320	ATSDR: Threshold based on reduced lymphocyte proliferation following mitogen stimulation in mice exposed to benzene for 6 hours/day for 6 days (from a study by Rozen et al. 1984, as cited in ATSDR 2007). A LOAEL of 10.2 ppm (32.59 mg/m³) was adjusted for continuous exposure (10.2 ppm x 6 hours/24 hours = LOAEL_{ADJ} of 2.55 ppm or 8.15 mg/m³) and an uncertainty factor of 300 was applied (10 for use of a LOAEL, 3 for extrapolation from animals to humans, 10 for human variability). A molecular weight of 78.11 g/mol was used to convert from ppm to mg/m³. The ATSDR value was selected over the lower OMOE value because the OMOE value is based on a cancer endpoint, which is not appropriate for the 24-hour averaging period. Cancer effects will be assessed under the chronic averaging period. OMOE: Threshold based on the linear non-threshold low dose extrapolation model used by US EPA that extrapolated occupational exposure concentrations to annual ambient air exposures based on mortality due to acute myeloid leukemia. The 24-hour threshold was calculated from the annual threshold (0.45 µg/m³) based on a conversion factor of 5 (based on empirical monitoring data, ratios of concentrations observed for different averaging times, and meteorological considerations). TCEQ: Threshold based on a LOAEL of 10.2 ppm for depressed peripheral lymphocytes and depressed mitogen-induced blastogenesis of femoral B-lymphocytes in mice exposed to 0 to 301 ppm benzene for 6 hours/day for 6 days (from a study by Rozen et al. 1984, as cited in TCEQ 2014f). The study TCEQ used to derive a screening level is the same as that used by ATSDR to derive a minimal risk level. TCEQ did not adjust the LOAEL for duration, (i.e., it was not extrapolated to 24 hours as it was not considered applicable based on consideration of toxicokinetics). TCEQ considered there to be inadequate clearance following each day of exposure, and considered the multiple day exposure as a continuous exposure in order to derive a 24-hour screening level. The LOAEL was adjusted to a human equivalent concentration (HEC) (10.2 ppm). Uncertainty factors for interspecies variation (3), intraspecies variation (10), and use of a LOAEL (3) were applied to derive an acute reference value of 320 µg/m³.
Ethylbenzene	-	-	-	-	21,710 (5 ppm)	-	-	1,000	-	ATSDR: Threshold based on auditory threshold data where rats were exposed to 99% pure ethylbenzene for 6 hours/day, 6 days/week for 13 weeks. An acute-duration inhalation minimal risk level was identified using benchmark dose (BMD) analysis of auditory threshold data. The human equivalent concentration (HEC) was calculated using a reference body weight of 70 kg and an assumption of 14 days of continuous exposure. The lowest HEC of 669 mg/m³ (154.26 ppm) was selected as the point of departure (POD). This HEC was divided by an uncertainty factor of 30 (3 for extrapolation from animals to humans with dosimetric adjustments and 10 for human variability) resulting in an acute-duration inhalation minimal risk level of 21.7 mg/m³ (5 ppm; molecular weight = 106 g/mol). OMOE: Threshold based on a health endpoint (supporting documentation not available).
Propylbenzene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
1,2,4-Trimethylbenzene	-	-	-	-	-	-	-	220	-	OMOE: Threshold based on central nervous system (CNS) effects in rats from subchronic exposure to trimethylbenzenes. The NOAEL of 123 mg/m³ was identified after reviewing five subchronic inhalation studies, which indicated that long-term central nervous system effects may result following a 4-week inhalation exposure to any of the trimethylbenzene isomers at concentrations as low as 492 mg/m³. The NOAEL was adjusted for continuous exposure (by multiplying 6/24 hours x 5/7 days = 22.0 mg/m³) and an uncertainty factor of 100 was applied to account for subchronic to chronic extrapolation (factor of 10^{1/2}), interspecies extrapolation (factor of 10^{1/2}), and intraspecies variability (factor of 10).
1,3,5-Trimethylbenzene	-	-	-	-	-	-	-	220	-	OMOE: Threshold based on the same study provided above for 1,2,4-Trimethylbenzene.
Indanone	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Toluene	-	-	-	-	3,800 (1 ppm)	-	-	-	-	ATSDR: Threshold based on neurological effects on 16 healthy young men exposed to toluene for 6 hours/day for 4 consecutive days. A NOAEL of 40 ppm was adjusted from intermittent to continuous exposure (40 ppm x 5 days/week x 8 hours/day = 9.5 ppm or 36.7 mg/m ³) and an uncertainty factor of 10 (for human variability) was applied. The minimal risk level of 1 ppm was converted to µg/m ³ using molecular weight of 94.14 g/mol.
m-Ethyltoluene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
p-Ethyltoluene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Ethylene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
1,1,1-Trichloroethane (Methyl chloroform)	-	-	-	-	-	-	-	115,000	-	OMOE: Threshold based on a health endpoint (supporting documentation not available).
1,3-Butadiene	-	-	-	-	-	-	-	10	950	OMOE: Threshold based on carcinogenicity associated with exposure to this compound. Threshold based on an inhalation unit risk (IUR) estimate from the TCEQ that was based on cancer studies in occupationally exposed workers. The IUR from TCEQ is 5 x 10 ⁻⁷ per µg/m ³ and was used to derive an annual threshold of 2 µg/m ³ . A conversion factor of 5 (based on empirical monitoring data, ratios of concentrations observed for different averaging times and meteorological considerations) was used to derive the 24-hour threshold.
										TCEQ: Threshold based on a study where reduction in extragastrational weight gain and fetal body weight, and developmental toxicity (abnormal sternebrae, reduced ossification for all sites and increased incidence of supernumerary (additional) ribs) were observed in mice exposed to 1,3-butadiene for 6 hours/day on gestational days 6 to 15. A benchmark concentration level corresponding to the lower confidence limit (one standard deviation) (BMCL _{1SD}) of 51.3 ppm was calculated based on this study. The BMCL _{1SD} was extrapolated to 24 hours (12.8 ppm) and adjusted to a human equivalent concentration (HEC) (12.8 ppm). Uncertainty factors for interspecies variation (3) and intraspecies variation (10) were applied, resulting in a value of 0.43 ppm (0.95 mg/m ³). The TCEQ value was selected over the lower OMOE value because the OMOE value is based on a cancer endpoint, which is not appropriate for the 24-hour averaging period. Cancer effects will be assessed under the chronic averaging period.
2,3-Dimethylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,4-Dimethylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,2,4-Trimethylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,3,4-Trimethylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,3-Dimethylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,4-Dimethylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,5-Dimethylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
2-Methyl-1-butene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Methyl-1-butene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methyl-2-pentene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylheptane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Methylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2-Methylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Methylpentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
3-Ethylhexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Butane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,2-Dimethylbutane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,3-Dimethylbutane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
cis-2-Butene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
trans-2-Butene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Cyclohexane	-	-	-	-	-	-	-	6,100	-	OMOE: Threshold based on health effects (supporting documentation not available).
Cyclopentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Dodecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Dodecylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Eicosane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Farnesane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Heneicosane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Heptadecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Heptane	-	-	-	-	-	-	-	11,000	-	OMOE: Threshold based on health effects (supporting documentation not available).
n-Hexadecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
cis-2-Hexene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
trans-2-Hexene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Isobutene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Isopentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Methylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Methylcyclopentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Nonadecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Nonane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Octadecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Octane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Pentadecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Pentane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Pentadecylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
trans-2-Pentene	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Pentylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Pristane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Tetradecylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Tetradecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
n-Tridecane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Tridecylcyclohexane	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
o-Xylene Surrogate: xylenes (total)	-	-	-	-	-	-	-	730	-	OMOE: Threshold based on Xylenes (total) as a surrogate.
Xylenes (total)	-	-	-	-	-	-	-	730	-	OMOE: Threshold based on a health endpoint (supporting documentation not available).
Aliphatics C2-C6 Surrogate: cyclohexane	-	-	-	-	-	-	-	6,100	-	OMOE: Threshold based on health effects for cyclohexane as a surrogate.
Aliphatics >C6-C8 Surrogate: heptane	-	-	-	-	-	-	-	11,000	-	OMOE: Threshold based on health effects, for heptane as a surrogate.
Aliphatics >C8-C10	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Aliphatics >C10-C12	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Aliphatics >C12-C16	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Aliphatics >C16-C21	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Aromatics C6-C8 Surrogate: benzene	-	-	-	-	29 (0.009 ppm)	-	-	2.3	320	ATSDR, OMOE, and TCEQ: Threshold based on benzene as a surrogate.
Aromatics >C8-C10 Surrogate: trimethylbenzenes	-	-	-	-	-	-	-	220	-	OMOE: Threshold based on health effects, for trimethylbenzenes as a surrogate.
Aldehydes										
Methacrolein (2-methyl-2-propenal)	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Acrolein	-	-	-	-	-	-	-	-	-	A 24-hour threshold is available from OMOE (0.4 µg/m ³); however, it is based on a chronic study (rats exposed to acrolein for 13 weeks, 6 hours/day, 5 days/week, and then adjusted for continuous exposure). As an appropriate 24-hour threshold was not available, acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Benzaldehyde	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
2,5-Dimethylbenzaldehyde	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Butyraldehyde (butanal)	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Formaldehyde	-	-	-	-	-	-	-	65	50	OMOE: Threshold based on a health endpoint and odour (supporting documentation not available).
										TCEQ: Threshold based on a LOAEL of 0.5 mg/m ³ for eye and nose irritation and symptoms of rhinitis in human volunteers exposed to 0.5 mg/m ³ formaldehyde for 2 hours. The LOAEL was not adjusted for duration as effects were concentration dependent. Uncertainty factors for intraspecies variation (3) and use of a LOAEL (3) were applied.
Acetaldehyde	-	-	-	-	-	-	-	500	-	OMOE: Threshold based on a health endpoint (supporting documentation not available).
Propionaldehyde (propanal) Surrogate: acetaldehyde	-	-	-	-	-	-	-	500	-	OMOE: Threshold based on acetaldehyde as a surrogate.
Crotonaldehyde	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Hexaldehyde (hexanal)	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Heptaldehyde (heptanal)	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Octanal	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Nonanal	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Decanal	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Undecanal	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Dodecanal (Lauraldehyde)	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Tridecanal	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
Ketones										
Acetone	-	-	-	-	-	-	-	11,880	-	OMOE: Threshold based on irritation and neurological effects in human studies. A LOAEL of 594 mg/m ³ was used and an uncertainty factor of 50 (10 to account for sensitive individuals and 5 for extrapolating from a LOAEL to a NOAEL) was applied.
Acetophenone	-	-	-	-	-	-	-	-	-	A 24-hour threshold was not available. Acute exposure will be assessed under the 1-hour exposure period. Chronic exposure will be assessed under the annual exposure scenario.
Methyl ethyl ketone	-	-	-	-	-	-	-	1,000	-	OMOE: Threshold based on a health endpoint (supporting documentation not available).
Dioxins										
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,7,8-Pentachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
1,2,3,4,6,7,8,9-Octachlorodibenzo- <i>p</i> -dioxin	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
Polychlorinated dibenzo- <i>p</i> -dioxin (PCDD)	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Dioxins will be assessed as total dioxins, on a total toxicity equivalent concentration basis.
Total Polychlorinated Dibenzodioxins (PCDD)	-	-	-	-	-	-	-	1.0 x 10 ⁻⁷ TEQ	-	OMOE: Threshold based on a health endpoint, and expressed as a total toxicity equivalent (0.1 pg/m ³).
2,3,7,8-Tetrachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,7,8-Pentachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
2,3,4,7,8-Pentachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.

Table B-2 Acute Inhalation Assessment – 24-Hour Thresholds

Parameter	NWT Standards ^(a)	CCME NAAQO/CAAQS ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	WHO Guidelines ^{(f),(g)}	Others		Toxicological Endpoints and Derivations
		Desirable	Acceptable	Tolerable				OMOE AAQOs ^{(h),(i)}	TCEQ ESLs ^(j)	
1,2,3,4,7,8-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,6,7,8-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,7,8,9-Hexachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,4,6,7,8-Heptachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,4,7,8,9-Heptachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	-	-	-	-	-	-	-	-	-	A 24-hour threshold is not available. Furans will be assessed as total furans, on a total toxicity equivalent concentration basis.
Total Polychlorinated Dibenzofurans (PCDF)	-	-	-	-	-	-	-	1.0 x 10 ⁻⁷ TEQ	-	OMOE: Threshold based on a health endpoint, and expressed as a total toxicity equivalent (0.1 pg/m ³).

Note:

a) GNWT-ENR, 2014

b) CCME, 1999.

c) CCME, 2012.

d) ATSDR, 2013.

e) US EPA, 2011b.

f) WHO, 2006.

g) WHO, 2000.

h) OMOE, 2012.

i) OMOE, 2008.

j) TCEQ, 2014e. The screening levels derived by TCEQ are based on an HQ = 0.3..

All values are in µg/m³, unless otherwise noted.

Concentrations in ppm were converted to mg/m³ by applying the formula: molecular weight (g/mol) x ppm / 24.45.

>= greater than; µg/m³= microgram per cubic metre; “ – ” = no value;% = percent; ATSDR = Agency for Toxic Substances and Disease Registry; BMCL = benchmark concentration lower confidence limit; BMD = benchmark dose; CAAQS = Canadian Ambient Air Quality Standards; Cal EPA = California Environmental Protection Agency; CCME = Canadian Council of Ministers of the Environment; CNS = Central nervous system; Cr(0) = zero valent chromium; Cr(II) = divalent chromium; Cr(III) = trivalent chromium; Cr(VI) = hexavalent chromium; g/mol = gram per mol; HEC = Human Equivalent Concentration; i.e. = *id est* (that is); IUR = inhalation unit risk; kg = kilogram; LOAEL = Lowest Observable Adverse Effect Level; mg/m³ = milligram per cubic metre; MnO₂ = manganese dioxide; MRL = Minimal Risk Level; NAAQO = National Ambient Air Quality Objectives; NAAQS = National Ambient Air Quality Standard; ng/m³ = nanogram per cubic metre; NOAEL = No Observable Adverse Effect Level; NWT = Northwest Territories; OMOE = Ontario Ministry of Environment; PM_{2.5} = particulate matter with a mean aerodynamic diameter of 2.5 microns (µm) or smaller; PM₁₀ = particulate matter with a mean aerodynamic diameter of 10 microns (µm) or smaller; POD = Point of Departure; ppm = parts per million; RDDR = regional deposited dose ratio; SO₂ = sulphur dioxide; TCEQ = Texas Commission on Environmental Quality; TSP = total suspended particulate; US EPA = United States Environmental Protection Agency; WHO = World Health Organization.

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																
Carbon monoxide	15,000	5.67E+00	6.06E+00	7%	1.27E+03	1.27E+03	0%	1.35E+02	1.36E+02	0%	1.53E+02	1.53E+02	0%	5.59E+01	5.59E+01	0%
Nitrogen dioxide	190	1.68E+01	1.77E+01	5%	4.95E+02	4.95E+02	0%	9.22E+01	9.22E+01	0%	1.21E+02	1.21E+02	0%	8.82E+01	8.82E+01	0%
Sulphur dioxide (10 minute)	500	3.36E-02	3.59E-02	7%	4.87E+00	4.88E+00	0%	1.41E+00	1.41E+00	0%	7.61E-01	7.61E-01	0%	5.02E-01	5.02E-01	0%
Sulphur dioxide	200	2.03E-02	2.18E-02	7%	2.95E+00	2.95E+00	0%	8.51E-01	8.51E-01	0%	4.61E-01	4.61E-01	0%	3.04E-01	3.04E-01	0%
Metals																
Aluminum	20	5.37E-02	1.12E-01	109%	6.63E+00	6.64E+00	0%	3.39E+00	3.85E+00	14%	1.52E+01	1.52E+01	0%	6.94E-01	1.02E+00	48%
Antimony	5	1.50E-06	3.11E-06	107%	1.91E-04	1.91E-04	0%	9.40E-05	1.07E-04	14%	4.28E-04	4.28E-04	0%	1.92E-05	2.84E-05	48%
Arsenic	3	1.63E-05	1.70E-05	4%	5.74E-03	5.74E-03	0%	7.27E-04	7.27E-04	0%	2.00E-03	2.00E-03	0%	3.46E-04	3.46E-04	0%
Barium	5	4.96E-04	9.18E-04	85%	1.06E-01	1.06E-01	0%	2.77E-02	3.14E-02	14%	1.64E-01	1.64E-01	0%	5.66E-03	8.36E-03	48%
Beryllium	0.02	1.18E-05	1.19E-05	1%	4.19E-03	4.19E-03	0%	5.19E-04	5.19E-04	0%	5.20E-04	5.20E-04	0%	2.50E-04	2.50E-04	0%
Cadmium	0.1	2.32E-04	2.56E-04	10%	5.96E-02	5.96E-02	0%	5.54E-03	5.57E-03	1%	6.01E-03	6.02E-03	0%	2.73E-03	2.73E-03	0%
Chromium (VI) ^(b)	0.1	1.91E-04	2.91E-04	52%	6.51E-02	6.51E-02	0%	8.62E-03	9.79E-03	14%	7.10E-02	7.10E-02	0%	3.11E-03	3.11E-03	0%
Chromium (III) ^(b)	3.6	1.91E-04	2.91E-04	52%	6.51E-02	6.51E-02	0%	8.62E-03	9.79E-03	14%	7.10E-02	7.10E-02	0%	3.11E-03	3.11E-03	0%
Cobalt	0.2	3.78E-05	4.24E-05	12%	1.02E-02	1.02E-02	0%	9.36E-04	9.42E-04	1%	4.49E-03	4.49E-03	0%	4.57E-04	4.57E-04	0%
Copper	10	6.15E-05	6.72E-05	9%	1.38E-02	1.38E-02	0%	1.64E-03	1.64E-03	0%	5.58E-03	5.58E-03	0%	6.96E-04	6.96E-04	0%
Iron	10	1.46E-02	2.67E-02	83%	3.23E+00	3.23E+00	0%	8.03E-01	9.12E-01	14%	4.88E+00	4.88E+00	0%	1.64E-01	2.43E-01	48%
Lead	-	7.28E-05	7.83E-05	8%	1.61E-02	1.61E-02	0%	2.04E-03	2.04E-03	0%	4.51E-03	4.51E-03	0%	9.03E-04	9.03E-04	0%
Manganese	2	2.42E-04	4.09E-04	69%	6.27E-02	6.27E-02	0%	1.23E-02	1.39E-02	14%	8.27E-02	8.27E-02	0%	3.11E-03	3.71E-03	19%
Mercury	0.25	1.31E-05	1.35E-05	3%	4.48E-03	4.48E-03	0%	5.61E-04	5.61E-04	0%	1.08E-03	1.08E-03	0%	2.94E-04	2.94E-04	0%
Molybdenum	30	1.21E-06	2.30E-06	90%	2.30E-04	2.30E-04	0%	6.93E-05	7.88E-05	14%	3.88E-04	3.88E-04	0%	1.42E-05	2.10E-05	48%
Nickel	0.33	7.71E-05	7.71E-05	0%	6.71E-02	6.71E-02	0%	6.56E-03	6.56E-03	0%	7.77E-02	7.77E-02	0%	3.09E-03	3.09E-03	0%
Selenium	2	5.81E-05	5.82E-05	0%	2.08E-02	2.08E-02	0%	2.56E-03	2.56E-03	0%	1.47E-03	1.47E-03	0%	1.24E-03	1.24E-03	0%
Silver	0.1	3.67E-05	4.07E-05	11%	9.93E-03	9.93E-03	0%	9.12E-04	9.17E-04	1%	9.97E-04	9.97E-04	0%	4.36E-04	4.36E-04	0%
Strontium	20	3.13E-04	5.93E-04	89%	6.07E-02	6.07E-02	0%	1.79E-02	2.03E-02	14%	1.01E-01	1.01E-01	0%	3.66E-03	5.40E-03	48%
Tellurium	1	8.28E-08	1.65E-07	99%	1.25E-05	1.25E-05	0%	4.98E-06	5.66E-06	14%	2.51E-05	2.51E-05	0%	1.02E-06	1.50E-06	48%
Thallium	1	1.03E-06	2.16E-06	110%	1.23E-04	1.23E-04	0%	6.53E-05	7.42E-05	14%	2.87E-04	2.87E-04	0%	1.34E-05	1.97E-05	47%
Titanium	50	1.21E-03	2.44E-03	101%	1.76E-01	1.76E-01	0%	7.37E-02	8.37E-02	14%	3.62E-01	3.62E-01	0%	1.51E-02	2.23E-02	48%
Tungsten	10	3.49E-06	7.27E-06	108%	4.35E-04	4.35E-04	0%	2.20E-04	2.50E-04	14%	9.90E-04	9.90E-04	0%	4.50E-05	6.64E-05	48%
Uranium	0.5	4.37E-06	8.92E-06	104%	5.93E-04	5.93E-04	0%	2.70E-04	3.06E-04	14%	1.28E-03	1.28E-03	0%	5.52E-05	8.14E-05	48%
Vanadium	0.5	2.99E-05	5.59E-05	87%	6.11E-03	6.11E-03	0%	1.68E-03	1.91E-03	14%	9.79E-03	9.79E-03	0%	3.45E-04	5.09E-04	48%
Zinc	20	2.76E-04	3.09E-04	12%	6.99E-02	6.99E-02	0%	6.64E-03	6.64E-03	0%	1.59E-02	1.59E-02	0%	3.25E-03	3.25E-03	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	30	7.26E-05	1.36E-04	87%	6.79E-03	7.10E-03	5%	2.60E-03	2.68E-03	3%	2.59E-03	2.65E-03	2%	7.93E-04	8.12E-04	2%
1-Methylphenanthrene	0.5	3.27E-06	6.12E-06	87%	3.05E-04	3.19E-04	5%	1.17E-04	1.21E-04	3%	1.17E-04	1.19E-04	2%	3.57E-05	3.65E-05	2%
2-Methylantracene	0.5	2.00E-06	3.74E-06	87%	1.87E-04	1.95E-04	5%	7.16E-05	7.37E-05	3%	7.13E-05	7.29E-05	2%	2.18E-05	2.23E-05	2%
2-Methylfluorene	10	6.74E-08	1.26E-07	87%	6.30E-06	6.59E-06	5%	2.42E-06	2.49E-06	3%	2.41E-06	2.46E-06	2%	7.36E-07	7.53E-07	2%
2-methylnaphthalene	30	1.17E-04	2.20E-04	87%	1.10E-02	1.15E-02	5%	4.21E-03	4.33E-03	3%	4.19E-03	4.28E-03	2%	1.28E-03	1.31E-03	2%
2-Methylphenanthrene	0.5	8.07E-06	1.51E-05	87%	7.55E-04	7.89E-04	5%	2.89E-04	2.98E-04	3%	2.88E-04	2.94E-04	2%	8.81E-05	9.02E-05	2%
2-Methylpyrene	0.5	5.98E-07	1.12E-06	87%	5.59E-05	5.85E-05	5%	2.14E-05	2.21E-05	3%	2.13E-05	2.18E-05	2%	6.53E-06	6.68E-06	2%
3-Methyldibenzothiophene	25	1.24E-07	2.31E-07	87%	1.16E-05	1.21E-05	5%	4.43E-06	4.56E-06	3%	4.41E-06	4.51E-06	2%	1.35E-06	1.38E-06	2%
3-Methylphenanthrene	0.5	5.82E-06	1.09E-05	87%	5.44E-04	5.69E-04	5%	2.09E-04	2.15E-04	3%	2.08E-04	2.12E-04	2%	6.36E-05	6.51E-05	2%
4-+9-Methylphenanthrene	0.5	4.40E-06	8.24E-06	87%	4.11E-04	4.30E-04	5%	1.58E-04	1.62E-04	3%	1.57E-04	1.60E-04	2%	4.80E-05	4.92E-05	2%
4-Methyldibenzothiophene	25	7.86E-08	1.47E-07	87%	7.36E-06	7.69E-06	5%	2.82E-06	2.90E-06	3%	2.81E-06	2.87E-06	2%	8.59E-07	8.79E-07	2%
9-Methylphenanthrene	0.5	2.98E-08	2.98E-08	0%	9.55E-06	9.55E-06	0%	7.01E-07	7.01E-07	0%	2.61E-06	2.61E-06	0%	8.53E-07	8.53E-07	0%
Acenaphthene	1	2.29E-05	2.53E-05	10%	6.90E-03	6.90E-03	0%	3.43E-04	3.43E-04	0%	8.29E-04	8.29E-04	0%	2.92E-04	2.92E-04	0%
Acenaphthylene	1	4.78E-05	5.64E-05	18%	1.36E-02	1.36E-02	0%	6.74E-04	6.74E-04	0%	1.64E-03	1.64E-03	0%	5.75E-04	5.75E-04	0%
Acphenanthrylene	0.5	2.31E-06	4.32E-06	87%	2.16E-04	2.25E-04	5%	8.26E-05	8.51E-05	3%	8.23E-05	8.41E-05	2%	2.52E-05	2.58E-05	2%
Anthracene	0.5	6.76E-06	8.29E-06	23%	1.82E-03	1.82E-03	0%	9.03E-05	9.03E-05	0%	2.20E-04	2.20E-04	0%	7.72E-05	7.72E-05	0%
Benz(a)anthracene	0.5	3.12E-06	3.49E-06	12%	9.19E-04	9.19E-04	0%	4.58E-05	4.58E-05	0%	1.11E-04	1.11E-04	0%	3.90E-05	3.90E-05	0%
Benzo(a)fluorene	0.5	7.25E-07	1.36E-06	87%	6.78E-05	7.09E-05	5%	2.60E-05	2.68E-05	3%	2.59E-05	2.65E-05	2%	7.92E-06	8.10E-06	2%
Benzo(a)pyrene	0.03	1.30E-06	1.50E-06	16%	3.78E-04	3.78E-04	0%	1.87E-05	1.87E-05	0%	4.55E-05	4.56E-05	0%	1.60E-05	1.60E-05	0%
Benzo(b)fluoranthene	0.5	6.44E-06	8.14E-06	26%	1.64E-03	1.64E-03	0%	9.64E-05	9.92E-05	3%	2.00E-04	2.00E-04	0%	7.02E-05	7.02E-05	0%
Benzo(e)pyrene	0.5	6.33E-08	1.03E-07	62%	5.91E-06	5.91E-06	0%	1.77E-06	1.82E-06	3%	1.71E-06	1.75E-06	2%	8.11E-07	8.11E-07	0%
Benzo(g,h,i)fluoranthene	0.5	1.12E-06	2.09E-06	87%	1.05E-04	1.09E-04	5%	4.01E-05	4.13E-05	3%	3.99E-05	4.08E-05	2%	1.22E-05	1.25E-05	2%
Benzo(g,h,i)perylene	0.5	2.91E-06	3.37E-06	16%	8.21E-04	8.21E-04	0%	4.12E-05	4.12E-05	0%	9.92E-05	9.93E-05	0%	3.50E-05	3.50E-05	0%
Benzo(k)fluoranthene	0.5	1.12E-06	1.31E-06	17%	3.21E-04	3.21E-04	0%	1.59E-05	1.59E-05	0%	3.87E-05	3.87E-05	0%	1.36E-05	1.36E-05	0%
Biphenyl	10	1.26E-07	1.26E-07	0%	4.03E-05	4.03E-05	0%	2.96E-06	2.96E-06	0%	1.10E-05	1.10E-05	0%	3.60E-06	3.60E-06	0%
Chrysene	0.5	7.06E-06	7.46E-06	6%	2.25E-03	2.25E-03	0%	1.11E-04	1.11E-04	0%	2.69E-04	2.69E-04	0%	9.47E-05	9.47E-05	0%
Coronene	0.5	5.61E-09	1.05E-08	87%	5.25E-07	5.49E-07	5%	2.01E-07	2.07E-07	3%	2.00E-07	2.05E-07	2%	6.13E-08	6.27E-08	2%
Cyclopenta(c,d)pyrene	0.03	3.96E-07	7.41E-07	87%	3.70E-05	3.87E-05	5%	1.42E-05	1.46E-05	3%	1.41E-05	1.44E-05	2%	4.32E-06	4.42E-06	2%
Dibenzo(a,h)anthracene	0.5	2.03E-06	2.56E-06	26%	5.13E-04	5.13E-04	0%	3.03E-05	3.11E-05	3%	6.25E-05	6.26E-05	0%	2.20E-05	2.20E-05	0%
Dibenzothiophene	25	4.78E-08	8.95E-08	87%	4.47E-06	4.67E-06	5%	1.71E-06	1.76E-06	3%	1.71E-06	1.74E-06	2%	5.22E-07	5.34E-07	2%
Fluoranthene	0.5	2.37E-05	3.02E-05	27%	5.97E-03	5.97E-03	0%	3.69E-04	3.79E-04	3%	7.27E-04	7.29E-04	0%	2.56E-04	2.56E-04	0%
Fluorene	10	6.66E-05	7.89E-05	18%	1.89E-02	1.89E-02	0%	9.36E-04	9.36E-04	0%	2.28E-03	2.28E-03	0%	7.99E-04	7.99E-04	0%
Indeno(1,2,3-cd)fluoranthene	0.5	2.81E-08	5.26E-08	87%	2.63E-06	2.74E-06	5%	1.01E-06	1.04E-06	3%	1.00E-06	1.02E-06	2%	3.07E-07	3.14E-07	2%
Indeno(1,2,3-cd)pyrene	0.5	1.87E-06	1.87E-06	0%	6.09E-04	6.09E-04	0%	3.02E-05	3.02E-05	0%	7.27E-05	7.27E-05	0%	2.56E-05	2.56E-05	0%
Indeno(1,2,3-W)pyrene	0.5	5.04E-07	9.45E-07	87%	4.72E-05	4.93E-05	5%	1.81E-05	1.86E-05	3%	1.80E-05	1.84E-05	2%	5.51E-06	5.64E-06	2%
Naphthalene	30	7.60E-04	9.44E-04	24%	1.93E-01	1.93E-01	0%	1.06E-02	1.09E-02	3%	2.35E-02	2.36E-02	0%	8.29E-03	8.29E-03	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	0.5	4.49E-07	8.41E-07	87%	4.20E-05	4.39E-05	5%	1.61E-05	1.66E-05	3%	1.60E-05	1.64E-05	2%	4.90E-06	5.02E-06	2%
Perylene	0.5	5.61E-09	1.05E-08	87%	5.25E-07	5.49E-07	5%	2.01E-07	2.07E-07	3%	2.00E-07	2.05E-07	2%	6.13E-08	6.27E-08	2%
Phenanthrene	0.5	1.87E-04	1.98E-04	6%	5.99E-02	5.99E-02	0%	2.96E-03	2.96E-03	0%	7.16E-03	7.17E-03	0%	2.52E-03	2.52E-03	0%
Picene	0.5	5.61E-09	1.05E-08	87%	5.25E-07	5.49E-07	5%	2.01E-07	2.07E-07	3%	2.00E-07	2.05E-07	2%	6.13E-08	6.27E-08	2%
Pyrene	0.5	2.45E-05	3.33E-05	36%	5.52E-03	5.52E-03	0%	4.99E-04	5.13E-04	3%	6.79E-04	6.81E-04	0%	2.38E-04	2.38E-04	0%
Volatile Organic Compounds																
Methacrolein	16	8.14E-03	9.76E-03	20%	1.87E+00	1.88E+00	0%	3.43E-01	3.46E-01	1%	1.92E-01	1.94E-01	1%	1.08E-01	1.10E-01	2%
Acrolein	7	6.93E-03	8.30E-03	20%	1.59E+00	1.60E+00	0%	2.92E-01	2.95E-01	1%	1.64E-01	1.65E-01	1%	9.15E-02	9.31E-02	2%
Benzaldehyde	90	7.74E-03	9.27E-03	20%	1.78E+00	1.78E+00	0%	3.26E-01	3.29E-01	1%	1.83E-01	1.84E-01	1%	1.02E-01	1.04E-01	2%
2,5-dimethylbenzaldehyde	90	8.35E-03	1.00E-02	20%	1.92E+00	1.92E+00	0%	3.52E-01	3.55E-01	1%	1.97E-01	1.99E-01	1%	1.10E-01	1.12E-01	2%
Butanal (Butyraldehyde)	3,300	2.65E-03	3.17E-03	20%	6.09E-01	6.10E-01	0%	1.11E-01	1.13E-01	1%	6.26E-02	6.30E-02	1%	3.50E-02	3.56E-02	2%
Formaldehyde	50	4.66E-02	5.56E-02	19%	1.05E+01	1.05E+01	0%	1.92E+00	1.93E+00	1%	1.11E+00	1.12E+00	1%	6.08E-01	6.19E-01	2%
Acetaldehyde	470	8.51E-02	1.02E-01	20%	1.96E+01	1.96E+01	0%	3.59E+00	3.62E+00	1%	2.01E+00	2.03E+00	1%	1.12E+00	1.14E+00	2%
Propanal	470	2.85E-02	3.42E-02	20%	6.56E+00	6.57E+00	0%	1.20E+00	1.21E+00	1%	6.74E-01	6.79E-01	1%	3.77E-01	3.83E-01	2%
Crotonaldehyde	8.6	2.73E-02	3.27E-02	20%	6.28E+00	6.29E+00	0%	1.15E+00	1.16E+00	1%	6.45E-01	6.50E-01	1%	3.61E-01	3.67E-01	2%
Hexanal	40	4.48E-03	5.37E-03	20%	1.03E+00	1.03E+00	0%	1.89E-01	1.91E-01	1%	1.06E-01	1.07E-01	1%	5.92E-02	6.02E-02	2%
Heptanal	40	6.52E-03	7.81E-03	20%	1.50E+00	1.50E+00	0%	2.74E-01	2.77E-01	1%	1.54E-01	1.55E-01	1%	8.61E-02	8.76E-02	2%
Octanal	40	6.31E-03	7.56E-03	20%	1.45E+00	1.45E+00	0%	2.66E-01	2.68E-01	1%	1.49E-01	1.50E-01	1%	8.34E-02	8.49E-02	2%
Nonanal	1,500	8.96E-03	1.07E-02	20%	2.06E+00	2.07E+00	0%	3.77E-01	3.81E-01	1%	2.12E-01	2.13E-01	1%	1.18E-01	1.20E-01	2%
Decanal	40	5.70E-03	6.83E-03	20%	1.31E+00	1.31E+00	0%	2.40E-01	2.43E-01	1%	1.35E-01	1.36E-01	1%	7.53E-02	7.67E-02	2%
Undecanal	100	5.29E-03	6.34E-03	20%	1.22E+00	1.22E+00	0%	2.23E-01	2.25E-01	1%	1.25E-01	1.26E-01	1%	7.00E-02	7.12E-02	2%
Dodecanal	40	2.44E-03	2.93E-03	20%	5.62E-01	5.63E-01	0%	1.03E-01	1.04E-01	1%	5.77E-02	5.82E-02	1%	3.23E-02	3.29E-02	2%
Tridecanal	40	4.07E-03	4.88E-03	20%	9.37E-01	9.39E-01	0%	1.72E-01	1.73E-01	1%	9.62E-02	9.69E-02	1%	5.38E-02	5.48E-02	2%
1,2,4-Trimethylbenzene	1,250	1.79E-03	2.15E-03	20%	4.12E-01	4.13E-01	0%	7.55E-02	7.62E-02	1%	4.23E-02	4.27E-02	1%	2.37E-02	2.41E-02	2%
1,3,5-Trimethylbenzene	1,250	5.29E-04	6.34E-04	20%	1.22E-01	1.22E-01	0%	2.23E-02	2.25E-02	1%	1.25E-02	1.26E-02	1%	7.00E-03	7.12E-03	2%
Benzene	27	7.28E-03	8.09E-03	11%	1.29E+00	1.29E+00	0%	2.47E-01	2.49E-01	1%	1.44E-01	1.44E-01	0%	7.81E-02	7.94E-02	2%
Ethylbenzene	26,000	9.62E-04	1.15E-03	20%	2.20E-01	2.21E-01	0%	4.03E-02	4.07E-02	1%	2.27E-02	2.29E-02	1%	1.27E-02	1.29E-02	2%
Propylbenzene	26,000	2.04E-04	2.44E-04	20%	4.69E-02	4.69E-02	0%	8.58E-03	8.66E-03	1%	4.81E-03	4.85E-03	1%	2.69E-03	2.74E-03	2%
Indanone	480	1.42E-04	1.70E-04	20%	3.26E-02	3.26E-02	0%	5.96E-03	6.02E-03	1%	3.34E-03	3.37E-03	1%	1.87E-03	1.90E-03	2%
Toluene	4,500	8.50E-03	1.01E-02	19%	1.87E+00	1.87E+00	0%	3.46E-01	3.50E-01	1%	1.99E-01	2.01E-01	1%	1.11E-01	1.13E-01	2%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	89	4.28E-04	5.12E-04	20%	9.84E-02	9.86E-02	0%	1.80E-02	1.82E-02	1%	1.01E-02	1.02E-02	1%	5.65E-03	5.75E-03	2%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	89	1.06E-03	1.27E-03	20%	2.44E-01	2.44E-01	0%	4.46E-02	4.50E-02	1%	2.50E-02	2.52E-02	1%	1.40E-02	1.42E-02	2%
Acetone	62,000	4.48E-02	5.37E-02	20%	1.03E+01	1.03E+01	0%	1.89E+00	1.91E+00	1%	1.06E+00	1.07E+00	1%	5.92E-01	6.02E-01	2%
Acetophenone	490	1.04E-02	1.24E-02	20%	2.39E+00	2.39E+00	0%	4.37E-01	4.42E-01	1%	2.45E-01	2.47E-01	1%	1.37E-01	1.40E-01	2%
Methyl Ethyl Ketone	13,000	1.53E-02	1.83E-02	20%	3.52E+00	3.52E+00	0%	6.43E-01	6.50E-01	1%	3.61E-01	3.64E-01	1%	2.02E-01	2.05E-01	2%
Xylene	8,700	4.85E-03	5.79E-03	19%	1.09E+00	1.09E+00	0%	2.03E-01	2.05E-01	1%	1.12E-01	1.13E-01	1%	6.39E-02	6.50E-02	2%
o-Xylene	8,700	1.69E-03	2.03E-03	20%	3.89E-01	3.90E-01	0%	7.12E-02	7.19E-02	1%	4.01E-02	4.04E-02	1%	2.24E-02	2.28E-02	2%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	170,000	1.74E-02	2.09E-02	20%	4.01E+00	4.02E+00	0%	7.34E-01	7.41E-01	1%	4.12E-01	4.15E-01	1%	2.30E-01	2.34E-01	2%
1,1,1-Trichloroethane (Methyl chloroform)	10,900	1.01E-05	1.01E-05	0%	1.61E-03	1.61E-03	0%	4.79E-04	4.79E-04	0%	4.24E-04	4.24E-04	0%	2.61E-04	2.61E-04	0%
Butane	66,000	7.80E-03	9.35E-03	20%	1.80E+00	1.80E+00	0%	3.28E-01	3.32E-01	1%	1.84E-01	1.86E-01	1%	1.03E-01	1.05E-01	2%
2,2-Dimethylbutane	3,500	6.31E-04	7.56E-04	20%	1.45E-01	1.45E-01	0%	2.66E-02	2.68E-02	1%	1.49E-02	1.50E-02	1%	8.34E-03	8.49E-03	2%
2,3-Dimethylbutane	3,500	1.16E-03	1.39E-03	20%	2.67E-01	2.68E-01	0%	4.89E-02	4.94E-02	1%	2.74E-02	2.76E-02	1%	1.53E-02	1.56E-02	2%
Isobutene	180,000	2.32E-03	2.78E-03	20%	5.34E-01	5.35E-01	0%	9.78E-02	9.87E-02	1%	5.49E-02	5.53E-02	1%	3.07E-02	3.12E-02	2%
cis-2-Butene	10,000	5.29E-04	6.34E-04	20%	1.22E-01	1.22E-01	0%	2.23E-02	2.25E-02	1%	1.25E-02	1.26E-02	1%	7.00E-03	7.12E-03	2%
trans-2-Butene	10,000	1.06E-03	1.27E-03	20%	2.44E-01	2.44E-01	0%	4.46E-02	4.50E-02	1%	2.50E-02	2.52E-02	1%	1.40E-02	1.42E-02	2%
2-Methyl-1-butene	19,000	5.29E-04	6.34E-04	20%	1.22E-01	1.22E-01	0%	2.23E-02	2.25E-02	1%	1.25E-02	1.26E-02	1%	7.00E-03	7.12E-03	2%
3-Methyl-1-butene	19,000	3.26E-04	3.90E-04	20%	7.50E-02	7.51E-02	0%	1.37E-02	1.39E-02	1%	7.70E-03	7.76E-03	1%	4.30E-03	4.38E-03	2%
1,3-Butadiene	660	6.31E-04	7.56E-04	20%	1.45E-01	1.45E-01	0%	2.66E-02	2.68E-02	1%	1.49E-02	1.50E-02	1%	8.34E-03	8.49E-03	2%
Cyclopentane	3,400	8.35E-04	1.00E-03	20%	1.92E-01	1.92E-01	0%	3.52E-02	3.55E-02	1%	1.97E-02	1.99E-02	1%	1.10E-02	1.12E-02	2%
Methylcyclopentane	2,600	1.26E-03	1.51E-03	20%	2.91E-01	2.91E-01	0%	5.32E-02	5.37E-02	1%	2.98E-02	3.01E-02	1%	1.67E-02	1.70E-02	2%
Pentane	59,000	3.79E-03	4.54E-03	20%	8.72E-01	8.73E-01	0%	1.60E-01	1.61E-01	1%	8.95E-02	9.02E-02	1%	5.00E-02	5.09E-02	2%
Isopentane	59,000	5.58E-03	6.69E-03	20%	1.28E+00	1.29E+00	0%	2.35E-01	2.37E-01	1%	1.32E-01	1.33E-01	1%	7.37E-02	7.50E-02	2%
2-Methylpentane	3,500	1.89E-03	2.27E-03	20%	4.36E-01	4.36E-01	0%	7.98E-02	8.05E-02	1%	4.48E-02	4.51E-02	1%	2.50E-02	2.55E-02	2%
3-Methylpentane	3,500	1.36E-03	1.63E-03	20%	3.14E-01	3.14E-01	0%	5.75E-02	5.80E-02	1%	3.22E-02	3.25E-02	1%	1.80E-02	1.83E-02	2%
2,3-Dimethylpentane	3,500	1.47E-03	1.76E-03	20%	3.37E-01	3.38E-01	0%	6.17E-02	6.24E-02	1%	3.46E-02	3.49E-02	1%	1.94E-02	1.97E-02	2%
2,4-Dimethylpentane	3,500	8.35E-04	1.00E-03	20%	1.92E-01	1.92E-01	0%	3.52E-02	3.55E-02	1%	1.97E-02	1.99E-02	1%	1.10E-02	1.12E-02	2%
2,2,4-Trimethylpentane	3,500	2.52E-03	3.03E-03	20%	5.81E-01	5.82E-01	0%	1.06E-01	1.07E-01	1%	5.97E-02	6.01E-02	1%	3.34E-02	3.40E-02	2%
2,3,4-Trimethylpentane	3,500	6.31E-04	7.56E-04	20%	1.45E-01	1.45E-01	0%	2.66E-02	2.68E-02	1%	1.49E-02	1.50E-02	1%	8.34E-03	8.49E-03	2%
2-Methyl-2-pentene	1,800	4.28E-04	5.12E-04	20%	9.84E-02	9.86E-02	0%	1.80E-02	1.82E-02	1%	1.01E-02	1.02E-02	1%	5.65E-03	5.75E-03	2%
trans-2-Pentene	13,000	1.02E-04	1.22E-04	20%	2.34E-02	2.35E-02	0%	4.29E-03	4.33E-03	1%	2.41E-03	2.42E-03	1%	1.35E-03	1.37E-03	2%
Cyclohexane	3,400	4.28E-04	5.12E-04	20%	9.84E-02	9.86E-02	0%	1.80E-02	1.82E-02	1%	1.01E-02	1.02E-02	1%	5.65E-03	5.75E-03	2%
Methylcyclohexane	3,400	1.06E-03	1.27E-03	20%	2.44E-01	2.44E-01	0%	4.46E-02	4.50E-02	1%	2.50E-02	2.52E-02	1%	1.40E-02	1.42E-02	2%
Pentylcyclohexane	3,400	1.71E-04	2.05E-04	20%	3.93E-02	3.94E-02	0%	7.20E-03	7.27E-03	1%	4.04E-03	4.07E-03	1%	2.26E-03	2.30E-03	2%
Dodecylcyclohexane	100	3.42E-05	4.10E-05	20%	7.87E-03	7.88E-03	0%	1.44E-03	1.46E-03	1%	8.08E-04	8.14E-04	1%	4.52E-04	4.60E-04	2%
Tridecylcyclohexane	100	3.36E-05	4.03E-05	20%	7.73E-03	7.74E-03	0%	1.42E-03	1.43E-03	1%	7.94E-04	8.00E-04	1%	4.44E-04	4.52E-04	2%
Tetradecylcyclohexane	100	3.24E-05	3.88E-05	20%	7.45E-03	7.46E-03	0%	1.36E-03	1.38E-03	1%	7.65E-04	7.71E-04	1%	4.28E-04	4.35E-04	2%
Pentadecylcyclohexane	100	2.61E-05	3.12E-05	20%	6.00E-03	6.01E-03	0%	1.10E-03	1.11E-03	1%	6.16E-04	6.20E-04	1%	3.44E-04	3.50E-04	2%
2-Methylhexane	3,070	1.16E-03	1.39E-03	20%	2.67E-01	2.68E-01	0%	4.89E-02	4.94E-02	1%	2.74E-02	2.76E-02	1%	1.53E-02	1.56E-02	2%
3-Methylhexane	3,070	6.31E-04	7.56E-04	20%	1.45E-01	1.45E-01	0%	2.66E-02	2.68E-02	1%	1.49E-02	1.50E-02	1%	8.34E-03	8.49E-03	2%
3-Ethylhexane	3,500	4.28E-04	5.12E-04	20%	9.84E-02	9.86E-02	0%	1.80E-02	1.82E-02	1%	1.01E-02	1.02E-02	1%	5.65E-03	5.75E-03	2%
2,3-Dimethylhexane	3,500	3.26E-04	3.90E-04	20%	7.50E-02	7.51E-02	0%	1.37E-02	1.39E-02	1%	7.70E-03	7.76E-03	1%	4.30E-03	4.38E-03	2%
2,4-Dimethylhexane	3,500	1.02E-04	1.22E-04	20%	2.34E-02	2.35E-02	0%	4.29E-03	4.33E-03	1%	2.41E-03	2.42E-03	1%	1.35E-03	1.37E-03	2%
2,5-Dimethylhexane	3,500	1.02E-04	1.22E-04	20%	2.34E-02	2.35E-02	0%	4.29E-03	4.33E-03	1%	2.41E-03	2.42E-03	1%	1.35E-03	1.37E-03	2%
cis-2-Hexene	1,000	2.04E-04	2.44E-04	20%	4.69E-02	4.69E-02	0%	8.58E-03	8.66E-03	1%	4.81E-03	4.85E-03	1%	2.69E-03	2.74E-03	2%

**Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A**

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	1,000	3.26E-04	3.90E-04	20%	7.50E-02	7.51E-02	0%	1.37E-02	1.39E-02	1%	7.70E-03	7.76E-03	1%	4.30E-03	4.38E-03	2%
Heptane	3,500	9.57E-04	1.15E-03	20%	2.20E-01	2.21E-01	0%	4.03E-02	4.07E-02	1%	2.26E-02	2.28E-02	1%	1.26E-02	1.29E-02	2%
2-Methylheptane	3,500	2.04E-04	2.44E-04	20%	4.69E-02	4.69E-02	0%	8.58E-03	8.66E-03	1%	4.81E-03	4.85E-03	1%	2.69E-03	2.74E-03	2%
Octane	3,500	5.29E-04	6.34E-04	20%	1.22E-01	1.22E-01	0%	2.23E-02	2.25E-02	1%	1.25E-02	1.26E-02	1%	7.00E-03	7.12E-03	2%
Nonane	10,500	3.26E-04	3.90E-04	20%	7.50E-02	7.51E-02	0%	1.37E-02	1.39E-02	1%	7.70E-03	7.76E-03	1%	4.30E-03	4.38E-03	2%
Dodecane	3,500	1.02E-03	1.23E-03	20%	2.36E-01	2.36E-01	0%	4.31E-02	4.36E-02	1%	2.42E-02	2.44E-02	1%	1.35E-02	1.38E-02	2%
Tridecane	3,500	9.71E-04	1.16E-03	20%	2.24E-01	2.24E-01	0%	4.09E-02	4.13E-02	1%	2.30E-02	2.31E-02	1%	1.28E-02	1.31E-02	2%
Tetradecane	3,500	1.28E-03	1.53E-03	20%	2.95E-01	2.95E-01	0%	5.39E-02	5.45E-02	1%	3.03E-02	3.05E-02	1%	1.69E-02	1.72E-02	2%
n-Pentadecane	100	8.10E-04	9.71E-04	20%	1.87E-01	1.87E-01	0%	3.41E-02	3.45E-02	1%	1.92E-02	1.93E-02	1%	1.07E-02	1.09E-02	2%
Hexadecane	3,500	1.45E-03	1.73E-03	20%	3.33E-01	3.34E-01	0%	6.10E-02	6.16E-02	1%	3.42E-02	3.45E-02	1%	1.91E-02	1.95E-02	2%
n-Heptadecane	100	1.25E-03	1.50E-03	20%	2.88E-01	2.88E-01	0%	5.27E-02	5.32E-02	1%	2.95E-02	2.98E-02	1%	1.65E-02	1.68E-02	2%
n-Octadecane	100	1.22E-03	1.47E-03	20%	2.82E-01	2.82E-01	0%	5.15E-02	5.21E-02	1%	2.89E-02	2.91E-02	1%	1.62E-02	1.65E-02	2%
n-Nonadecane	100	8.37E-04	1.00E-03	20%	1.93E-01	1.93E-01	0%	3.52E-02	3.56E-02	1%	1.98E-02	1.99E-02	1%	1.11E-02	1.13E-02	2%
n-Eicosane	100	4.19E-04	5.03E-04	20%	9.65E-02	9.67E-02	0%	1.77E-02	1.78E-02	1%	9.91E-03	9.99E-03	1%	5.54E-03	5.64E-03	2%
n-Heneicosane	100	1.34E-04	1.61E-04	20%	3.08E-02	3.09E-02	0%	5.64E-03	5.70E-03	1%	3.17E-03	3.19E-03	1%	1.77E-03	1.80E-03	2%
Farnesane	3,500	8.84E-04	1.06E-03	20%	2.03E-01	2.04E-01	0%	3.72E-02	3.76E-02	1%	2.09E-02	2.10E-02	1%	1.17E-02	1.19E-02	2%
Pristane	100	9.02E-04	1.08E-03	20%	2.08E-01	2.08E-01	0%	3.80E-02	3.84E-02	1%	2.13E-02	2.15E-02	1%	1.19E-02	1.21E-02	2%
C ₂ -C ₆ aliphatic	3,400	6.09E-02	7.27E-02	19%	1.37E+01	1.38E+01	0%	2.55E+00	2.58E+00	1%	1.41E+00	1.42E+00	1%	8.02E-01	8.16E-01	2%
>C ₆ -C ₈ aliphatic	3,500	1.10E-02	1.31E-02	20%	2.52E+00	2.52E+00	0%	4.61E-01	4.66E-01	1%	2.59E-01	2.61E-01	1%	1.45E-01	1.47E-01	2%
>C ₈ -C ₁₀ aliphatic	3,500	3.26E-04	3.90E-04	20%	7.50E-02	7.51E-02	0%	1.37E-02	1.39E-02	1%	7.70E-03	7.76E-03	1%	4.30E-03	4.38E-03	2%
>C ₁₀ -C ₁₂ aliphatic	3,500	1.23E-03	1.47E-03	20%	2.82E-01	2.82E-01	0%	5.16E-02	5.21E-02	1%	2.90E-02	2.92E-02	1%	1.62E-02	1.65E-02	2%
>C ₁₂ -C ₁₆ aliphatic	3,500	7.05E-03	8.44E-03	20%	1.62E+00	1.62E+00	0%	2.97E-01	3.00E-01	1%	1.67E-01	1.68E-01	1%	9.31E-02	9.47E-02	2%
>C ₁₆ -C ₂₁ aliphatic	100	6.99E-03	8.37E-03	20%	1.61E+00	1.61E+00	0%	2.94E-01	2.97E-01	1%	1.65E-01	1.66E-01	1%	9.23E-02	9.40E-02	2%
C ₆ -C ₈ aromatic	27	1.54E-02	1.83E-02	19%	3.38E+00	3.38E+00	0%	6.34E-01	6.40E-01	1%	3.54E-01	3.57E-01	1%	2.01E-01	2.05E-01	2%
>C ₈ -C ₁₀ aromatic	1,250	1.69E-03	2.03E-03	20%	3.89E-01	3.90E-01	0%	7.12E-02	7.19E-02	1%	3.99E-02	4.02E-02	1%	2.23E-02	2.27E-02	2%
Dioxins and Furans^(a)																
2378 - TCDD	-	1.18E-12	1.18E-12	0%	2.61E-10	2.61E-10	0%	1.82E-11	1.82E-11	0%	1.41E-10	1.41E-10	0%	2.04E-11	2.04E-11	0%
12378 - PeCDD	-	1.91E-12	1.91E-12	0%	4.22E-10	4.22E-10	0%	2.94E-11	2.94E-11	0%	2.28E-10	2.28E-10	0%	3.31E-11	3.31E-11	0%
123478 - HxCDD	-	4.16E-13	4.16E-13	0%	9.21E-11	9.21E-11	0%	6.42E-12	6.42E-12	0%	4.98E-11	4.98E-11	0%	7.21E-12	7.21E-12	0%
123678 - HxCDD	-	1.11E-12	1.11E-12	0%	2.46E-10	2.46E-10	0%	1.71E-11	1.71E-11	0%	1.33E-10	1.33E-10	0%	1.92E-11	1.92E-11	0%
123789 - HxCDD	-	1.70E-12	1.70E-12	0%	3.76E-10	3.76E-10	0%	2.62E-11	2.62E-11	0%	2.03E-10	2.03E-10	0%	2.95E-11	2.95E-11	0%
1234678 - HpCDD	-	3.15E-12	3.15E-12	0%	6.98E-10	6.98E-10	0%	4.86E-11	4.86E-11	0%	3.77E-10	3.77E-10	0%	5.46E-11	5.46E-11	0%
1,2,3,4,6,7,8,9-Octa CDD	-	3.20E-12	3.20E-12	0%	7.10E-10	7.10E-10	0%	4.95E-11	4.95E-11	0%	3.84E-10	3.84E-10	0%	5.56E-11	5.56E-11	0%
2378 - TCDF	-	1.93E-11	1.93E-11	0%	4.28E-09	4.28E-09	0%	2.98E-10	2.98E-10	0%	2.31E-09	2.31E-09	0%	3.35E-10	3.35E-10	0%
12378 - PeCDF	-	1.01E-11	1.01E-11	0%	2.24E-09	2.24E-09	0%	1.56E-10	1.56E-10	0%	1.21E-09	1.21E-09	0%	1.75E-10	1.75E-10	0%
23478 - PeCDF	-	1.74E-11	1.74E-11	0%	3.85E-09	3.85E-09	0%	2.68E-10	2.68E-10	0%	2.08E-09	2.08E-09	0%	3.02E-10	3.02E-10	0%
123478 - HxCDF	-	1.77E-11	1.77E-11	0%	3.91E-09	3.91E-09	0%	2.73E-10	2.73E-10	0%	2.12E-09	2.12E-09	0%	3.06E-10	3.06E-10	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	-	9.49E-12	9.49E-12	0%	2.10E-09	2.10E-09	0%	1.47E-10	1.47E-10	0%	1.14E-09	1.14E-09	0%	1.65E-10	1.65E-10	0%
234678 - HxCDF	-	3.67E-12	3.67E-12	0%	8.13E-10	8.13E-10	0%	5.67E-11	5.67E-11	0%	4.39E-10	4.39E-10	0%	6.37E-11	6.37E-11	0%
123789 - HxCDF	-	3.81E-13	3.81E-13	0%	8.44E-11	8.44E-11	0%	5.89E-12	5.89E-12	0%	4.56E-11	4.56E-11	0%	6.61E-12	6.61E-12	0%
1234678 - HpCDF	-	1.44E-11	1.44E-11	0%	3.19E-09	3.19E-09	0%	2.23E-10	2.23E-10	0%	1.73E-09	1.73E-09	0%	2.50E-10	2.50E-10	0%
1234789 - HpCDF	-	1.63E-12	1.63E-12	0%	3.61E-10	3.61E-10	0%	2.51E-11	2.51E-11	0%	1.95E-10	1.95E-10	0%	2.82E-11	2.82E-11	0%
1,2,3,4,6,7,8,9-Octa CDF	-	1.49E-12	1.49E-12	0%	3.31E-10	3.31E-10	0%	2.31E-11	2.31E-11	0%	1.79E-10	1.79E-10	0%	2.59E-11	2.59E-11	0%
Total PCDDs (TEQ)	-	3.44E-12	3.44E-12	0%	7.62E-10	7.62E-10	0%	5.31E-11	5.31E-11	0%	4.12E-10	4.12E-10	0%	5.97E-11	5.97E-11	0%
Total PCDFs (TEQ)	-	1.07E-11	1.07E-11	0%	2.38E-09	2.38E-09	0%	1.66E-10	1.66E-10	0%	1.28E-09	1.28E-09	0%	1.86E-10	1.86E-10	0%
Total PCDDs + PCDFs	-	3.58E-10	3.58E-10	0%	7.93E-08	7.93E-08	0%	5.53E-09	5.53E-09	0%	4.29E-08	4.29E-08	0%	6.21E-09	6.21E-09	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 1-hour (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

>= greater than; "-" = no value;% = percent; MPOI = Maximum Point of Impingment; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																			
Carbon monoxide	15,000	3.70E+01	3.70E+01	0%	1.23E+02	1.23E+02	0%	4.74E+00	5.75E+00	21%	8.58E+00	9.04E+00	5%	8.88E+00	9.54E+00	7%	1.42E+03	1.42E+03	0%
Nitrogen dioxide	190	7.79E+01	7.79E+01	0%	8.51E+01	8.51E+01	0%	1.42E+01	1.57E+01	11%	2.52E+01	2.62E+01	4%	2.59E+01	2.70E+01	4%	5.00E+02	5.00E+02	0%
Sulphur dioxide (10 minute)	500	3.83E-01	3.83E-01	0%	8.78E-01	8.78E-01	0%	3.53E-02	3.97E-02	13%	6.00E-02	6.33E-02	6%	6.30E-02	6.64E-02	5%	2.57E+01	2.57E+01	0%
Sulphur dioxide	200	2.32E-01	2.32E-01	0%	5.32E-01	5.32E-01	0%	2.14E-02	2.40E-02	13%	3.63E-02	3.83E-02	6%	3.81E-02	4.02E-02	5%	1.56E+01	1.56E+01	0%
Metals																			
Aluminum	20	1.72E+00	1.83E+00	6%	3.32E+01	3.35E+01	1%	6.44E-02	2.05E-01	218%	5.05E-02	1.20E-01	137%	4.71E-02	1.22E-01	159%	2.26E+02	4.19E+02	85%
Antimony	5	4.78E-05	5.07E-05	6%	9.21E-04	9.29E-04	1%	1.80E-06	5.70E-06	217%	1.41E-06	3.32E-06	136%	1.31E-06	3.38E-06	159%	6.29E-03	1.16E-02	85%
Arsenic	3	2.69E-04	2.69E-04	0%	4.06E-03	4.06E-03	0%	2.10E-05	2.76E-05	31%	2.93E-05	2.93E-05	0%	3.02E-05	3.03E-05	0%	2.63E-02	4.86E-02	85%
Barium	5	1.41E-02	1.50E-02	6%	2.71E-01	2.73E-01	1%	5.78E-04	1.73E-03	199%	4.51E-04	9.96E-04	121%	4.01E-04	1.01E-03	152%	1.85E+00	3.42E+00	85%
Beryllium	0.02	1.86E-04	1.86E-04	0%	1.09E-03	1.09E-03	0%	1.54E-05	1.54E-05	0%	2.17E-05	2.17E-05	0%	2.23E-05	2.24E-05	0%	6.38E-03	1.18E-02	85%
Cadmium	0.1	1.73E-03	1.73E-03	0%	2.93E-03	3.12E-03	6%	1.88E-04	2.20E-04	17%	3.50E-04	3.79E-04	8%	3.57E-04	3.89E-04	9%	5.90E-02	5.90E-02	0%
Chromium (VI) ^(b)	0.1	4.41E-03	4.69E-03	6%	8.52E-02	8.54E-02	0%	2.24E-04	5.86E-04	162%	1.83E-04	3.39E-04	85%	2.03E-04	3.32E-04	64%	5.77E-01	1.07E+00	85%
Chromium (III) ^(b)	3.6	4.41E-03	4.69E-03	6%	8.52E-02	8.54E-02	0%	2.24E-04	5.86E-04	162%	1.83E-04	3.39E-04	85%	2.03E-04	3.32E-04	64%	5.77E-01	1.07E+00	85%
Cobalt	0.2	3.00E-04	3.00E-04	0%	3.36E-03	3.36E-03	0%	3.26E-05	4.61E-05	42%	6.17E-05	6.77E-05	10%	6.27E-05	6.89E-05	10%	2.29E-02	4.44E-02	94%
Copper	10	5.67E-04	5.67E-04	0%	9.24E-03	9.24E-03	0%	5.33E-05	8.10E-05	52%	8.49E-05	8.94E-05	5%	9.35E-05	9.82E-05	5%	6.11E-02	1.15E-01	88%
Iron	10	4.09E-01	4.34E-01	6%	7.87E+00	7.93E+00	1%	1.70E-02	5.03E-02	196%	1.33E-02	2.90E-02	118%	1.18E-02	2.95E-02	150%	5.37E+01	9.92E+01	85%
Lead	-	6.96E-04	6.96E-04	0%	8.69E-03	8.69E-03	0%	6.47E-05	7.96E-05	23%	1.06E-04	1.11E-04	4%	1.16E-04	1.20E-04	4%	5.63E-02	1.06E-01	89%
Manganese	2	6.25E-03	6.64E-03	6%	1.21E-01	1.21E-01	0%	2.89E-04	8.02E-04	177%	2.25E-04	4.59E-04	104%	2.38E-04	4.61E-04	94%	8.20E-01	1.52E+00	85%
Mercury	0.25	2.17E-04	2.17E-04	0%	1.99E-03	1.99E-03	0%	1.71E-05	1.71E-05	0%	2.38E-05	2.38E-05	0%	2.47E-05	2.48E-05	0%	1.23E-02	2.27E-02	85%
Molybdenum	30	3.53E-05	3.75E-05	6%	6.80E-04	6.85E-04	1%	1.42E-06	4.30E-06	203%	1.11E-06	2.49E-06	124%	9.95E-07	2.53E-06	154%	4.64E-03	8.57E-03	85%
Nickel	0.33	2.47E-03	2.47E-03	0%	1.18E-02	1.18E-02	0%	1.03E-04	1.24E-04	20%	1.32E-04	1.32E-04	0%	1.05E-04	1.05E-04	0%	1.05E-01	1.37E-01	30%
Selenium	2	9.14E-04	9.14E-04	0%	1.77E-03	1.77E-03	0%	7.65E-05	7.65E-05	0%	1.08E-04	1.08E-04	0%	1.11E-04	1.11E-04	0%	2.49E-02	2.49E-02	0%
Silver	0.1	2.64E-04	2.64E-04	0%	5.08E-04	5.21E-04	3%	2.99E-05	3.52E-05	18%	5.66E-05	6.16E-05	9%	5.81E-05	6.35E-05	9%	9.37E-03	9.37E-03	0%
Strontium	20	9.10E-03	9.66E-03	6%	1.75E-01	1.77E-01	1%	3.67E-04	1.11E-03	202%	2.87E-04	6.41E-04	124%	2.57E-04	6.52E-04	154%	1.20E+00	2.21E+00	85%
Tellurium	1	2.53E-06	2.69E-06	6%	4.88E-05	4.92E-05	1%	9.82E-08	3.05E-07	211%	7.69E-08	1.77E-07	130%	7.03E-08	1.80E-07	156%	3.33E-04	6.15E-04	85%
Thallium	1	3.32E-05	3.52E-05	6%	6.40E-04	6.45E-04	1%	1.23E-06	3.94E-06	220%	9.67E-07	2.30E-06	138%	9.04E-07	2.34E-06	159%	4.36E-03	8.07E-03	85%
Titanium	50	3.75E-02	3.98E-02	6%	7.22E-01	7.28E-01	1%	1.44E-03	4.50E-03	212%	1.13E-03	2.62E-03	132%	1.04E-03	2.66E-03	157%	4.92E+00	9.10E+00	85%
Tungsten	10	1.12E-04	1.18E-04	6%	2.15E-03	2.17E-03	1%	4.18E-06	1.33E-05	218%	3.28E-06	7.76E-06	137%	3.05E-06	7.90E-06	159%	1.47E-02	2.71E-02	85%
Uranium	0.5	1.37E-04	1.45E-04	6%	2.64E-03	2.66E-03	1%	5.21E-06	1.64E-05	215%	4.08E-06	9.55E-06	134%	3.77E-06	9.72E-06	158%	1.80E-02	3.33E-02	85%
Vanadium	0.5	8.57E-04	9.10E-04	6%	1.65E-02	1.66E-02	1%	3.49E-05	1.05E-04	200%	2.73E-05	6.05E-05	122%	2.43E-05	6.15E-05	153%	1.13E-01	2.08E-01	85%
Zinc	20	2.09E-03	2.09E-03	0%	2.61E-02	2.61E-02	0%	2.26E-04	3.26E-04	44%	4.21E-04	4.63E-04	10%	4.28E-04	4.72E-04	10%	1.78E-01	3.43E-01	93%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																			
1-Methylnaphthalene	30	9.73E-04	1.61E-03	65%	4.01E-03	6.22E-03	55%	1.25E-04	3.46E-04	177%	1.40E-04	1.98E-04	41%	1.09E-04	1.84E-04	69%	1.26E-02	5.20E-02	312%
1-Methylphenanthrene	0.5	4.37E-05	7.23E-05	65%	1.81E-04	2.80E-04	55%	5.61E-06	1.55E-05	177%	6.32E-06	8.92E-06	41%	4.90E-06	8.26E-06	69%	5.67E-04	2.34E-03	312%
2-Methylantracene	0.5	2.68E-05	4.42E-05	65%	1.10E-04	1.71E-04	55%	3.43E-06	9.51E-06	177%	3.86E-06	5.46E-06	41%	3.00E-06	5.05E-06	69%	3.47E-04	1.43E-03	312%
2-Methylfluorene	10	9.03E-07	1.49E-06	65%	3.73E-06	5.77E-06	55%	1.16E-07	3.21E-07	177%	1.30E-07	1.84E-07	41%	1.01E-07	1.70E-07	69%	1.17E-05	4.83E-05	312%
2-methylnaphthalene	30	1.57E-03	2.60E-03	65%	6.49E-03	1.01E-02	55%	2.01E-04	5.59E-04	177%	2.27E-04	3.21E-04	41%	1.76E-04	2.97E-04	69%	2.04E-02	8.41E-02	312%
2-Methylphenanthrene	0.5	1.08E-04	1.79E-04	65%	4.46E-04	6.91E-04	55%	1.39E-05	3.84E-05	177%	1.56E-05	2.20E-05	41%	1.21E-05	2.04E-05	69%	1.40E-03	5.78E-03	312%
2-Methylpyrene	0.5	8.01E-06	1.32E-05	65%	3.30E-05	5.12E-05	55%	1.03E-06	2.85E-06	177%	1.16E-06	1.63E-06	41%	8.98E-07	1.51E-06	69%	1.04E-04	4.28E-04	312%
3-Methyldibenzothiophene	25	1.65E-06	2.74E-06	65%	6.83E-06	1.06E-05	55%	2.12E-07	5.88E-07	177%	2.39E-07	3.37E-07	41%	1.85E-07	3.13E-07	69%	2.15E-05	8.85E-05	312%
3-Methylphenanthrene	0.5	7.80E-05	1.29E-04	65%	3.22E-04	4.99E-04	55%	9.99E-06	2.77E-05	177%	1.13E-05	1.59E-05	41%	8.74E-06	1.47E-05	69%	1.01E-03	4.17E-03	312%
4-+9-Methylphenanthrene	0.5	5.89E-05	9.74E-05	65%	2.43E-04	3.77E-04	55%	7.55E-06	2.09E-05	177%	8.51E-06	1.20E-05	41%	6.60E-06	1.11E-05	69%	7.64E-04	3.15E-03	312%
4-Methyldibenzothiophene	25	1.05E-06	1.74E-06	65%	4.35E-06	6.74E-06	55%	1.35E-07	3.74E-07	177%	1.52E-07	2.15E-07	41%	1.18E-07	1.99E-07	69%	1.37E-05	5.63E-05	312%
9-Methylphenanthrene	0.5	2.96E-07	2.96E-07	0%	7.09E-07	7.09E-07	0%	4.29E-08	4.29E-08	0%	7.68E-08	7.68E-08	0%	6.53E-08	6.53E-08	0%	3.36E-05	3.36E-05	0%
Acenaphthene	1	1.48E-04	1.48E-04	0%	2.85E-04	3.21E-04	13%	2.08E-05	2.54E-05	22%	3.45E-05	3.73E-05	8%	3.69E-05	3.99E-05	8%	6.59E-03	6.60E-03	0%
Acenaphthylene	1	2.91E-04	2.98E-04	2%	7.79E-04	1.16E-03	49%	4.32E-05	6.41E-05	48%	7.17E-05	8.19E-05	14%	7.62E-05	8.72E-05	15%	1.29E-02	1.30E-02	0%
Acephenanthrylene	0.5	3.09E-05	5.10E-05	65%	1.27E-04	1.98E-04	55%	3.96E-06	1.10E-05	177%	4.46E-06	6.30E-06	41%	3.46E-06	5.83E-06	69%	4.00E-04	1.65E-03	312%
Anthracene	0.5	3.89E-05	5.32E-05	37%	1.36E-04	2.06E-04	52%	6.08E-06	1.15E-05	89%	1.01E-05	1.20E-05	18%	1.07E-05	1.27E-05	18%	1.73E-03	1.74E-03	0%
Benz(a)anthracene	0.5	1.96E-05	1.96E-05	0%	3.88E-05	4.95E-05	28%	2.83E-06	3.54E-06	25%	4.72E-06	5.15E-06	9%	5.02E-06	5.49E-06	9%	8.80E-04	8.81E-04	0%
Benzo(a)fluorene	0.5	9.71E-06	1.61E-05	65%	4.01E-05	6.21E-05	55%	1.24E-06	3.45E-06	177%	1.40E-06	1.98E-06	41%	1.09E-06	1.83E-06	69%	1.26E-04	5.19E-04	312%
Benzo(a)pyrene	0.03	8.11E-06	8.11E-06	0%	1.87E-05	2.73E-05	46%	1.18E-06	1.57E-06	33%	1.94E-06	2.18E-06	12%	2.07E-06	2.33E-06	13%	3.60E-04	3.60E-04	0%
Benzo(b)fluoranthene	0.5	3.69E-05	5.91E-05	60%	1.48E-04	2.29E-04	54%	5.74E-06	1.28E-05	122%	9.66E-06	1.17E-05	21%	1.01E-05	1.25E-05	23%	1.57E-03	1.91E-03	21%
Benzo(e)pyrene	0.5	7.84E-07	1.04E-06	33%	2.62E-06	3.87E-06	47%	8.79E-08	2.24E-07	155%	1.34E-07	1.50E-07	12%	1.08E-07	1.41E-07	31%	2.13E-05	3.21E-05	51%
Benzo(g,h,i)fluoranthene	0.5	1.50E-05	2.48E-05	65%	6.18E-05	9.58E-05	55%	1.92E-06	5.32E-06	177%	2.16E-06	3.05E-06	41%	1.68E-06	2.83E-06	69%	1.94E-04	8.01E-04	312%
Benzo(g,h,i)perylene	0.5	1.76E-05	1.76E-05	0%	4.27E-05	6.26E-05	47%	2.61E-06	3.58E-06	37%	4.38E-06	4.93E-06	13%	4.65E-06	5.24E-06	13%	7.86E-04	7.87E-04	0%
Benzo(k)fluoranthene	0.5	6.88E-06	6.88E-06	0%	1.76E-05	2.60E-05	48%	1.01E-06	1.44E-06	42%	1.68E-06	1.91E-06	14%	1.79E-06	2.03E-06	14%	3.05E-04	3.06E-04	0%
Biphenyl	10	1.25E-06	1.25E-06	0%	2.99E-06	2.99E-06	0%	1.81E-07	1.81E-07	0%	3.24E-07	3.24E-07	0%	2.75E-07	2.75E-07	0%	1.42E-04	1.42E-04	0%
Chrysene	0.5	4.82E-05	4.82E-05	0%	8.78E-05	8.78E-05	0%	6.45E-06	7.25E-06	12%	1.06E-05	1.11E-05	5%	1.14E-05	1.20E-05	5%	2.14E-03	2.14E-03	0%
Coronene	0.5	7.52E-08	1.24E-07	65%	3.10E-07	4.81E-07	55%	9.64E-09	2.67E-08	177%	1.09E-08	1.53E-08	41%	8.43E-09	1.42E-08	69%	9.75E-07	4.02E-06	312%
Cyclopenta(c,d)pyrene	0.03	5.30E-06	8.76E-06	65%	2.19E-05	3.39E-05	55%	6.79E-07	1.88E-06	177%	7.65E-07	1.08E-06	41%	5.94E-07	1.00E-06	69%	6.87E-05	2.83E-04	312%
Dibenzo(a,h)anthracene	0.5	1.18E-05	1.85E-05	56%	4.66E-05	7.15E-05	53%	1.81E-06	4.03E-06	123%	3.05E-06	3.68E-06	21%	3.19E-06	3.95E-06	24%	4.92E-04	5.96E-04	21%
Dibenzothiophene	25	6.40E-07	1.06E-06	65%	2.64E-06	4.10E-06	55%	8.21E-08	2.27E-07	177%	9.24E-08	1.31E-07	41%	7.18E-08	1.21E-07	69%	8.30E-06	3.42E-05	312%
Fluoranthene	0.5	1.41E-04	2.26E-04	60%	5.66E-04	8.75E-04	55%	2.11E-05	4.88E-05	131%	3.56E-05	4.33E-05	22%	3.72E-05	4.68E-05	26%	5.71E-03	7.29E-03	28%
Fluorene	10	4.04E-04	4.25E-04	5%	1.11E-03	1.65E-03	49%	6.03E-05	9.14E-05	52%	1.00E-04	1.15E-04	14%	1.06E-04	1.22E-04	15%	1.80E-02	1.80E-02	0%
Indeno(1,2,3-cd)fluoranthene	0.5	3.76E-07	6.21E-07	65%	1.55E-06	2.41E-06	55%	4.82E-08	1.34E-07	177%	5.43E-08	7.67E-08	41%	4.21E-08	7.10E-08	69%	4.88E-06	2.01E-05	312%
Indeno(1,2,3-cd)pyrene	0.5	1.30E-05	1.30E-05	0%	2.31E-05	2.31E-05	0%	1.69E-06	1.69E-06	0%	2.78E-06	2.78E-06	0%	3.00E-06	3.00E-06	0%	5.81E-04	5.81E-04	0%
Indeno(1,2,3-W)pyrene	0.5	6.75E-06	1.12E-05	65%	2.79E-05	4.32E-05	55%	8.66E-07	2.40E-06	177%	9.75E-07	1.38E-06	41%	7.57E-07	1.28E-06	69%	8.76E-05	3.61E-04	312%
Naphthalene	30	4.28E-03	6.39E-03	49%	1.64E-02	2.47E-02	51%	6.78E-04	1.42E-03	109%	1.15E-03	1.36E-03	19%	1.20E-03	1.46E-03	21%	1.86E-01	2.06E-01	11%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	0.5	6.01E-06	9.94E-06	65%	2.48E-05	3.85E-05	55%	7.70E-07	2.14E-06	177%	8.68E-07	1.23E-06	41%	6.74E-07	1.14E-06	69%	7.80E-05	3.21E-04	312%
Perylene	0.5	7.52E-08	1.24E-07	65%	3.10E-07	4.81E-07	55%	9.64E-09	2.67E-08	177%	1.09E-08	1.53E-08	41%	8.43E-09	1.42E-08	69%	9.75E-07	4.02E-06	312%
Phenanthrene	0.5	1.28E-03	1.28E-03	0%	2.33E-03	2.33E-03	0%	1.71E-04	1.93E-04	13%	2.81E-04	2.94E-04	5%	3.03E-04	3.18E-04	5%	5.69E-02	5.69E-02	0%
Picene	0.5	7.52E-08	1.24E-07	65%	3.10E-07	4.81E-07	55%	9.64E-09	2.67E-08	177%	1.09E-08	1.53E-08	41%	8.43E-09	1.42E-08	69%	9.75E-07	4.02E-06	312%
Pyrene	0.5	1.90E-04	3.07E-04	61%	7.65E-04	1.19E-03	55%	2.41E-05	6.61E-05	175%	3.77E-05	4.91E-05	30%	3.84E-05	5.43E-05	41%	5.29E-03	9.90E-03	87%
Volatile Organic Compounds																			
Methacrolein	16	1.09E-01	1.17E-01	8%	3.44E-01	3.44E-01	0%	1.55E-02	2.11E-02	36%	1.51E-02	1.70E-02	13%	1.27E-02	1.45E-02	14%	8.74E+00	8.74E+00	0%
Acrolein	7	9.26E-02	9.98E-02	8%	2.92E-01	2.92E-01	0%	1.32E-02	1.80E-02	36%	1.28E-02	1.45E-02	13%	1.08E-02	1.23E-02	14%	7.43E+00	7.43E+00	0%
Benzaldehyde	90	1.03E-01	1.12E-01	8%	3.26E-01	3.26E-01	0%	1.48E-02	2.01E-02	36%	1.43E-02	1.62E-02	13%	1.20E-02	1.38E-02	14%	8.30E+00	8.30E+00	0%
2,5-dimethylbenzaldehyde	90	1.12E-01	1.20E-01	8%	3.52E-01	3.52E-01	0%	1.59E-02	2.17E-02	36%	1.55E-02	1.75E-02	13%	1.30E-02	1.49E-02	14%	8.95E+00	8.96E+00	0%
Butanal (Butyraldehyde)	3,300	3.54E-02	3.82E-02	8%	1.12E-01	1.12E-01	0%	5.05E-03	6.87E-03	36%	4.90E-03	5.54E-03	13%	4.12E-03	4.72E-03	14%	2.84E+00	2.84E+00	0%
Formaldehyde	50	6.19E-01	6.76E-01	9%	1.94E+00	1.94E+00	0%	8.92E-02	1.20E-01	35%	8.71E-02	9.82E-02	13%	7.32E-02	8.45E-02	16%	4.87E+01	4.87E+01	0%
Acetaldehyde	470	1.14E+00	1.23E+00	8%	3.59E+00	3.59E+00	0%	1.62E-01	2.21E-01	36%	1.58E-01	1.78E-01	13%	1.33E-01	1.52E-01	14%	9.13E+01	9.13E+01	0%
Propanal	470	3.81E-01	4.11E-01	8%	1.20E+00	1.20E+00	0%	5.44E-02	7.40E-02	36%	5.28E-02	5.96E-02	13%	4.44E-02	5.08E-02	14%	3.06E+01	3.06E+01	0%
Crotonaldehyde	8.6	3.65E-01	3.93E-01	8%	1.15E+00	1.15E+00	0%	5.21E-02	7.08E-02	36%	5.05E-02	5.71E-02	13%	4.25E-02	4.86E-02	14%	2.93E+01	2.93E+01	0%
Hexanal	40	5.99E-02	6.46E-02	8%	1.89E-01	1.89E-01	0%	8.55E-03	1.16E-02	36%	8.29E-03	9.37E-03	13%	6.98E-03	7.98E-03	14%	4.81E+00	4.81E+00	0%
Heptanal	40	8.71E-02	9.39E-02	8%	2.75E-01	2.75E-01	0%	1.24E-02	1.69E-02	36%	1.21E-02	1.36E-02	13%	1.01E-02	1.16E-02	14%	6.99E+00	6.99E+00	0%
Octanal	40	8.44E-02	9.10E-02	8%	2.66E-01	2.66E-01	0%	1.20E-02	1.64E-02	36%	1.17E-02	1.32E-02	13%	9.83E-03	1.12E-02	14%	6.77E+00	6.77E+00	0%
Nonanal	1,500	1.20E-01	1.29E-01	8%	3.78E-01	3.78E-01	0%	1.71E-02	2.33E-02	36%	1.66E-02	1.87E-02	13%	1.40E-02	1.60E-02	14%	9.61E+00	9.61E+00	0%
Decanal	40	7.62E-02	8.22E-02	8%	2.41E-01	2.41E-01	0%	1.09E-02	1.48E-02	36%	1.06E-02	1.19E-02	13%	8.88E-03	1.02E-02	14%	6.12E+00	6.12E+00	0%
Undecanal	100	7.08E-02	7.63E-02	8%	2.23E-01	2.23E-01	0%	1.01E-02	1.37E-02	36%	9.80E-03	1.11E-02	13%	8.24E-03	9.43E-03	14%	5.68E+00	5.68E+00	0%
Dodecanal	40	3.27E-02	3.52E-02	8%	1.03E-01	1.03E-01	0%	4.66E-03	6.34E-03	36%	4.52E-03	5.11E-03	13%	3.81E-03	4.35E-03	14%	2.62E+00	2.62E+00	0%
Tridecanal	40	5.45E-02	5.87E-02	8%	1.72E-01	1.72E-01	0%	7.77E-03	1.06E-02	36%	7.54E-03	8.52E-03	13%	6.34E-03	7.25E-03	14%	4.37E+00	4.37E+00	0%
1,2,4-Trimethylbenzene	1,250	2.40E-02	2.58E-02	8%	7.56E-02	7.56E-02	0%	3.42E-03	4.65E-03	36%	3.32E-03	3.75E-03	13%	2.79E-03	3.19E-03	14%	1.92E+00	1.92E+00	0%
1,3,5-Trimethylbenzene	1,250	7.08E-03	7.63E-03	8%	2.23E-02	2.23E-02	0%	1.01E-03	1.37E-03	36%	9.80E-04	1.11E-03	13%	8.24E-04	9.43E-04	14%	5.68E-01	5.68E-01	0%
Benzene	27	8.10E-02	8.62E-02	6%	2.46E-01	2.46E-01	0%	1.15E-02	1.54E-02	33%	1.31E-02	1.35E-02	3%	1.28E-02	1.43E-02	11%	6.00E+00	6.00E+00	0%
Ethylbenzene	26,000	1.28E-02	1.39E-02	8%	4.05E-02	4.05E-02	0%	1.83E-03	2.49E-03	36%	1.79E-03	2.01E-03	13%	1.50E-03	1.71E-03	14%	1.03E+00	1.03E+00	0%
Propylbenzene	26,000	2.72E-03	2.94E-03	8%	8.59E-03	8.59E-03	0%	3.89E-04	5.28E-04	36%	3.77E-04	4.26E-04	13%	3.17E-04	3.63E-04	14%	2.18E-01	2.18E-01	0%
Indanone	480	1.89E-03	2.04E-03	8%	5.97E-03	5.97E-03	0%	2.70E-04	3.67E-04	36%	2.62E-04	2.96E-04	13%	2.20E-04	2.52E-04	14%	1.52E-01	1.52E-01	0%
Toluene	4,500	1.13E-01	1.23E-01	9%	3.51E-01	3.51E-01	0%	1.62E-02	2.18E-02	34%	1.65E-02	1.79E-02	8%	1.46E-02	1.67E-02	14%	8.70E+00	8.70E+00	0%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	89	5.72E-03	6.16E-03	8%	1.80E-02	1.80E-02	0%	8.16E-04	1.11E-03	36%	7.92E-04	8.95E-04	13%	6.66E-04	7.62E-04	14%	4.59E-01	4.59E-01	0%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	89	1.42E-02	1.53E-02	8%	4.47E-02	4.47E-02	0%	2.02E-03	2.75E-03	36%	1.96E-03	2.22E-03	13%	1.65E-03	1.89E-03	14%	1.14E+00	1.14E+00	0%
Acetone	62,000	5.99E-01	6.46E-01	8%	1.89E+00	1.89E+00	0%	8.55E-02	1.16E-01	36%	8.29E-02	9.37E-02	13%	6.98E-02	7.98E-02	14%	4.81E+01	4.81E+01	0%
Acetophenone	490	1.39E-01	1.50E-01	8%	4.38E-01	4.38E-01	0%	1.98E-02	2.70E-02	36%	1.92E-02	2.17E-02	13%	1.62E-02	1.85E-02	14%	1.11E+01	1.11E+01	0%
Methyl Ethyl Ketone	13,000	2.04E-01	2.20E-01	8%	6.44E-01	6.44E-01	0%	2.91E-02	3.96E-02	36%	2.83E-02	3.19E-02	13%	2.38E-02	2.72E-02	14%	1.64E+01	1.64E+01	0%
Xylene	8,700	6.50E-02	6.99E-02	7%	2.03E-01	2.03E-01	0%	9.27E-03	1.25E-02	35%	9.48E-03	1.01E-02	7%	8.27E-03	9.50E-03	15%	5.09E+00	5.09E+00	0%
o-Xylene	8,700	2.26E-02	2.44E-02	8%	7.14E-02	7.14E-02	0%	3.23E-03	4.39E-03	36%	3.14E-03	3.55E-03	13%	2.64E-03	3.02E-03	14%	1.81E+00	1.81E+00	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	170,000	2.33E-01	2.51E-01	8%	7.35E-01	7.35E-01	0%	3.33E-02	4.52E-02	36%	3.23E-02	3.65E-02	13%	2.71E-02	3.10E-02	14%	1.87E+01	1.87E+01	0%
1,1,1-Trichloroethane (Methyl chloroform)	10,900	1.72E-04	1.72E-04	0%	4.05E-04	4.05E-04	0%	2.00E-05	2.00E-05	0%	2.67E-05	2.67E-05	0%	2.62E-05	2.62E-05	0%	3.68E-03	3.68E-03	0%
Butane	66,000	1.04E-01	1.12E-01	8%	3.29E-01	3.29E-01	0%	1.49E-02	2.02E-02	36%	1.44E-02	1.63E-02	13%	1.21E-02	1.39E-02	14%	8.37E+00	8.37E+00	0%
2,2-Dimethylbutane	3,500	8.44E-03	9.10E-03	8%	2.66E-02	2.66E-02	0%	1.20E-03	1.64E-03	36%	1.17E-03	1.32E-03	13%	9.83E-04	1.12E-03	14%	6.77E-01	6.77E-01	0%
2,3-Dimethylbutane	3,500	1.55E-02	1.67E-02	8%	4.90E-02	4.90E-02	0%	2.22E-03	3.01E-03	36%	2.15E-03	2.43E-03	13%	1.81E-03	2.07E-03	14%	1.24E+00	1.25E+00	0%
Isobutene	180,000	3.10E-02	3.35E-02	8%	9.79E-02	9.79E-02	0%	4.43E-03	6.02E-03	36%	4.30E-03	4.86E-03	13%	3.61E-03	4.13E-03	14%	2.49E+00	2.49E+00	0%
cis-2-Butene	10,000	7.08E-03	7.63E-03	8%	2.23E-02	2.23E-02	0%	1.01E-03	1.37E-03	36%	9.80E-04	1.11E-03	13%	8.24E-04	9.43E-04	14%	5.68E-01	5.68E-01	0%
trans-2-Butene	10,000	1.42E-02	1.53E-02	8%	4.47E-02	4.47E-02	0%	2.02E-03	2.75E-03	36%	1.96E-03	2.22E-03	13%	1.65E-03	1.89E-03	14%	1.14E+00	1.14E+00	0%
2-Methyl-1-butene	19,000	7.08E-03	7.63E-03	8%	2.23E-02	2.23E-02	0%	1.01E-03	1.37E-03	36%	9.80E-04	1.11E-03	13%	8.24E-04	9.43E-04	14%	5.68E-01	5.68E-01	0%
3-Methyl-1-butene	19,000	4.36E-03	4.70E-03	8%	1.37E-02	1.37E-02	0%	6.22E-04	8.46E-04	36%	6.03E-04	6.82E-04	13%	5.07E-04	5.80E-04	14%	3.49E-01	3.50E-01	0%
1,3-Butadiene	660	8.44E-03	9.10E-03	8%	2.66E-02	2.66E-02	0%	1.20E-03	1.64E-03	36%	1.17E-03	1.32E-03	13%	9.83E-04	1.12E-03	14%	6.77E-01	6.77E-01	0%
Cyclopentane	3,400	1.12E-02	1.20E-02	8%	3.52E-02	3.52E-02	0%	1.59E-03	2.17E-03	36%	1.55E-03	1.75E-03	13%	1.30E-03	1.49E-03	14%	8.95E-01	8.96E-01	0%
Methylcyclopentane	2,600	1.69E-02	1.82E-02	8%	5.33E-02	5.33E-02	0%	2.41E-03	3.28E-03	36%	2.34E-03	2.64E-03	13%	1.97E-03	2.25E-03	14%	1.35E+00	1.35E+00	0%
Pentane	59,000	5.06E-02	5.46E-02	8%	1.60E-01	1.60E-01	0%	7.23E-03	9.83E-03	36%	7.01E-03	7.92E-03	13%	5.90E-03	6.75E-03	14%	4.06E+00	4.06E+00	0%
Isopentane	59,000	7.46E-02	8.04E-02	8%	2.35E-01	2.35E-01	0%	1.06E-02	1.45E-02	36%	1.03E-02	1.17E-02	13%	8.69E-03	9.94E-03	14%	5.98E+00	5.99E+00	0%
2-Methylpentane	3,500	2.53E-02	2.73E-02	8%	7.99E-02	7.99E-02	0%	3.61E-03	4.92E-03	36%	3.51E-03	3.96E-03	13%	2.95E-03	3.37E-03	14%	2.03E+00	2.03E+00	0%
3-Methylpentane	3,500	1.82E-02	1.97E-02	8%	5.75E-02	5.76E-02	0%	2.60E-03	3.54E-03	36%	2.53E-03	2.85E-03	13%	2.12E-03	2.43E-03	14%	1.46E+00	1.46E+00	0%
2,3-Dimethylpentane	3,500	1.96E-02	2.11E-02	8%	6.18E-02	6.18E-02	0%	2.80E-03	3.81E-03	36%	2.71E-03	3.07E-03	13%	2.28E-03	2.61E-03	14%	1.57E+00	1.57E+00	0%
2,4-Dimethylpentane	3,500	1.12E-02	1.20E-02	8%	3.52E-02	3.52E-02	0%	1.59E-03	2.17E-03	36%	1.55E-03	1.75E-03	13%	1.30E-03	1.49E-03	14%	8.95E-01	8.96E-01	0%
2,2,4-Trimethylpentane	3,500	3.38E-02	3.64E-02	8%	1.07E-01	1.07E-01	0%	4.82E-03	6.55E-03	36%	4.68E-03	5.28E-03	13%	3.93E-03	4.50E-03	14%	2.71E+00	2.71E+00	0%
2,3,4-Trimethylpentane	3,500	8.44E-03	9.10E-03	8%	2.66E-02	2.66E-02	0%	1.20E-03	1.64E-03	36%	1.17E-03	1.32E-03	13%	9.83E-04	1.12E-03	14%	6.77E-01	6.77E-01	0%
2-Methyl-2-pentene	1800	5.72E-03	6.16E-03	8%	1.80E-02	1.80E-02	0%	8.16E-04	1.11E-03	36%	7.92E-04	8.95E-04	13%	6.66E-04	7.62E-04	14%	4.59E-01	4.59E-01	0%
trans-2-Pentene	13,000	1.36E-03	1.47E-03	8%	4.29E-03	4.29E-03	0%	1.94E-04	2.64E-04	36%	1.89E-04	2.13E-04	13%	1.59E-04	1.81E-04	14%	1.09E-01	1.09E-01	0%
Cyclohexane	3,400	5.72E-03	6.16E-03	8%	1.80E-02	1.80E-02	0%	8.16E-04	1.11E-03	36%	7.92E-04	8.95E-04	13%	6.66E-04	7.62E-04	14%	4.59E-01	4.59E-01	0%
Methylcyclohexane	3,400	1.42E-02	1.53E-02	8%	4.47E-02	4.47E-02	0%	2.02E-03	2.75E-03	36%	1.96E-03	2.22E-03	13%	1.65E-03	1.89E-03	14%	1.14E+00	1.14E+00	0%
Pentylcyclohexane	3,400	2.28E-03	2.46E-03	8%	7.21E-03	7.21E-03	0%	3.26E-04	4.43E-04	36%	3.16E-04	3.57E-04	13%	2.66E-04	3.04E-04	14%	1.83E-01	1.83E-01	0%
Dodecylcyclohexane	100	4.57E-04	4.93E-04	8%	1.44E-03	1.44E-03	0%	6.53E-05	8.88E-05	36%	6.33E-05	7.16E-05	13%	5.33E-05	6.09E-05	14%	3.67E-02	3.67E-02	0%
Tridecylcyclohexane	100	4.49E-04	4.84E-04	8%	1.42E-03	1.42E-03	0%	6.41E-05	8.72E-05	36%	6.22E-05	7.03E-05	13%	5.23E-05	5.98E-05	14%	3.60E-02	3.60E-02	0%
Tetradecylcyclohexane	100	4.33E-04	4.67E-04	8%	1.37E-03	1.37E-03	0%	6.18E-05	8.40E-05	36%	5.99E-05	6.77E-05	13%	5.04E-05	5.77E-05	14%	3.47E-02	3.47E-02	0%
Pentadecylcyclohexane	100	3.49E-04	3.76E-04	8%	1.10E-03	1.10E-03	0%	4.97E-05	6.76E-05	36%	4.83E-05	5.45E-05	13%	4.06E-05	4.64E-05	14%	2.80E-02	2.80E-02	0%
2-Methylhexane	3,070	1.55E-02	1.67E-02	8%	4.90E-02	4.90E-02	0%	2.22E-03	3.01E-03	36%	2.15E-03	2.43E-03	13%	1.81E-03	2.07E-03	14%	1.24E+00	1.25E+00	0%
3-Methylhexane	3,070	8.44E-03	9.10E-03	8%	2.66E-02	2.66E-02	0%	1.20E-03	1.64E-03	36%	1.17E-03	1.32E-03	13%	9.83E-04	1.12E-03	14%	6.77E-01	6.77E-01	0%
3-Ethylhexane	3,500	5.72E-03	6.16E-03	8%	1.80E-02	1.80E-02	0%	8.16E-04	1.11E-03	36%	7.92E-04	8.95E-04	13%	6.66E-04	7.62E-04	14%	4.59E-01	4.59E-01	0%
2,3-Dimethylhexane	3,500	4.36E-03	4.70E-03	8%	1.37E-02	1.37E-02	0%	6.22E-04	8.46E-04	36%	6.03E-04	6.82E-04	13%	5.07E-04	5.80E-04	14%	3.49E-01	3.50E-01	0%
2,4-Dimethylhexane	3,500	1.36E-03	1.47E-03	8%	4.29E-03	4.29E-03	0%	1.94E-04	2.64E-04	36%	1.89E-04	2.13E-04	13%	1.59E-04	1.81E-04	14%	1.09E-01	1.09E-01	0%
2,5-Dimethylhexane	3,500	1.36E-03	1.47E-03	8%	4.29E-03	4.29E-03	0%	1.94E-04	2.64E-04	36%	1.89E-04	2.13E-04	13%	1.59E-04	1.81E-04	14%	1.09E-01	1.09E-01	0%
cis-2-Hexene	1,000	2.72E-03	2.94E-03	8%	8.59E-03	8.59E-03	0%	3.89E-04	5.28E-04	36%	3.77E-04	4.26E-04	13%	3.17E-04	3.63E-04	14%	2.18E-01	2.18E-01	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	1,000	4.36E-03	4.70E-03	8%	1.37E-02	1.37E-02	0%	6.22E-04	8.46E-04	36%	6.03E-04	6.82E-04	13%	5.07E-04	5.80E-04	14%	3.49E-01	3.50E-01	0%
Heptane	3,500	1.28E-02	1.38E-02	8%	4.04E-02	4.04E-02	0%	1.83E-03	2.48E-03	36%	1.77E-03	2.00E-03	13%	1.49E-03	1.70E-03	14%	1.03E+00	1.03E+00	0%
2-Methylheptane	3,500	2.72E-03	2.94E-03	8%	8.59E-03	8.59E-03	0%	3.89E-04	5.28E-04	36%	3.77E-04	4.26E-04	13%	3.17E-04	3.63E-04	14%	2.18E-01	2.18E-01	0%
Octane	3,500	7.08E-03	7.63E-03	8%	2.23E-02	2.23E-02	0%	1.01E-03	1.37E-03	36%	9.80E-04	1.11E-03	13%	8.24E-04	9.43E-04	14%	5.68E-01	5.68E-01	0%
Nonane	10,500	4.36E-03	4.70E-03	8%	1.37E-02	1.37E-02	0%	6.22E-04	8.46E-04	36%	6.03E-04	6.82E-04	13%	5.07E-04	5.80E-04	14%	3.49E-01	3.50E-01	0%
Dodecane	3,500	1.37E-02	1.48E-02	8%	4.32E-02	4.32E-02	0%	1.95E-03	2.66E-03	36%	1.90E-03	2.14E-03	13%	1.60E-03	1.82E-03	14%	1.10E+00	1.10E+00	0%
Tridecane	3,500	1.30E-02	1.40E-02	8%	4.10E-02	4.10E-02	0%	1.85E-03	2.52E-03	36%	1.80E-03	2.03E-03	13%	1.51E-03	1.73E-03	14%	1.04E+00	1.04E+00	0%
Tetradecane	3,500	1.71E-02	1.85E-02	8%	5.40E-02	5.40E-02	0%	2.44E-03	3.32E-03	36%	2.37E-03	2.68E-03	13%	1.99E-03	2.28E-03	14%	1.37E+00	1.37E+00	0%
n-Pentadecane	100	1.08E-02	1.17E-02	8%	3.42E-02	3.42E-02	0%	1.55E-03	2.10E-03	36%	1.50E-03	1.70E-03	13%	1.26E-03	1.44E-03	14%	8.69E-01	8.69E-01	0%
Hexadecane	3,500	1.94E-02	2.09E-02	8%	6.11E-02	6.11E-02	0%	2.76E-03	3.76E-03	36%	2.68E-03	3.03E-03	13%	2.25E-03	2.58E-03	14%	1.55E+00	1.55E+00	0%
n-Heptadecane	100	1.67E-02	1.80E-02	8%	5.27E-02	5.27E-02	0%	2.39E-03	3.24E-03	36%	2.32E-03	2.62E-03	13%	1.95E-03	2.23E-03	14%	1.34E+00	1.34E+00	0%
n-Octadecane	100	1.64E-02	1.76E-02	8%	5.16E-02	5.16E-02	0%	2.34E-03	3.18E-03	36%	2.27E-03	2.56E-03	13%	1.91E-03	2.18E-03	14%	1.31E+00	1.31E+00	0%
n-Nonadecane	100	1.12E-02	1.21E-02	8%	3.53E-02	3.53E-02	0%	1.60E-03	2.17E-03	36%	1.55E-03	1.75E-03	13%	1.30E-03	1.49E-03	14%	8.98E-01	8.98E-01	0%
n-Eicosane	100	5.61E-03	6.05E-03	8%	1.77E-02	1.77E-02	0%	8.01E-04	1.09E-03	36%	7.77E-04	8.78E-04	13%	6.53E-04	7.47E-04	14%	4.50E-01	4.50E-01	0%
n-Heneicosane	100	1.79E-03	1.93E-03	8%	5.65E-03	5.65E-03	0%	2.56E-04	3.48E-04	36%	2.48E-04	2.80E-04	13%	2.09E-04	2.39E-04	14%	1.44E-01	1.44E-01	0%
Farnesane	3,500	1.18E-02	1.27E-02	8%	3.73E-02	3.73E-02	0%	1.69E-03	2.29E-03	36%	1.64E-03	1.85E-03	13%	1.38E-03	1.57E-03	14%	9.48E-01	9.48E-01	0%
Pristane	100	1.21E-02	1.30E-02	8%	3.81E-02	3.81E-02	0%	1.72E-03	2.34E-03	36%	1.67E-03	1.89E-03	13%	1.40E-03	1.61E-03	14%	9.68E-01	9.68E-01	0%
C ₂ -C ₆ aliphatic	3,400	8.19E-01	8.78E-01	7%	2.55E+00	2.55E+00	0%	1.17E-01	1.58E-01	35%	1.20E-01	1.28E-01	7%	1.06E-01	1.21E-01	15%	6.40E+01	6.40E+01	0%
>C ₆ -C ₈ aliphatic	3,500	1.46E-01	1.58E-01	8%	4.62E-01	4.62E-01	0%	2.09E-02	2.84E-02	36%	2.03E-02	2.29E-02	13%	1.71E-02	1.95E-02	14%	1.18E+01	1.18E+01	0%
>C ₈ -C ₁₀ aliphatic	3,500	4.36E-03	4.70E-03	8%	1.37E-02	1.37E-02	0%	6.22E-04	8.46E-04	36%	6.03E-04	6.82E-04	13%	5.07E-04	5.80E-04	14%	3.49E-01	3.50E-01	0%
>C ₁₀ -C ₁₂ aliphatic	3,500	1.64E-02	1.77E-02	8%	5.17E-02	5.17E-02	0%	2.34E-03	3.18E-03	36%	2.27E-03	2.56E-03	13%	1.91E-03	2.18E-03	14%	1.31E+00	1.31E+00	0%
>C ₁₂ -C ₁₆ aliphatic	3,500	9.42E-02	1.02E-01	8%	2.97E-01	2.97E-01	0%	1.34E-02	1.83E-02	36%	1.30E-02	1.47E-02	13%	1.10E-02	1.26E-02	14%	7.56E+00	7.56E+00	0%
>C ₁₆ -C ₂₁ aliphatic	100	9.34E-02	1.01E-01	8%	2.95E-01	2.95E-01	0%	1.33E-02	1.81E-02	36%	1.29E-02	1.46E-02	13%	1.09E-02	1.24E-02	14%	7.50E+00	7.50E+00	0%
C ₆ -C ₈ aromatic	27	2.05E-01	2.23E-01	9%	6.38E-01	6.38E-01	0%	2.96E-02	3.97E-02	34%	3.14E-02	3.25E-02	4%	2.89E-02	3.27E-02	13%	1.57E+01	1.57E+01	0%
>C ₈ -C ₁₀ aromatic	1,250	2.26E-02	2.44E-02	8%	7.13E-02	7.13E-02	0%	3.23E-03	4.39E-03	36%	3.13E-03	3.54E-03	13%	2.63E-03	3.01E-03	14%	1.81E+00	1.81E+00	0%
Dioxins and Furans^(a)																			
2378 - TCDD	-	6.13E-12	6.13E-12	0%	1.69E-11	1.69E-11	0%	1.29E-12	1.29E-12	0%	1.69E-12	1.69E-12	0%	1.63E-12	1.63E-12	0%	9.29E-10	9.29E-10	0%
12378 - PeCDD	-	9.91E-12	9.91E-12	0%	2.73E-11	2.73E-11	0%	2.08E-12	2.08E-12	0%	2.74E-12	2.74E-12	0%	2.64E-12	2.64E-12	0%	1.50E-09	1.50E-09	0%
123478 - HxCDD	-	2.16E-12	2.16E-12	0%	5.96E-12	5.96E-12	0%	4.54E-13	4.54E-13	0%	5.98E-13	5.98E-13	0%	5.77E-13	5.77E-13	0%	3.28E-10	3.28E-10	0%
123678 - HxCDD	-	5.77E-12	5.77E-12	0%	1.59E-11	1.59E-11	0%	1.21E-12	1.21E-12	0%	1.59E-12	1.59E-12	0%	1.54E-12	1.54E-12	0%	8.74E-10	8.74E-10	0%
123789 - HxCDD	-	8.83E-12	8.83E-12	0%	2.44E-11	2.44E-11	0%	1.86E-12	1.86E-12	0%	2.44E-12	2.44E-12	0%	2.36E-12	2.36E-12	0%	1.34E-09	1.34E-09	0%
1234678 - HpCDD	-	1.64E-11	1.64E-11	0%	4.52E-11	4.52E-11	0%	3.44E-12	3.44E-12	0%	4.53E-12	4.53E-12	0%	4.37E-12	4.37E-12	0%	2.48E-09	2.48E-09	0%
1,2,3,4,6,7,8,9-Octa CDD	-	1.67E-11	1.67E-11	0%	4.59E-11	4.59E-11	0%	3.50E-12	3.50E-12	0%	4.61E-12	4.61E-12	0%	4.44E-12	4.44E-12	0%	2.52E-09	2.52E-09	0%
2378 - TCDF	-	1.00E-10	1.00E-10	0%	2.77E-10	2.77E-10	0%	2.11E-11	2.11E-11	0%	2.78E-11	2.78E-11	0%	2.68E-11	2.68E-11	0%	1.52E-08	1.52E-08	0%
12378 - PeCDF	-	5.25E-11	5.25E-11	0%	1.45E-10	1.45E-10	0%	1.10E-11	1.10E-11	0%	1.45E-11	1.45E-11	0%	1.40E-11	1.40E-11	0%	7.95E-09	7.95E-09	0%
23478 - PeCDF	-	9.04E-11	9.04E-11	0%	2.49E-10	2.49E-10	0%	1.90E-11	1.90E-11	0%	2.50E-11	2.50E-11	0%	2.41E-11	2.41E-11	0%	1.37E-08	1.37E-08	0%
123478 - HxCDF	-	9.19E-11	9.19E-11	0%	2.53E-10	2.53E-10	0%	1.93E-11	1.93E-11	0%	2.54E-11	2.54E-11	0%	2.45E-11	2.45E-11	0%	1.39E-08	1.39E-08	0%

Table B-3 Screening of Predicted 1-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	-	4.94E-11	4.94E-11	0%	1.36E-10	1.36E-10	0%	1.04E-11	1.04E-11	0%	1.36E-11	1.36E-11	0%	1.32E-11	1.32E-11	0%	7.48E-09	7.48E-09	0%
234678 - HxCDF	-	1.91E-11	1.91E-11	0%	5.26E-11	5.26E-11	0%	4.01E-12	4.01E-12	0%	5.28E-12	5.28E-12	0%	5.09E-12	5.09E-12	0%	2.89E-09	2.89E-09	0%
123789 - HxCDF	-	1.98E-12	1.98E-12	0%	5.47E-12	5.47E-12	0%	4.16E-13	4.16E-13	0%	5.48E-13	5.48E-13	0%	5.29E-13	5.29E-13	0%	3.00E-10	3.00E-10	0%
1234678 - HpCDF	-	7.50E-11	7.50E-11	0%	2.07E-10	2.07E-10	0%	1.57E-11	1.57E-11	0%	2.07E-11	2.07E-11	0%	2.00E-11	2.00E-11	0%	1.14E-08	1.14E-08	0%
1234789 - HpCDF	-	8.47E-12	8.47E-12	0%	2.34E-11	2.34E-11	0%	1.78E-12	1.78E-12	0%	2.34E-12	2.34E-12	0%	2.26E-12	2.26E-12	0%	1.28E-09	1.28E-09	0%
1,2,3,4,6,7,8,9-Octa CDF	-	7.77E-12	7.77E-12	0%	2.14E-11	2.14E-11	0%	1.63E-12	1.63E-12	0%	2.15E-12	2.15E-12	0%	2.07E-12	2.07E-12	0%	1.18E-09	1.18E-09	0%
Total PCDDs (TEQ)	-	1.79E-11	1.79E-11	0%	4.93E-11	4.93E-11	0%	3.76E-12	3.76E-12	0%	4.95E-12	4.95E-12	0%	4.77E-12	4.77E-12	0%	2.71E-09	2.71E-09	0%
Total PCDFs (TEQ)	-	5.58E-11	5.58E-11	0%	1.54E-10	1.54E-10	0%	1.17E-11	1.17E-11	0%	1.54E-11	1.54E-11	0%	1.49E-11	1.49E-11	0%	8.46E-09	8.46E-09	0%
Total PCDDs + PCDFs	-	1.86E-09	1.86E-09	0%	5.14E-09	5.14E-09	0%	3.91E-10	3.91E-10	0%	5.15E-10	5.15E-10	0%	4.97E-10	4.97E-10	0%	2.82E-07	2.82E-07	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 1-hour (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

>= greater than; "-" = no value;% = percent; MPOI = Maximum Point of Impingment; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																
Carbon monoxide	15,000	5.67E+00	7.60E+00	34%	1.27E+03	1.27E+03	0%	1.35E+02	1.39E+02	3%	1.53E+02	1.52E+02	0%	5.59E+01	5.59E+01	0%
Nitrogen dioxide	190	1.68E+01	1.96E+01	17%	4.95E+02	4.95E+02	0%	9.22E+01	9.21E+01	0%	1.21E+02	1.21E+02	0%	8.82E+01	8.82E+01	0%
Sulphur dioxide (10 minute)	500	3.36E-02	3.86E-02	15%	4.87E+00	4.88E+00	0%	1.41E+00	1.41E+00	0%	7.61E-01	6.36E-01	-16%	5.02E-01	5.02E-01	0%
Sulphur dioxide	200	2.03E-02	2.34E-02	15%	2.95E+00	2.96E+00	0%	8.51E-01	8.51E-01	0%	4.61E-01	3.85E-01	-16%	3.04E-01	3.04E-01	0%
Metals																
Aluminum	20	5.37E-02	1.05E-01	95%	6.63E+00	6.63E+00	0%	3.39E+00	2.54E+00	-25%	1.52E+01	8.80E+00	-42%	6.94E-01	1.09E+00	58%
Antimony	5	1.50E-06	2.90E-06	94%	1.91E-04	1.90E-04	0%	9.40E-05	7.07E-05	-25%	4.28E-04	2.50E-04	-42%	1.92E-05	3.04E-05	58%
Arsenic	3	1.63E-05	1.68E-05	3%	5.74E-03	5.74E-03	0%	7.27E-04	7.26E-04	0%	2.00E-03	1.18E-03	-41%	3.46E-04	3.45E-04	0%
Barium	5	4.96E-04	8.76E-04	77%	1.06E-01	1.06E-01	0%	2.77E-02	2.09E-02	-24%	1.64E-01	1.01E-01	-38%	5.66E-03	8.99E-03	59%
Beryllium	0.02	1.18E-05	1.19E-05	1%	4.19E-03	4.19E-03	0%	5.19E-04	5.19E-04	0%	5.20E-04	2.57E-04	-51%	2.50E-04	2.50E-04	0%
Cadmium	0.1	2.32E-04	2.89E-04	24%	5.96E-02	5.96E-02	0%	5.54E-03	5.58E-03	1%	6.01E-03	5.97E-03	-1%	2.73E-03	2.73E-03	0%
Chromium (VI) ²	0.1	1.91E-04	2.95E-04	54%	6.51E-02	6.51E-02	0%	8.62E-03	6.60E-03	-23%	7.10E-02	6.35E-02	-11%	3.11E-03	3.11E-03	0%
Chromium (III) ²	3.6	1.91E-04	2.95E-04	54%	6.51E-02	6.51E-02	0%	8.62E-03	6.60E-03	-23%	7.10E-02	6.35E-02	-11%	3.11E-03	3.11E-03	0%
Cobalt	0.2	3.78E-05	4.78E-05	26%	1.02E-02	1.02E-02	0%	9.36E-04	9.44E-04	1%	4.49E-03	4.35E-03	-3%	4.57E-04	4.57E-04	0%
Copper	10	6.15E-05	7.22E-05	17%	1.38E-02	1.38E-02	0%	1.64E-03	1.64E-03	0%	5.58E-03	3.58E-03	-36%	6.96E-04	6.89E-04	-1%
Iron	10	1.46E-02	2.55E-02	75%	3.23E+00	3.23E+00	0%	8.03E-01	6.07E-01	-24%	4.88E+00	3.02E+00	-38%	1.64E-01	2.61E-01	59%
Lead	-	7.28E-05	8.33E-05	14%	1.61E-02	1.61E-02	0%	2.04E-03	2.04E-03	0%	4.51E-03	2.84E-03	-37%	9.03E-04	9.00E-04	0%
Manganese	2	2.42E-04	4.05E-04	67%	6.27E-02	6.27E-02	0%	1.23E-02	9.32E-03	-24%	8.27E-02	5.72E-02	-31%	3.11E-03	4.02E-03	29%
Mercury	0.25	1.31E-05	1.34E-05	2%	4.48E-03	4.48E-03	0%	5.61E-04	5.61E-04	0%	1.08E-03	6.84E-04	-37%	2.94E-04	2.94E-04	0%
Molybdenum	30	1.21E-06	2.18E-06	81%	2.30E-04	2.30E-04	0%	6.93E-05	5.23E-05	-25%	3.88E-04	2.37E-04	-39%	1.42E-05	2.25E-05	59%
Nickel	0.33	7.71E-05	7.62E-05	-1%	6.71E-02	6.71E-02	0%	6.56E-03	6.56E-03	0%	7.77E-02	7.55E-02	-3%	3.09E-03	3.09E-03	0%
Selenium	2	5.81E-05	5.81E-05	0%	2.08E-02	2.08E-02	0%	2.56E-03	2.56E-03	0%	1.47E-03	9.37E-04	-36%	1.24E-03	1.24E-03	0%
Silver	0.1	3.67E-05	4.61E-05	26%	9.93E-03	9.93E-03	0%	9.12E-04	9.19E-04	1%	9.97E-04	9.91E-04	-1%	4.36E-04	4.36E-04	0%
Strontium	20	3.13E-04	5.63E-04	80%	6.07E-02	6.07E-02	0%	1.79E-02	1.35E-02	-25%	1.01E-01	6.17E-02	-39%	3.66E-03	5.81E-03	59%
Tellurium	1	8.28E-08	1.55E-07	87%	1.25E-05	1.25E-05	0%	4.98E-06	3.75E-06	-25%	2.51E-05	1.50E-05	-40%	1.02E-06	1.61E-06	58%
Thallium	1	1.03E-06	2.01E-06	96%	1.23E-04	1.22E-04	0%	6.53E-05	4.90E-05	-25%	2.87E-04	1.67E-04	-42%	1.34E-05	2.11E-05	58%
Titanium	50	1.21E-03	2.29E-03	89%	1.76E-01	1.76E-01	0%	7.37E-02	5.54E-02	-25%	3.62E-01	2.15E-01	-41%	1.51E-02	2.39E-02	58%
Tungsten	10	3.49E-06	6.78E-06	94%	4.35E-04	4.35E-04	0%	2.20E-04	1.65E-04	-25%	9.90E-04	5.76E-04	-42%	4.50E-05	7.10E-05	58%
Uranium	0.5	4.37E-06	8.36E-06	91%	5.93E-04	5.93E-04	0%	2.70E-04	2.03E-04	-25%	1.28E-03	7.52E-04	-41%	5.52E-05	8.72E-05	58%
Vanadium	0.5	2.99E-05	5.32E-05	78%	6.11E-03	6.11E-03	0%	1.68E-03	1.27E-03	-24%	9.79E-03	6.01E-03	-39%	3.45E-04	5.47E-04	59%
Zinc	20	2.76E-04	3.45E-04	25%	6.99E-02	6.99E-02	0%	6.64E-03	6.65E-03	0%	1.59E-02	1.09E-02	-31%	3.25E-03	3.25E-03	0%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	30	7.26E-05	2.12E-04	192%	6.79E-03	7.40E-03	9%	2.60E-03	2.88E-03	11%	2.59E-03	9.13E-03	252%	7.93E-04	1.22E-03	54%
1-Methylphenanthrene	0.5	3.27E-06	9.55E-06	192%	3.05E-04	3.33E-04	9%	1.17E-04	1.30E-04	11%	1.17E-04	4.11E-04	252%	3.57E-05	5.50E-05	54%
2-Methylantracene	0.5	2.00E-06	5.84E-06	192%	1.87E-04	2.04E-04	9%	7.16E-05	7.93E-05	11%	7.13E-05	2.51E-04	252%	2.18E-05	3.37E-05	54%
2-Methylfluorene	10	6.74E-08	1.97E-07	192%	6.30E-06	6.87E-06	9%	2.42E-06	2.67E-06	11%	2.41E-06	8.47E-06	252%	7.36E-07	1.14E-06	54%
2-methylnaphthalene	30	1.17E-04	3.43E-04	192%	1.10E-02	1.20E-02	9%	4.21E-03	4.66E-03	11%	4.19E-03	1.48E-02	252%	1.28E-03	1.98E-03	54%
2-Methylphenanthrene	0.5	8.07E-06	2.36E-05	192%	7.55E-04	8.22E-04	9%	2.89E-04	3.20E-04	11%	2.88E-04	1.01E-03	252%	8.81E-05	1.36E-04	54%
2-Methylpyrene	0.5	5.98E-07	1.75E-06	192%	5.59E-05	6.09E-05	9%	2.14E-05	2.37E-05	11%	2.13E-05	7.52E-05	252%	6.53E-06	1.01E-05	54%
3-Methyldibenzothiophene	25	1.24E-07	3.61E-07	192%	1.16E-05	1.26E-05	9%	4.43E-06	4.90E-06	11%	4.41E-06	1.55E-05	252%	1.35E-06	2.08E-06	54%
3-Methylphenanthrene	0.5	5.82E-06	1.70E-05	192%	5.44E-04	5.93E-04	9%	2.09E-04	2.31E-04	11%	2.08E-04	7.32E-04	252%	6.36E-05	9.81E-05	54%
4-+9-Methylphenanthrene	0.5	4.40E-06	1.29E-05	192%	4.11E-04	4.48E-04	9%	1.58E-04	1.75E-04	11%	1.57E-04	5.53E-04	252%	4.80E-05	7.41E-05	54%
4-Methyldibenzothiophene	25	7.86E-08	2.30E-07	192%	7.36E-06	8.01E-06	9%	2.82E-06	3.12E-06	11%	2.81E-06	9.89E-06	252%	8.59E-07	1.32E-06	54%
9-Methylphenanthrene	0.5	2.98E-08	2.98E-08	0%	9.55E-06	9.55E-06	0%	7.01E-07	7.01E-07	0%	2.61E-06	2.61E-06	0%	8.53E-07	8.53E-07	0%
Acenaphthene	1	2.29E-05	2.72E-05	19%	6.90E-03	6.90E-03	0%	3.43E-04	3.43E-04	0%	8.29E-04	8.31E-04	0%	2.92E-04	2.92E-04	0%
Acenaphthylene	1	4.78E-05	6.34E-05	33%	1.36E-02	1.36E-02	0%	6.74E-04	6.74E-04	0%	1.64E-03	1.70E-03	4%	5.75E-04	5.75E-04	0%
Acphenanthrylene	0.5	2.31E-06	6.74E-06	192%	2.16E-04	2.35E-04	9%	8.26E-05	9.15E-05	11%	8.23E-05	2.90E-04	252%	2.52E-05	3.88E-05	54%
Anthracene	0.5	6.76E-06	9.54E-06	41%	1.82E-03	1.82E-03	0%	9.03E-05	9.62E-05	7%	2.20E-04	3.03E-04	38%	7.72E-05	7.72E-05	0%
Benz(a)anthracene	0.5	3.12E-06	3.79E-06	21%	9.19E-04	9.19E-04	0%	4.58E-05	4.58E-05	0%	1.11E-04	1.11E-04	0%	3.90E-05	3.90E-05	0%
Benzo(a)fluorene	0.5	7.25E-07	2.12E-06	192%	6.78E-05	7.39E-05	9%	2.60E-05	2.88E-05	11%	2.59E-05	9.11E-05	252%	7.92E-06	1.22E-05	54%
Benzo(a)pyrene	0.03	1.30E-06	1.66E-06	28%	3.78E-04	3.78E-04	0%	1.87E-05	1.87E-05	0%	4.55E-05	4.58E-05	1%	1.60E-05	1.60E-05	0%
Benzo(b)fluoranthene	0.5	6.44E-06	9.53E-06	48%	1.64E-03	1.64E-03	0%	9.64E-05	1.07E-04	11%	2.00E-04	3.35E-04	68%	7.02E-05	7.02E-05	0%
Benzo(e)pyrene	0.5	6.33E-08	1.50E-07	136%	5.91E-06	5.91E-06	0%	1.77E-06	1.86E-06	5%	1.71E-06	5.65E-06	230%	8.11E-07	8.27E-07	2%
Benzo(g,h,i)fluoranthene	0.5	1.12E-06	3.27E-06	192%	1.05E-04	1.14E-04	9%	4.01E-05	4.44E-05	11%	3.99E-05	1.41E-04	252%	1.22E-05	1.88E-05	54%
Benzo(g,h,i)perylene	0.5	2.91E-06	3.75E-06	29%	8.21E-04	8.21E-04	0%	4.12E-05	4.12E-05	0%	9.92E-05	9.98E-05	1%	3.50E-05	3.50E-05	0%
Benzo(k)fluoranthene	0.5	1.12E-06	1.47E-06	31%	3.21E-04	3.21E-04	0%	1.59E-05	1.59E-05	0%	3.87E-05	3.90E-05	1%	1.36E-05	1.36E-05	0%
Biphenyl	10	1.26E-07	1.26E-07	0%	4.03E-05	4.03E-05	0%	2.96E-06	2.96E-06	0%	1.10E-05	1.10E-05	0%	3.60E-06	3.60E-06	0%
Chrysene	0.5	7.06E-06	7.79E-06	10%	2.25E-03	2.25E-03	0%	1.11E-04	1.11E-04	0%	2.69E-04	2.70E-04	0%	9.47E-05	9.47E-05	0%
Coronene	0.5	5.61E-09	1.64E-08	192%	5.25E-07	5.72E-07	9%	2.01E-07	2.23E-07	11%	2.00E-07	7.06E-07	252%	6.13E-08	9.46E-08	54%
Cyclopenta(c,d)pyrene	0.03	3.96E-07	1.16E-06	192%	3.70E-05	4.03E-05	9%	1.42E-05	1.57E-05	11%	1.41E-05	4.97E-05	252%	4.32E-06	6.67E-06	54%
Dibenzo(a,h)anthracene	0.5	2.03E-06	2.99E-06	48%	5.13E-04	5.13E-04	0%	3.03E-05	3.33E-05	10%	6.25E-05	1.05E-04	68%	2.20E-05	2.20E-05	0%
Dibenzothiophene	25	4.78E-08	1.40E-07	192%	4.47E-06	4.87E-06	9%	1.71E-06	1.90E-06	11%	1.71E-06	6.01E-06	252%	5.22E-07	8.05E-07	54%
Fluoranthene	0.5	2.37E-05	3.55E-05	50%	5.97E-03	5.97E-03	0%	3.69E-04	4.08E-04	10%	7.27E-04	1.28E-03	76%	2.56E-04	2.56E-04	0%
Fluorene	10	6.66E-05	8.89E-05	33%	1.89E-02	1.89E-02	0%	9.36E-04	9.36E-04	0%	2.28E-03	2.42E-03	6%	7.99E-04	7.99E-04	0%
Indeno(1,2,3-cd)fluoranthene	0.5	2.81E-08	8.21E-08	192%	2.63E-06	2.86E-06	9%	1.01E-06	1.11E-06	11%	1.00E-06	3.53E-06	252%	3.07E-07	4.73E-07	54%
Indeno(1,2,3-cd)pyrene	0.5	1.87E-06	1.87E-06	0%	6.09E-04	6.09E-04	0%	3.02E-05	3.02E-05	0%	7.27E-05	7.26E-05	0%	2.56E-05	2.56E-05	0%
Indeno(1,2,3-W)pyrene	0.5	5.04E-07	1.47E-06	192%	4.72E-05	5.14E-05	9%	1.81E-05	2.00E-05	11%	1.80E-05	6.34E-05	252%	5.51E-06	8.50E-06	54%
Naphthalene	30	7.60E-04	1.09E-03	44%	1.93E-01	1.93E-01	0%	1.06E-02	1.15E-02	9%	2.35E-02	3.63E-02	54%	8.29E-03	8.29E-03	0%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	0.5	4.49E-07	1.31E-06	192%	4.20E-05	4.57E-05	9%	1.61E-05	1.78E-05	11%	1.60E-05	5.64E-05	252%	4.90E-06	7.56E-06	54%
Perylene	0.5	5.61E-09	1.64E-08	192%	5.25E-07	5.72E-07	9%	2.01E-07	2.23E-07	11%	2.00E-07	7.06E-07	252%	6.13E-08	9.46E-08	54%
Phenanthrene	0.5	1.87E-04	2.07E-04	11%	5.99E-02	5.99E-02	0%	2.96E-03	2.96E-03	0%	7.16E-03	7.18E-03	0%	2.52E-03	2.52E-03	0%
Picene	0.5	5.61E-09	1.64E-08	192%	5.25E-07	5.72E-07	9%	2.01E-07	2.23E-07	11%	2.00E-07	7.06E-07	252%	6.13E-08	9.46E-08	54%
Pyrene	0.5	2.45E-05	4.08E-05	66%	5.52E-03	5.52E-03	0%	4.99E-04	5.52E-04	11%	6.79E-04	1.74E-03	156%	2.38E-04	2.38E-04	0%
Volatile Organic Compounds																
Methacrolein	16	8.14E-03	1.73E-02	113%	1.87E+00	1.89E+00	1%	3.43E-01	3.62E-01	6%	1.92E-01	4.06E-01	111%	1.08E-01	1.18E-01	9%
Acrolein	7	6.93E-03	1.47E-02	113%	1.59E+00	1.61E+00	1%	2.92E-01	3.08E-01	6%	1.64E-01	3.45E-01	111%	9.15E-02	1.00E-01	9%
Benzaldehyde	90	7.74E-03	1.65E-02	113%	1.78E+00	1.79E+00	1%	3.26E-01	3.44E-01	6%	1.83E-01	3.86E-01	111%	1.02E-01	1.12E-01	9%
2,5-dimethylbenzaldehyde	90	8.35E-03	1.78E-02	113%	1.92E+00	1.94E+00	1%	3.52E-01	3.71E-01	6%	1.97E-01	4.17E-01	111%	1.10E-01	1.21E-01	9%
Butanal (Butyraldehyde)	3,300	2.65E-03	5.63E-03	113%	6.09E-01	6.14E-01	1%	1.11E-01	1.18E-01	6%	6.26E-02	1.32E-01	111%	3.50E-02	3.83E-02	9%
Formaldehyde	50	4.66E-02	9.78E-02	110%	1.05E+01	1.05E+01	1%	1.92E+00	2.02E+00	6%	1.11E+00	2.27E+00	104%	6.08E-01	6.65E-01	9%
Acetaldehyde	470	8.51E-02	1.81E-01	113%	1.96E+01	1.97E+01	1%	3.59E+00	3.79E+00	6%	2.01E+00	4.25E+00	111%	1.12E+00	1.23E+00	9%
Propanal	470	2.85E-02	6.07E-02	113%	6.56E+00	6.61E+00	1%	1.20E+00	1.27E+00	6%	6.74E-01	1.42E+00	111%	3.77E-01	4.12E-01	9%
Crotonaldehyde	8.6	2.73E-02	5.81E-02	113%	6.28E+00	6.33E+00	1%	1.15E+00	1.21E+00	6%	6.45E-01	1.36E+00	111%	3.61E-01	3.95E-01	9%
Hexanal	40	4.48E-03	9.53E-03	113%	1.03E+00	1.04E+00	1%	1.89E-01	1.99E-01	6%	1.06E-01	2.24E-01	111%	5.92E-02	6.48E-02	9%
Heptanal	40	6.52E-03	1.39E-02	113%	1.50E+00	1.51E+00	1%	2.74E-01	2.90E-01	6%	1.54E-01	3.25E-01	111%	8.61E-02	9.42E-02	9%
Octanal	40	6.31E-03	1.34E-02	113%	1.45E+00	1.46E+00	1%	2.66E-01	2.81E-01	6%	1.49E-01	3.15E-01	111%	8.34E-02	9.13E-02	9%
Nonanal	1,500	8.96E-03	1.91E-02	113%	2.06E+00	2.08E+00	1%	3.77E-01	3.98E-01	6%	2.12E-01	4.47E-01	111%	1.18E-01	1.30E-01	9%
Decanal	40	5.70E-03	1.21E-02	113%	1.31E+00	1.32E+00	1%	2.40E-01	2.54E-01	6%	1.35E-01	2.85E-01	111%	7.53E-02	8.24E-02	9%
Undecanal	100	5.29E-03	1.13E-02	113%	1.22E+00	1.23E+00	1%	2.23E-01	2.35E-01	6%	1.25E-01	2.64E-01	111%	7.00E-02	7.66E-02	9%
Dodecanal	40	2.44E-03	5.20E-03	113%	5.62E-01	5.67E-01	1%	1.03E-01	1.09E-01	6%	5.77E-02	1.22E-01	111%	3.23E-02	3.53E-02	9%
Tridecanal	40	4.07E-03	8.67E-03	113%	9.37E-01	9.45E-01	1%	1.72E-01	1.81E-01	6%	9.62E-02	2.03E-01	111%	5.38E-02	5.89E-02	9%
1,2,4-Trimethylbenzene	1,250	1.79E-03	3.81E-03	113%	4.12E-01	4.16E-01	1%	7.55E-02	7.97E-02	6%	4.23E-02	8.94E-02	111%	2.37E-02	2.59E-02	9%
1,3,5-Trimethylbenzene	1,250	5.29E-04	1.13E-03	113%	1.22E-01	1.23E-01	1%	2.23E-02	2.35E-02	6%	1.25E-02	2.64E-02	111%	7.00E-03	7.66E-03	9%
Benzene	27	7.28E-03	1.23E-02	68%	1.29E+00	1.30E+00	1%	2.47E-01	2.60E-01	5%	1.44E-01	2.79E-01	94%	7.81E-02	8.51E-02	9%
Ethylbenzene	26,000	9.62E-04	2.04E-03	112%	2.20E-01	2.22E-01	1%	4.03E-02	4.26E-02	6%	2.27E-02	4.78E-02	110%	1.27E-02	1.39E-02	9%
Propylbenzene	26,000	2.04E-04	4.33E-04	113%	4.69E-02	4.72E-02	1%	8.58E-03	9.05E-03	6%	4.81E-03	1.02E-02	111%	2.69E-03	2.94E-03	9%
Indanone	480	1.42E-04	3.01E-04	113%	3.26E-02	3.28E-02	1%	5.96E-03	6.29E-03	6%	3.34E-03	7.06E-03	111%	1.87E-03	2.05E-03	9%
Toluene	4,500	8.50E-03	1.76E-02	108%	1.87E+00	1.88E+00	1%	3.46E-01	3.65E-01	5%	1.99E-01	4.05E-01	103%	1.11E-01	1.21E-01	9%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	89	4.28E-04	9.10E-04	113%	9.84E-02	9.92E-02	1%	1.80E-02	1.90E-02	6%	1.01E-02	2.13E-02	111%	5.65E-03	6.18E-03	9%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	89	1.06E-03	2.25E-03	113%	2.44E-01	2.46E-01	1%	4.46E-02	4.71E-02	6%	2.50E-02	5.28E-02	111%	1.40E-02	1.53E-02	9%
Acetone	62,000	4.48E-02	9.53E-02	113%	1.03E+01	1.04E+01	1%	1.89E+00	1.99E+00	6%	1.06E+00	2.24E+00	111%	5.92E-01	6.48E-01	9%
Acetophenone	490	1.04E-02	2.21E-02	113%	2.39E+00	2.41E+00	1%	4.37E-01	4.62E-01	6%	2.45E-01	5.18E-01	111%	1.37E-01	1.50E-01	9%
Methyl Ethyl Ketone	13,000	1.53E-02	3.25E-02	113%	3.52E+00	3.54E+00	1%	6.43E-01	6.79E-01	6%	3.61E-01	7.62E-01	111%	2.02E-01	2.21E-01	9%
Xylene	8,700	4.85E-03	1.02E-02	110%	1.09E+00	1.10E+00	1%	2.03E-01	2.14E-01	5%	1.12E-01	2.37E-01	111%	6.39E-02	6.98E-02	9%
o-Xylene	8,700	1.69E-03	3.60E-03	113%	3.89E-01	3.92E-01	1%	7.12E-02	7.52E-02	6%	4.01E-02	8.43E-02	111%	2.24E-02	2.45E-02	9%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	170,000	1.74E-02	3.71E-02	113%	4.01E+00	4.04E+00	1%	7.34E-01	7.75E-01	6%	4.12E-01	8.70E-01	111%	2.30E-01	2.52E-01	9%
1,1,1-Trichloroethane (Methyl chloroform)	10,900	1.01E-05	1.01E-05	0%	1.61E-03	1.61E-03	0%	4.79E-04	4.78E-04	0%	4.24E-04	2.23E-04	-47%	2.61E-04	2.60E-04	0%
Butane	66,000	7.80E-03	1.66E-02	113%	1.80E+00	1.81E+00	1%	3.28E-01	3.47E-01	6%	1.84E-01	3.89E-01	111%	1.03E-01	1.13E-01	9%
2,2-Dimethylbutane	3,500	6.31E-04	1.34E-03	113%	1.45E-01	1.46E-01	1%	2.66E-02	2.81E-02	6%	1.49E-02	3.15E-02	111%	8.34E-03	9.13E-03	9%
2,3-Dimethylbutane	3,500	1.16E-03	2.47E-03	113%	2.67E-01	2.69E-01	1%	4.89E-02	5.16E-02	6%	2.74E-02	5.79E-02	111%	1.53E-02	1.68E-02	9%
Isobutene	180,000	2.32E-03	4.94E-03	113%	5.34E-01	5.38E-01	1%	9.78E-02	1.03E-01	6%	5.49E-02	1.16E-01	111%	3.07E-02	3.36E-02	9%
cis-2-Butene	10,000	5.29E-04	1.13E-03	113%	1.22E-01	1.23E-01	1%	2.23E-02	2.35E-02	6%	1.25E-02	2.64E-02	111%	7.00E-03	7.66E-03	9%
trans-2-Butene	10,000	1.06E-03	2.25E-03	113%	2.44E-01	2.46E-01	1%	4.46E-02	4.71E-02	6%	2.50E-02	5.28E-02	111%	1.40E-02	1.53E-02	9%
2-Methyl-1-butene	19,000	5.29E-04	1.13E-03	113%	1.22E-01	1.23E-01	1%	2.23E-02	2.35E-02	6%	1.25E-02	2.64E-02	111%	7.00E-03	7.66E-03	9%
3-Methyl-1-butene	19,000	3.26E-04	6.93E-04	113%	7.50E-02	7.56E-02	1%	1.37E-02	1.45E-02	6%	7.70E-03	1.63E-02	111%	4.30E-03	4.71E-03	9%
1,3-Butadiene	660	6.31E-04	1.34E-03	113%	1.45E-01	1.46E-01	1%	2.66E-02	2.81E-02	6%	1.49E-02	3.15E-02	111%	8.34E-03	9.13E-03	9%
Cyclopentane	3,400	8.35E-04	1.78E-03	113%	1.92E-01	1.94E-01	1%	3.52E-02	3.71E-02	6%	1.97E-02	4.17E-02	111%	1.10E-02	1.21E-02	9%
Methylcyclopentane	2,600	1.26E-03	2.69E-03	113%	2.91E-01	2.93E-01	1%	5.32E-02	5.61E-02	6%	2.98E-02	6.30E-02	111%	1.67E-02	1.83E-02	9%
Pentane	59,000	3.79E-03	8.06E-03	113%	8.72E-01	8.78E-01	1%	1.60E-01	1.68E-01	6%	8.95E-02	1.89E-01	111%	5.00E-02	5.48E-02	9%
Isopentane	59,000	5.58E-03	1.19E-02	113%	1.28E+00	1.29E+00	1%	2.35E-01	2.48E-01	6%	1.32E-01	2.78E-01	111%	7.37E-02	8.07E-02	9%
2-Methylpentane	3,500	1.89E-03	4.03E-03	113%	4.36E-01	4.39E-01	1%	7.98E-02	8.42E-02	6%	4.48E-02	9.45E-02	111%	2.50E-02	2.74E-02	9%
3-Methylpentane	3,500	1.36E-03	2.90E-03	113%	3.14E-01	3.16E-01	1%	5.75E-02	6.07E-02	6%	3.22E-02	6.81E-02	111%	1.80E-02	1.97E-02	9%
2,3-Dimethylpentane	3,500	1.47E-03	3.12E-03	113%	3.37E-01	3.40E-01	1%	6.17E-02	6.52E-02	6%	3.46E-02	7.32E-02	111%	1.94E-02	2.12E-02	9%
2,4-Dimethylpentane	3,500	8.35E-04	1.78E-03	113%	1.92E-01	1.94E-01	1%	3.52E-02	3.71E-02	6%	1.97E-02	4.17E-02	111%	1.10E-02	1.21E-02	9%
2,2,4-Trimethylpentane	3,500	2.52E-03	5.37E-03	113%	5.81E-01	5.86E-01	1%	1.06E-01	1.12E-01	6%	5.97E-02	1.26E-01	111%	3.34E-02	3.65E-02	9%
2,3,4-Trimethylpentane	3,500	6.31E-04	1.34E-03	113%	1.45E-01	1.46E-01	1%	2.66E-02	2.81E-02	6%	1.49E-02	3.15E-02	111%	8.34E-03	9.13E-03	9%
2-Methyl-2-pentene	1,800	4.28E-04	9.10E-04	113%	9.84E-02	9.92E-02	1%	1.80E-02	1.90E-02	6%	1.01E-02	2.13E-02	111%	5.65E-03	6.18E-03	9%
trans-2-Pentene	13,000	1.02E-04	2.17E-04	113%	2.34E-02	2.36E-02	1%	4.29E-03	4.53E-03	6%	2.41E-03	5.08E-03	111%	1.35E-03	1.47E-03	9%
Cyclohexane	3,400	4.28E-04	9.10E-04	113%	9.84E-02	9.92E-02	1%	1.80E-02	1.90E-02	6%	1.01E-02	2.13E-02	111%	5.65E-03	6.18E-03	9%
Methylcyclohexane	3,400	1.06E-03	2.25E-03	113%	2.44E-01	2.46E-01	1%	4.46E-02	4.71E-02	6%	2.50E-02	5.28E-02	111%	1.40E-02	1.53E-02	9%
Pentylcyclohexane	3,400	1.71E-04	3.64E-04	113%	3.93E-02	3.96E-02	1%	7.20E-03	7.60E-03	6%	4.04E-03	8.53E-03	111%	2.26E-03	2.47E-03	9%
Dodecylcyclohexane	100	3.42E-05	7.28E-05	113%	7.87E-03	7.93E-03	1%	1.44E-03	1.52E-03	6%	8.08E-04	1.71E-03	111%	4.52E-04	4.95E-04	9%
Tridecylcyclohexane	100	3.36E-05	7.15E-05	113%	7.73E-03	7.79E-03	1%	1.42E-03	1.49E-03	6%	7.94E-04	1.68E-03	111%	4.44E-04	4.86E-04	9%
Tetradecylcyclohexane	100	3.24E-05	6.89E-05	113%	7.45E-03	7.51E-03	1%	1.36E-03	1.44E-03	6%	7.65E-04	1.62E-03	111%	4.28E-04	4.68E-04	9%
Pentadecylcyclohexane	100	2.61E-05	5.55E-05	113%	6.00E-03	6.05E-03	1%	1.10E-03	1.16E-03	6%	6.16E-04	1.30E-03	111%	3.44E-04	3.77E-04	9%
2-Methylhexane	3,070	1.16E-03	2.47E-03	113%	2.67E-01	2.69E-01	1%	4.89E-02	5.16E-02	6%	2.74E-02	5.79E-02	111%	1.53E-02	1.68E-02	9%
3-Methylhexane	3,070	6.31E-04	1.34E-03	113%	1.45E-01	1.46E-01	1%	2.66E-02	2.81E-02	6%	1.49E-02	3.15E-02	111%	8.34E-03	9.13E-03	9%
3-Ethylhexane	3,500	4.28E-04	9.10E-04	113%	9.84E-02	9.92E-02	1%	1.80E-02	1.90E-02	6%	1.01E-02	2.13E-02	111%	5.65E-03	6.18E-03	9%
2,3-Dimethylhexane	3,500	3.26E-04	6.93E-04	113%	7.50E-02	7.56E-02	1%	1.37E-02	1.45E-02	6%	7.70E-03	1.63E-02	111%	4.30E-03	4.71E-03	9%
2,4-Dimethylhexane	3,500	1.02E-04	2.17E-04	113%	2.34E-02	2.36E-02	1%	4.29E-03	4.53E-03	6%	2.41E-03	5.08E-03	111%	1.35E-03	1.47E-03	9%
2,5-Dimethylhexane	3,500	1.02E-04	2.17E-04	113%	2.34E-02	2.36E-02	1%	4.29E-03	4.53E-03	6%	2.41E-03	5.08E-03	111%	1.35E-03	1.47E-03	9%
cis-2-Hexene	1,000	2.04E-04	4.33E-04	113%	4.69E-02	4.72E-02	1%	8.58E-03	9.05E-03	6%	4.81E-03	1.02E-02	111%	2.69E-03	2.94E-03	9%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	1,000	3.26E-04	6.93E-04	113%	7.50E-02	7.56E-02	1%	1.37E-02	1.45E-02	6%	7.70E-03	1.63E-02	111%	4.30E-03	4.71E-03	9%
Heptane	3,500	9.57E-04	2.04E-03	113%	2.20E-01	2.22E-01	1%	4.03E-02	4.26E-02	6%	2.26E-02	4.78E-02	111%	1.26E-02	1.38E-02	9%
2-Methylheptane	3,500	2.04E-04	4.33E-04	113%	4.69E-02	4.72E-02	1%	8.58E-03	9.05E-03	6%	4.81E-03	1.02E-02	111%	2.69E-03	2.94E-03	9%
Octane	3,500	5.29E-04	1.13E-03	113%	1.22E-01	1.23E-01	1%	2.23E-02	2.35E-02	6%	1.25E-02	2.64E-02	111%	7.00E-03	7.66E-03	9%
Nonane	10,500	3.26E-04	6.93E-04	113%	7.50E-02	7.56E-02	1%	1.37E-02	1.45E-02	6%	7.70E-03	1.63E-02	111%	4.30E-03	4.71E-03	9%
Dodecane	3,500	1.02E-03	2.18E-03	113%	2.36E-01	2.38E-01	1%	4.31E-02	4.55E-02	6%	2.42E-02	5.11E-02	111%	1.35E-02	1.48E-02	9%
Tridecane	3,500	9.71E-04	2.07E-03	113%	2.24E-01	2.25E-01	1%	4.09E-02	4.32E-02	6%	2.30E-02	4.85E-02	111%	1.28E-02	1.40E-02	9%
Tetradecane	3,500	1.28E-03	2.73E-03	113%	2.95E-01	2.97E-01	1%	5.39E-02	5.70E-02	6%	3.03E-02	6.39E-02	111%	1.69E-02	1.85E-02	9%
n-Pentadecane	100	8.10E-04	1.72E-03	113%	1.87E-01	1.88E-01	1%	3.41E-02	3.60E-02	6%	1.92E-02	4.04E-02	111%	1.07E-02	1.17E-02	9%
Hexadecane	3,500	1.45E-03	3.08E-03	113%	3.33E-01	3.36E-01	1%	6.10E-02	6.44E-02	6%	3.42E-02	7.22E-02	111%	1.91E-02	2.09E-02	9%
n-Heptadecane	100	1.25E-03	2.66E-03	113%	2.88E-01	2.90E-01	1%	5.27E-02	5.56E-02	6%	2.95E-02	6.24E-02	111%	1.65E-02	1.81E-02	9%
n-Octadecane	100	1.22E-03	2.60E-03	113%	2.82E-01	2.84E-01	1%	5.15E-02	5.44E-02	6%	2.89E-02	6.11E-02	111%	1.62E-02	1.77E-02	9%
n-Nonadecane	100	8.37E-04	1.78E-03	113%	1.93E-01	1.94E-01	1%	3.52E-02	3.72E-02	6%	1.98E-02	4.18E-02	111%	1.11E-02	1.21E-02	9%
n-Eicosane	100	4.19E-04	8.93E-04	113%	9.65E-02	9.73E-02	1%	1.77E-02	1.87E-02	6%	9.91E-03	2.09E-02	111%	5.54E-03	6.07E-03	9%
n-Heneicosane	100	1.34E-04	2.85E-04	113%	3.08E-02	3.11E-02	1%	5.64E-03	5.96E-03	6%	3.17E-03	6.69E-03	111%	1.77E-03	1.94E-03	9%
Farnesane	3,500	8.84E-04	1.88E-03	113%	2.03E-01	2.05E-01	1%	3.72E-02	3.93E-02	6%	2.09E-02	4.41E-02	111%	1.17E-02	1.28E-02	9%
Pristane	100	9.02E-04	1.92E-03	113%	2.08E-01	2.09E-01	1%	3.80E-02	4.01E-02	6%	2.13E-02	4.50E-02	111%	1.19E-02	1.30E-02	9%
C ₂ -C ₆ aliphatic	3,400	6.09E-02	1.28E-01	110%	1.37E+01	1.38E+01	1%	2.55E+00	2.69E+00	5%	1.41E+00	2.98E+00	111%	8.02E-01	8.76E-01	9%
>C ₆ -C ₈ aliphatic	3,500	1.10E-02	2.33E-02	113%	2.52E+00	2.54E+00	1%	4.61E-01	4.87E-01	6%	2.59E-01	5.47E-01	111%	1.45E-01	1.58E-01	9%
>C ₈ -C ₁₀ aliphatic	3,500	3.26E-04	6.93E-04	113%	7.50E-02	7.56E-02	1%	1.37E-02	1.45E-02	6%	7.70E-03	1.63E-02	111%	4.30E-03	4.71E-03	9%
>C ₁₀ -C ₁₂ aliphatic	3,500	1.23E-03	2.61E-03	113%	2.82E-01	2.84E-01	1%	5.16E-02	5.45E-02	6%	2.90E-02	6.12E-02	111%	1.62E-02	1.77E-02	9%
>C ₁₂ -C ₁₆ aliphatic	3,500	7.05E-03	1.50E-02	113%	1.62E+00	1.63E+00	1%	2.97E-01	3.13E-01	6%	1.67E-01	3.52E-01	111%	9.31E-02	1.02E-01	9%
>C ₁₆ -C ₂₁ aliphatic	100	6.99E-03	1.49E-02	113%	1.61E+00	1.62E+00	1%	2.94E-01	3.11E-01	6%	1.65E-01	3.49E-01	111%	9.23E-02	1.01E-01	9%
C ₆ -C ₈ aromatic	27	1.54E-02	3.19E-02	107%	3.38E+00	3.40E+00	1%	6.34E-01	6.68E-01	5%	3.54E-01	7.32E-01	107%	2.01E-01	2.20E-01	9%
>C ₈ -C ₁₀ aromatic	1,250	1.69E-03	3.60E-03	113%	3.89E-01	3.92E-01	1%	7.12E-02	7.52E-02	6%	3.99E-02	8.43E-02	111%	2.23E-02	2.44E-02	9%
Dioxins and Furans^(a)																
2378 - TCDD	-	1.18E-12	1.18E-12	0%	2.61E-10	2.61E-10	0%	1.82E-11	1.82E-11	0%	1.41E-10	1.41E-10	0%	2.04E-11	2.04E-11	0%
12378 - PeCDD	-	1.91E-12	1.91E-12	0%	4.22E-10	4.22E-10	0%	2.94E-11	2.94E-11	0%	2.28E-10	2.28E-10	0%	3.31E-11	3.31E-11	0%
123478 - HxCDD	-	4.16E-13	4.16E-13	0%	9.21E-11	9.21E-11	0%	6.42E-12	6.42E-12	0%	4.98E-11	4.98E-11	0%	7.21E-12	7.21E-12	0%
123678 - HxCDD	-	1.11E-12	1.11E-12	0%	2.46E-10	2.46E-10	0%	1.71E-11	1.71E-11	0%	1.33E-10	1.33E-10	0%	1.92E-11	1.92E-11	0%
123789 - HxCDD	-	1.70E-12	1.70E-12	0%	3.76E-10	3.76E-10	0%	2.62E-11	2.62E-11	0%	2.03E-10	2.03E-10	0%	2.95E-11	2.95E-11	0%
1234678 - HpCDD	-	3.15E-12	3.15E-12	0%	6.98E-10	6.98E-10	0%	4.86E-11	4.86E-11	0%	3.77E-10	3.77E-10	0%	5.46E-11	5.46E-11	0%
1,2,3,4,6,7,8,9-Octa CDD	-	3.20E-12	3.20E-12	0%	7.10E-10	7.10E-10	0%	4.95E-11	4.95E-11	0%	3.84E-10	3.84E-10	0%	5.56E-11	5.56E-11	0%
2378 - TCDF	-	1.93E-11	1.93E-11	0%	4.28E-09	4.28E-09	0%	2.98E-10	2.98E-10	0%	2.31E-09	2.31E-09	0%	3.35E-10	3.35E-10	0%
12378 - PeCDF	-	1.01E-11	1.01E-11	0%	2.24E-09	2.24E-09	0%	1.56E-10	1.56E-10	0%	1.21E-09	1.21E-09	0%	1.75E-10	1.75E-10	0%
23478 - PeCDF	-	1.74E-11	1.74E-11	0%	3.85E-09	3.85E-09	0%	2.68E-10	2.68E-10	0%	2.08E-09	2.08E-09	0%	3.02E-10	3.02E-10	0%
123478 - HxCDF	-	1.77E-11	1.77E-11	0%	3.91E-09	3.91E-09	0%	2.73E-10	2.73E-10	0%	2.12E-09	2.12E-09	0%	3.06E-10	3.06E-10	0%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	-	9.49E-12	9.49E-12	0%	2.10E-09	2.10E-09	0%	1.47E-10	1.47E-10	0%	1.14E-09	1.14E-09	0%	1.65E-10	1.65E-10	0%
234678 - HxCDF	-	3.67E-12	3.67E-12	0%	8.13E-10	8.13E-10	0%	5.67E-11	5.67E-11	0%	4.39E-10	4.39E-10	0%	6.37E-11	6.37E-11	0%
123789 - HxCDF	-	3.81E-13	3.81E-13	0%	8.44E-11	8.44E-11	0%	5.89E-12	5.89E-12	0%	4.56E-11	4.56E-11	0%	6.61E-12	6.61E-12	0%
1234678 - HpCDF	-	1.44E-11	1.44E-11	0%	3.19E-09	3.19E-09	0%	2.23E-10	2.23E-10	0%	1.73E-09	1.73E-09	0%	2.50E-10	2.50E-10	0%
1234789 - HpCDF	-	1.63E-12	1.63E-12	0%	3.61E-10	3.61E-10	0%	2.51E-11	2.51E-11	0%	1.95E-10	1.95E-10	0%	2.82E-11	2.82E-11	0%
1,2,3,4,6,7,8,9-Octa CDF	-	1.49E-12	1.49E-12	0%	3.31E-10	3.31E-10	0%	2.31E-11	2.31E-11	0%	1.79E-10	1.79E-10	0%	2.59E-11	2.59E-11	0%
Total PCDDs (TEQ)	-	3.44E-12	3.44E-12	0%	7.62E-10	7.62E-10	0%	5.31E-11	5.31E-11	0%	4.12E-10	4.12E-10	0%	5.97E-11	5.97E-11	0%
Total PCDFs (TEQ)	-	1.07E-11	1.07E-11	0%	2.38E-09	2.38E-09	0%	1.66E-10	1.66E-10	0%	1.28E-09	1.28E-09	0%	1.86E-10	1.86E-10	0%
Total PCDDs + PCDFs	-	3.58E-10	3.58E-10	0%	7.93E-08	7.93E-08	0%	5.53E-09	5.53E-09	0%	4.29E-08	4.29E-08	0%	6.21E-09	6.21E-09	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 1-hour (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

>= greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																			
Carbon monoxide	15,000	3.70E+01	6.36E+01	72%	1.23E+02	2.76E+02	123%	4.74E+00	1.20E+01	153%	8.58E+00	1.09E+01	27%	8.88E+00	1.21E+01	36%	1.42E+03	2.41E+03	70%
Nitrogen dioxide	190	7.79E+01	8.13E+01	4%	8.51E+01	1.05E+02	23%	1.42E+01	1.91E+01	35%	2.52E+01	2.83E+01	12%	2.59E+01	2.95E+01	14%	5.00E+02	5.00E+02	0%
Sulphur dioxide (10 minute)	500	3.83E-01	3.83E-01	0%	8.78E-01	7.98E-01	-9%	3.53E-02	4.52E-02	28%	6.00E-02	6.69E-02	12%	6.30E-02	7.04E-02	12%	2.57E+01	2.57E+01	0%
Sulphur dioxide	200	2.32E-01	2.32E-01	0%	5.32E-01	4.83E-01	-9%	2.14E-02	2.74E-02	28%	3.63E-02	4.05E-02	12%	3.81E-02	4.26E-02	12%	1.56E+01	1.56E+01	0%
Metals																			
Aluminum	20	1.72E+00	1.77E+00	3%	3.32E+01	1.09E+01	-67%	6.44E-02	1.91E-01	197%	5.05E-02	1.10E-01	118%	4.71E-02	1.12E-01	137%	2.26E+02	7.53E+02	233%
Antimony	5	4.78E-05	4.90E-05	3%	9.21E-04	3.02E-04	-67%	1.80E-06	5.31E-06	196%	1.41E-06	3.06E-06	117%	1.31E-06	3.10E-06	137%	6.29E-03	2.09E-02	233%
Arsenic	3	2.69E-04	2.69E-04	0%	4.06E-03	1.27E-03	-69%	2.10E-05	2.61E-05	24%	2.93E-05	2.93E-05	0%	3.02E-05	3.03E-05	0%	2.63E-02	8.75E-02	233%
Barium	5	1.41E-02	1.44E-02	2%	2.71E-01	9.00E-02	-67%	5.78E-04	1.63E-03	182%	4.51E-04	9.30E-04	106%	4.01E-04	9.41E-04	135%	1.85E+00	6.15E+00	233%
Beryllium	0.02	1.86E-04	1.86E-04	0%	1.09E-03	3.53E-04	-68%	1.54E-05	1.54E-05	0%	2.17E-05	2.17E-05	0%	2.23E-05	2.23E-05	0%	6.38E-03	2.12E-02	233%
Cadmium	0.1	1.73E-03	1.78E-03	3%	2.93E-03	7.95E-03	171%	1.88E-04	2.60E-04	38%	3.50E-04	4.12E-04	18%	3.57E-04	4.29E-04	20%	5.90E-02	1.19E-01	102%
Chromium (VI) ^(b)	0.1	4.41E-03	4.62E-03	5%	8.52E-02	2.87E-02	-66%	2.24E-04	5.69E-04	154%	1.83E-04	3.14E-04	71%	2.03E-04	3.17E-04	56%	5.77E-01	1.93E+00	235%
Chromium (III) ^(b)	3.6	4.41E-03	4.62E-03	5%	8.52E-02	2.87E-02	-66%	2.24E-04	5.69E-04	154%	1.83E-04	3.14E-04	71%	2.03E-04	3.17E-04	56%	5.77E-01	1.93E+00	235%
Cobalt	0.2	3.00E-04	3.31E-04	10%	3.36E-03	1.55E-03	-54%	3.26E-05	5.24E-05	61%	6.17E-05	7.28E-05	18%	6.27E-05	7.55E-05	20%	2.29E-02	9.00E-02	294%
Copper	10	5.67E-04	5.77E-04	2%	9.24E-03	3.06E-03	-67%	5.33E-05	8.57E-05	61%	8.49E-05	9.49E-05	12%	9.35E-05	1.04E-04	11%	6.11E-02	2.17E-01	255%
Iron	10	4.09E-01	4.20E-01	3%	7.87E+00	2.61E+00	-67%	1.70E-02	4.76E-02	180%	1.33E-02	2.71E-02	104%	1.18E-02	2.74E-02	133%	5.37E+01	1.79E+02	233%
Lead	-	6.96E-04	6.96E-04	0%	8.69E-03	2.81E-03	-68%	6.47E-05	8.42E-05	30%	1.06E-04	1.16E-04	9%	1.16E-04	1.26E-04	9%	5.63E-02	2.01E-01	257%
Manganese	2	6.25E-03	6.51E-03	4%	1.21E-01	4.03E-02	-67%	2.89E-04	7.68E-04	166%	2.25E-04	4.30E-04	91%	2.38E-04	4.34E-04	82%	8.20E-01	2.74E+00	234%
Mercury	0.25	2.17E-04	2.17E-04	0%	1.99E-03	5.97E-04	-70%	1.71E-05	1.71E-05	0%	2.38E-05	2.38E-05	0%	2.47E-05	2.48E-05	0%	1.23E-02	4.09E-02	233%
Molybdenum	30	3.53E-05	3.62E-05	3%	6.80E-04	2.25E-04	-67%	1.42E-06	4.05E-06	185%	1.11E-06	2.31E-06	109%	9.95E-07	2.34E-06	135%	4.64E-03	1.54E-02	233%
Nickel	0.33	2.47E-03	2.47E-03	0%	1.18E-02	7.45E-03	-37%	1.03E-04	1.36E-04	32%	1.32E-04	1.32E-04	0%	1.05E-04	1.07E-04	2%	1.05E-01	6.00E-01	470%
Selenium	2	9.14E-04	9.14E-04	0%	1.77E-03	1.76E-03	-1%	7.65E-05	7.65E-05	0%	1.08E-04	1.08E-04	0%	1.11E-04	1.11E-04	0%	2.49E-02	2.49E-02	0%
Silver	0.1	2.64E-04	2.96E-04	12%	5.08E-04	1.33E-03	162%	2.99E-05	4.18E-05	40%	5.66E-05	6.70E-05	18%	5.81E-05	7.01E-05	21%	9.37E-03	2.18E-02	133%
Strontium	20	9.10E-03	9.33E-03	3%	1.75E-01	5.80E-02	-67%	3.67E-04	1.04E-03	185%	2.87E-04	5.97E-04	108%	2.57E-04	6.04E-04	135%	1.20E+00	3.98E+00	233%
Tellurium	1	2.53E-06	2.60E-06	3%	4.88E-05	1.61E-05	-67%	9.82E-08	2.86E-07	191%	7.69E-08	1.64E-07	113%	7.03E-08	1.66E-07	136%	3.33E-04	1.11E-03	233%
Thallium	1	3.32E-05	3.40E-05	3%	6.40E-04	2.10E-04	-67%	1.23E-06	3.67E-06	198%	9.67E-07	2.12E-06	119%	9.04E-07	2.15E-06	137%	4.36E-03	1.45E-02	233%
Titanium	50	3.75E-02	3.84E-02	3%	7.22E-01	2.38E-01	-67%	1.44E-03	4.21E-03	192%	1.13E-03	2.42E-03	114%	1.04E-03	2.45E-03	136%	4.92E+00	1.64E+01	233%
Tungsten	10	1.12E-04	1.15E-04	3%	2.15E-03	7.06E-04	-67%	4.18E-06	1.24E-05	197%	3.28E-06	7.14E-06	118%	3.05E-06	7.24E-06	137%	1.47E-02	4.88E-02	233%
Uranium	0.5	1.37E-04	1.41E-04	3%	2.64E-03	8.68E-04	-67%	5.21E-06	1.53E-05	194%	4.08E-06	8.82E-06	116%	3.77E-06	8.93E-06	137%	1.80E-02	5.99E-02	233%
Vanadium	0.5	8.57E-04	8.79E-04	3%	1.65E-02	5.47E-03	-67%	3.49E-05	9.89E-05	183%	2.73E-05	5.64E-05	107%	2.43E-05	5.71E-05	135%	1.13E-01	3.74E-01	233%
Zinc	20	2.09E-03	2.32E-03	11%	2.61E-02	1.10E-02	-58%	2.26E-04	3.63E-04	61%	4.21E-04	4.98E-04	18%	4.28E-04	5.17E-04	21%	1.78E-01	6.88E-01	287%

**Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																			
1-Methylnaphthalene	30	9.73E-04	2.61E-03	168%	4.01E-03	1.15E-02	188%	1.25E-04	5.65E-04	354%	1.40E-04	2.84E-04	102%	1.09E-04	2.63E-04	141%	1.26E-02	9.44E-02	648%
1-Methylphenanthrene	0.5	4.37E-05	1.17E-04	168%	1.81E-04	5.19E-04	188%	5.61E-06	2.54E-05	354%	6.32E-06	1.28E-05	102%	4.90E-06	1.18E-05	141%	5.67E-04	4.24E-03	648%
2-Methylantracene	0.5	2.68E-05	7.17E-05	168%	1.10E-04	3.18E-04	188%	3.43E-06	1.56E-05	354%	3.86E-06	7.82E-06	102%	3.00E-06	7.24E-06	141%	3.47E-04	2.60E-03	648%
2-Methylfluorene	10	9.03E-07	2.42E-06	168%	3.73E-06	1.07E-05	188%	1.16E-07	5.25E-07	354%	1.30E-07	2.64E-07	102%	1.01E-07	2.44E-07	141%	1.17E-05	8.76E-05	648%
2-methylnaphthalene	30	1.57E-03	4.21E-03	168%	6.49E-03	1.87E-02	188%	2.01E-04	9.14E-04	354%	2.27E-04	4.59E-04	102%	1.76E-04	4.25E-04	141%	2.04E-02	1.53E-01	648%
2-Methylphenanthrene	0.5	1.08E-04	2.89E-04	168%	4.46E-04	1.28E-03	188%	1.39E-05	6.28E-05	354%	1.56E-05	3.16E-05	102%	1.21E-05	2.92E-05	141%	1.40E-03	1.05E-02	648%
2-Methylpyrene	0.5	8.01E-06	2.14E-05	168%	3.30E-05	9.50E-05	188%	1.03E-06	4.65E-06	354%	1.16E-06	2.34E-06	102%	8.98E-07	2.17E-06	141%	1.04E-04	7.77E-04	648%
3-Methyldibenzothiophene	25	1.65E-06	4.43E-06	168%	6.83E-06	1.96E-05	188%	2.12E-07	9.62E-07	354%	2.39E-07	4.83E-07	102%	1.85E-07	4.47E-07	141%	2.15E-05	1.61E-04	648%
3-Methylphenanthrene	0.5	7.80E-05	2.09E-04	168%	3.22E-04	9.25E-04	188%	9.99E-06	4.53E-05	354%	1.13E-05	2.28E-05	102%	8.74E-06	2.11E-05	141%	1.01E-03	7.57E-03	648%
4-+9-Methylphenanthrene	0.5	5.89E-05	1.58E-04	168%	2.43E-04	6.99E-04	188%	7.55E-06	3.43E-05	354%	8.51E-06	1.72E-05	102%	6.60E-06	1.59E-05	141%	7.64E-04	5.72E-03	648%
4-Methyldibenzothiophene	25	1.05E-06	2.82E-06	168%	4.35E-06	1.25E-05	188%	1.35E-07	6.12E-07	354%	1.52E-07	3.08E-07	102%	1.18E-07	2.85E-07	141%	1.37E-05	1.02E-04	648%
9-Methylphenanthrene	0.5	2.96E-07	2.96E-07	0%	7.09E-07	7.09E-07	0%	4.29E-08	4.29E-08	0%	7.68E-08	7.68E-08	0%	6.53E-08	6.53E-08	0%	3.36E-05	3.36E-05	0%
Acenaphthene	1	1.48E-04	1.48E-04	0%	2.85E-04	5.92E-04	108%	2.08E-05	2.98E-05	43%	3.45E-05	3.94E-05	14%	3.69E-05	4.24E-05	15%	6.59E-03	6.60E-03	0%
Acenaphthylene	1	2.91E-04	4.83E-04	66%	7.79E-04	2.15E-03	175%	4.32E-05	1.05E-04	143%	7.17E-05	8.94E-05	25%	7.62E-05	9.63E-05	26%	1.29E-02	1.75E-02	35%
Acphenanthrylene	0.5	3.09E-05	8.27E-05	168%	1.27E-04	3.66E-04	188%	3.96E-06	1.79E-05	354%	4.46E-06	9.02E-06	102%	3.46E-06	8.35E-06	141%	4.00E-04	3.00E-03	648%
Anthracene	0.5	3.89E-05	8.62E-05	122%	1.36E-04	3.82E-04	182%	6.08E-06	1.87E-05	209%	1.01E-05	1.33E-05	31%	1.07E-05	1.46E-05	36%	1.73E-03	3.12E-03	80%
Benz(a)anthracene	0.5	1.96E-05	2.06E-05	5%	3.88E-05	9.14E-05	136%	2.83E-06	4.63E-06	64%	4.72E-06	5.47E-06	16%	5.02E-06	5.88E-06	17%	8.80E-04	8.82E-04	0%
Benzo(a)fluorene	0.5	9.71E-06	2.60E-05	168%	4.01E-05	1.15E-04	188%	1.24E-06	5.64E-06	354%	1.40E-06	2.84E-06	102%	1.09E-06	2.63E-06	141%	1.26E-04	9.42E-04	648%
Benzo(a)pyrene	0.03	8.11E-06	1.14E-05	40%	1.87E-05	5.06E-05	171%	1.18E-06	2.47E-06	110%	1.94E-06	2.36E-06	21%	2.07E-06	2.55E-06	23%	3.60E-04	4.12E-04	15%
Benzo(b)fluoranthene	0.5	3.69E-05	9.55E-05	159%	1.48E-04	4.24E-04	186%	5.74E-06	2.08E-05	263%	9.66E-06	1.32E-05	37%	1.01E-05	1.50E-05	48%	1.57E-03	3.46E-03	120%
Benzo(e)pyrene	0.5	7.84E-07	1.63E-06	109%	2.62E-06	7.16E-06	173%	8.79E-08	3.60E-07	310%	1.34E-07	2.02E-07	51%	1.08E-07	1.88E-07	74%	2.13E-05	5.84E-05	174%
Benzo(g,h,i)fluoranthene	0.5	1.50E-05	4.01E-05	168%	6.18E-05	1.78E-04	188%	1.92E-06	8.70E-06	354%	2.16E-06	4.38E-06	102%	1.68E-06	4.05E-06	141%	1.94E-04	1.45E-03	648%
Benzo(g,h,i)perylene	0.5	1.76E-05	2.61E-05	49%	4.27E-05	1.16E-04	171%	2.61E-06	5.78E-06	121%	4.38E-06	5.34E-06	22%	4.65E-06	5.73E-06	23%	7.86E-04	9.44E-04	20%
Benzo(k)fluoranthene	0.5	6.88E-06	1.09E-05	58%	1.76E-05	4.82E-05	174%	1.01E-06	2.36E-06	132%	1.68E-06	2.08E-06	24%	1.79E-06	2.24E-06	25%	3.05E-04	3.93E-04	29%
Biphenyl	10	1.25E-06	1.25E-06	0%	2.99E-06	2.99E-06	0%	1.81E-07	1.81E-07	0%	3.24E-07	3.24E-07	0%	2.75E-07	2.75E-07	0%	1.42E-04	1.42E-04	0%
Chrysene	0.5	4.82E-05	4.82E-05	0%	8.78E-05	1.03E-04	18%	6.45E-06	7.83E-06	21%	1.06E-05	1.15E-05	8%	1.14E-05	1.24E-05	8%	2.14E-03	2.14E-03	0%
Coronene	0.5	7.52E-08	2.01E-07	168%	3.10E-07	8.92E-07	188%	9.64E-09	4.37E-08	354%	1.09E-08	2.20E-08	102%	8.43E-09	2.03E-08	141%	9.75E-07	7.30E-06	648%
Cyclopenta(c,d)pyrene	0.03	5.30E-06	1.42E-05	168%	2.19E-05	6.29E-05	188%	6.79E-07	3.08E-06	354%	7.65E-07	1.55E-06	102%	5.94E-07	1.43E-06	141%	6.87E-05	5.14E-04	648%
Dibenzo(a,h)anthracene	0.5	1.18E-05	2.98E-05	153%	4.66E-05	1.32E-04	184%	1.81E-06	6.55E-06	262%	3.05E-06	4.19E-06	37%	3.19E-06	4.73E-06	48%	4.92E-04	1.08E-03	120%
Dibenzothiophene	25	6.40E-07	1.71E-06	168%	2.64E-06	7.60E-06	188%	8.21E-08	3.72E-07	354%	9.24E-08	1.87E-07	102%	7.18E-08	1.73E-07	141%	8.30E-06	6.21E-05	648%
Fluoranthene	0.5	1.41E-04	3.66E-04	159%	5.66E-04	1.62E-03	187%	2.11E-05	7.96E-05	277%	3.56E-05	4.98E-05	40%	3.72E-05	5.63E-05	51%	5.71E-03	1.32E-02	132%
Fluorene	10	4.04E-04	6.88E-04	70%	1.11E-03	3.05E-03	176%	6.03E-05	1.49E-04	148%	1.00E-04	1.25E-04	25%	1.06E-04	1.35E-04	27%	1.80E-02	2.49E-02	39%
Indeno(1,2,3-cd)fluoranthene	0.5	3.76E-07	1.01E-06	168%	1.55E-06	4.46E-06	188%	4.82E-08	2.19E-07	354%	5.43E-08	1.10E-07	102%	4.21E-08	1.02E-07	141%	4.88E-06	3.65E-05	648%
Indeno(1,2,3-cd)pyrene	0.5	1.30E-05	1.30E-05	0%	2.31E-05	2.31E-05	0%	1.69E-06	1.69E-06	0%	2.78E-06	2.78E-06	0%	3.00E-06	3.00E-06	0%	5.81E-04	5.81E-04	0%
Indeno(1,2,3-W)pyrene	0.5	6.75E-06	1.81E-05	168%	2.79E-05	8.02E-05	188%	8.66E-07	3.93E-06	354%	9.75E-07	1.97E-06	102%	7.57E-07	1.83E-06	141%	8.76E-05	6.55E-04	648%
Naphthalene	30	4.28E-03	1.03E-02	141%	1.64E-02	4.58E-02	180%	6.78E-04	2.29E-03	237%	1.15E-03	1.52E-03	33%	1.20E-03	1.72E-03	44%	1.86E-01	3.74E-01	101%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	0.5	6.01E-06	1.61E-05	168%	2.48E-05	7.13E-05	188%	7.70E-07	3.49E-06	354%	8.68E-07	1.76E-06	102%	6.74E-07	1.63E-06	141%	7.80E-05	5.83E-04	648%
Perylene	0.5	7.52E-08	2.01E-07	168%	3.10E-07	8.92E-07	188%	9.64E-09	4.37E-08	354%	1.09E-08	2.20E-08	102%	8.43E-09	2.03E-08	141%	9.75E-07	7.30E-06	648%
Phenanthrene	0.5	1.28E-03	1.28E-03	0%	2.33E-03	2.87E-03	23%	1.71E-04	2.10E-04	22%	2.81E-04	3.04E-04	8%	3.03E-04	3.30E-04	9%	5.69E-02	5.69E-02	0%
Picene	0.5	7.52E-08	2.01E-07	168%	3.10E-07	8.92E-07	188%	9.64E-09	4.37E-08	354%	1.09E-08	2.20E-08	102%	8.43E-09	2.03E-08	141%	9.75E-07	7.30E-06	648%
Pyrene	0.5	1.90E-04	4.96E-04	161%	7.65E-04	2.20E-03	187%	2.41E-05	1.08E-04	348%	3.77E-05	6.06E-05	61%	3.84E-05	6.72E-05	75%	5.29E-03	1.80E-02	239%
Volatile Organic Compounds																			
Methacrolein	16	1.09E-01	1.95E-01	79%	3.44E-01	8.54E-01	149%	1.55E-02	4.76E-02	206%	1.51E-02	2.61E-02	73%	1.27E-02	2.31E-02	82%	8.74E+00	8.74E+00	0%
Acrolein	7	9.26E-02	1.66E-01	79%	2.92E-01	7.26E-01	148%	1.32E-02	4.05E-02	206%	1.28E-02	2.22E-02	73%	1.08E-02	1.97E-02	82%	7.43E+00	7.43E+00	0%
Benzaldehyde	90	1.03E-01	1.86E-01	79%	3.26E-01	8.11E-01	149%	1.48E-02	4.52E-02	206%	1.43E-02	2.48E-02	73%	1.20E-02	2.20E-02	82%	8.30E+00	8.30E+00	0%
2,5-dimethylbenzaldehyde	90	1.12E-01	2.00E-01	79%	3.52E-01	8.75E-01	149%	1.59E-02	4.88E-02	206%	1.55E-02	2.68E-02	73%	1.30E-02	2.37E-02	82%	8.95E+00	8.96E+00	0%
Butanal (Butyraldehyde)	3,300	3.54E-02	6.35E-02	79%	1.12E-01	2.78E-01	149%	5.05E-03	1.55E-02	206%	4.90E-03	8.49E-03	73%	4.12E-03	7.52E-03	82%	2.84E+00	2.84E+00	0%
Formaldehyde	50	6.19E-01	1.09E+00	76%	1.94E+00	4.76E+00	145%	8.92E-02	2.68E-01	201%	8.71E-02	1.49E-01	71%	7.32E-02	1.32E-01	80%	4.87E+01	4.87E+01	0%
Acetaldehyde	470	1.14E+00	2.04E+00	79%	3.59E+00	8.92E+00	149%	1.62E-01	4.98E-01	206%	1.58E-01	2.73E-01	73%	1.33E-01	2.42E-01	82%	9.13E+01	9.13E+01	0%
Propanal	470	3.81E-01	6.84E-01	79%	1.20E+00	2.99E+00	149%	5.44E-02	1.67E-01	206%	5.28E-02	9.15E-02	73%	4.44E-02	8.09E-02	82%	3.06E+01	3.06E+01	0%
Crotonaldehyde	8.6	3.65E-01	6.54E-01	79%	1.15E+00	2.86E+00	149%	5.21E-02	1.60E-01	206%	5.05E-02	8.75E-02	73%	4.25E-02	7.75E-02	82%	2.93E+01	2.93E+01	0%
Hexanal	40	5.99E-02	1.07E-01	79%	1.89E-01	4.70E-01	149%	8.55E-03	2.62E-02	206%	8.29E-03	1.44E-02	73%	6.98E-03	1.27E-02	82%	4.81E+00	4.81E+00	0%
Heptanal	40	8.71E-02	1.56E-01	79%	2.75E-01	6.83E-01	149%	1.24E-02	3.81E-02	206%	1.21E-02	2.09E-02	73%	1.01E-02	1.85E-02	82%	6.99E+00	6.99E+00	0%
Octanal	40	8.44E-02	1.51E-01	79%	2.66E-01	6.62E-01	149%	1.20E-02	3.69E-02	206%	1.17E-02	2.03E-02	73%	9.83E-03	1.79E-02	82%	6.77E+00	6.77E+00	0%
Nonanal	1,500	1.20E-01	2.15E-01	79%	3.78E-01	9.39E-01	149%	1.71E-02	5.24E-02	206%	1.66E-02	2.87E-02	73%	1.40E-02	2.54E-02	82%	9.61E+00	9.62E+00	0%
Decanal	40	7.62E-02	1.37E-01	79%	2.41E-01	5.98E-01	149%	1.09E-02	3.33E-02	206%	1.06E-02	1.83E-02	73%	8.88E-03	1.62E-02	82%	6.12E+00	6.12E+00	0%
Undecanal	100	7.08E-02	1.27E-01	79%	2.23E-01	5.55E-01	149%	1.01E-02	3.10E-02	206%	9.80E-03	1.70E-02	73%	8.24E-03	1.50E-02	82%	5.68E+00	5.68E+00	0%
Dodecanal	40	3.27E-02	5.86E-02	79%	1.03E-01	2.56E-01	149%	4.66E-03	1.43E-02	206%	4.52E-03	7.84E-03	73%	3.81E-03	6.94E-03	82%	2.62E+00	2.62E+00	0%
Tridecanal	40	5.45E-02	9.77E-02	79%	1.72E-01	4.27E-01	149%	7.77E-03	2.38E-02	206%	7.54E-03	1.31E-02	73%	6.34E-03	1.16E-02	82%	4.37E+00	4.37E+00	0%
1,2,4-Trimethylbenzene	1,250	2.40E-02	4.30E-02	79%	7.56E-02	1.88E-01	149%	3.42E-03	1.05E-02	206%	3.32E-03	5.75E-03	73%	2.79E-03	5.09E-03	82%	1.92E+00	1.92E+00	0%
1,3,5-Trimethylbenzene	1,250	7.08E-03	1.27E-02	79%	2.23E-02	5.55E-02	149%	1.01E-03	3.10E-03	206%	9.80E-04	1.70E-03	73%	8.24E-04	1.50E-03	82%	5.68E-01	5.68E-01	0%
Benzene	27	8.10E-02	1.34E-01	65%	2.46E-01	5.86E-01	138%	1.15E-02	3.35E-02	191%	1.31E-02	1.88E-02	44%	1.28E-02	2.01E-02	57%	6.00E+00	6.01E+00	0%
Ethylbenzene	26,000	1.28E-02	2.30E-02	79%	4.05E-02	1.00E-01	148%	1.83E-03	5.60E-03	206%	1.79E-03	3.08E-03	72%	1.50E-03	2.72E-03	82%	1.03E+00	1.03E+00	0%
Propylbenzene	26,000	2.72E-03	4.88E-03	79%	8.59E-03	2.14E-02	149%	3.89E-04	1.19E-03	206%	3.77E-04	6.53E-04	73%	3.17E-04	5.78E-04	82%	2.18E-01	2.19E-01	0%
Indanone	480	1.89E-03	3.39E-03	79%	5.97E-03	1.48E-02	149%	2.70E-04	8.27E-04	206%	2.62E-04	4.54E-04	73%	2.20E-04	4.02E-04	82%	1.52E-01	1.52E-01	0%
Toluene	4,500	1.13E-01	1.94E-01	72%	3.51E-01	8.50E-01	142%	1.62E-02	4.82E-02	196%	1.65E-02	2.69E-02	63%	1.46E-02	2.51E-02	73%	8.70E+00	8.70E+00	0%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	89	5.72E-03	1.03E-02	79%	1.80E-02	4.48E-02	149%	8.16E-04	2.50E-03	206%	7.92E-04	1.37E-03	73%	6.66E-04	1.21E-03	82%	4.59E-01	4.59E-01	0%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	89	1.42E-02	2.54E-02	79%	4.47E-02	1.11E-01	149%	2.02E-03	6.19E-03	206%	1.96E-03	3.40E-03	73%	1.65E-03	3.01E-03	82%	1.14E+00	1.14E+00	0%
Acetone	62,000	5.99E-01	1.07E+00	79%	1.89E+00	4.70E+00	149%	8.55E-02	2.62E-01	206%	8.29E-02	1.44E-01	73%	6.98E-02	1.27E-01	82%	4.81E+01	4.81E+01	0%
Acetophenone	490	1.39E-01	2.49E-01	79%	4.38E-01	1.09E+00	149%	1.98E-02	6.07E-02	206%	1.92E-02	3.33E-02	73%	1.62E-02	2.95E-02	82%	1.11E+01	1.11E+01	0%
Methyl Ethyl Ketone	13,000	2.04E-01	3.66E-01	79%	6.44E-01	1.60E+00	149%	2.91E-02	8.93E-02	206%	2.83E-02	4.90E-02	73%	2.38E-02	4.34E-02	82%	1.64E+01	1.64E+01	0%
Xylene	8,700	6.50E-02	1.14E-01	75%	2.03E-01	4.98E-01	145%	9.27E-03	2.80E-02	201%	9.48E-03	1.54E-02	63%	8.27E-03	1.45E-02	75%	5.09E+00	5.10E+00	0%
o-Xylene	8,700	2.26E-02	4.05E-02	79%	7.14E-02	1.77E-01	148%	3.23E-03	9.89E-03	206%	3.14E-03	5.43E-03	73%	2.64E-03	4.81E-03	82%	1.81E+00	1.81E+00	0%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	170,000	2.33E-01	4.18E-01	79%	7.35E-01	1.83E+00	149%	3.33E-02	1.02E-01	206%	3.23E-02	5.59E-02	73%	2.71E-02	4.95E-02	82%	1.87E+01	1.87E+01	0%
1,1,1-Trichloroethane (Methyl chloroform)	10,900	1.72E-04	1.72E-04	0%	4.05E-04	4.05E-04	0%	2.00E-05	2.00E-05	0%	2.67E-05	2.67E-05	0%	2.62E-05	2.62E-05	0%	3.68E-03	3.68E-03	0%
Butane	66,000	1.04E-01	1.87E-01	79%	3.29E-01	8.18E-01	149%	1.49E-02	4.56E-02	206%	1.44E-02	2.50E-02	73%	1.21E-02	2.21E-02	82%	8.37E+00	8.37E+00	0%
2,2-Dimethylbutane	3,500	8.44E-03	1.51E-02	79%	2.66E-02	6.62E-02	149%	1.20E-03	3.69E-03	206%	1.17E-03	2.03E-03	73%	9.83E-04	1.79E-03	82%	6.77E-01	6.77E-01	0%
2,3-Dimethylbutane	3,500	1.55E-02	2.78E-02	79%	4.90E-02	1.22E-01	149%	2.22E-03	6.79E-03	206%	2.15E-03	3.72E-03	73%	1.81E-03	3.30E-03	82%	1.24E+00	1.25E+00	0%
Isobutene	180,000	3.10E-02	5.57E-02	79%	9.79E-02	2.43E-01	149%	4.43E-03	1.36E-02	206%	4.30E-03	7.45E-03	73%	3.61E-03	6.59E-03	82%	2.49E+00	2.49E+00	0%
cis-2-Butene	10,000	7.08E-03	1.27E-02	79%	2.23E-02	5.55E-02	149%	1.01E-03	3.10E-03	206%	9.80E-04	1.70E-03	73%	8.24E-04	1.50E-03	82%	5.68E-01	5.68E-01	0%
trans-2-Butene	10,000	1.42E-02	2.54E-02	79%	4.47E-02	1.11E-01	149%	2.02E-03	6.19E-03	206%	1.96E-03	3.40E-03	73%	1.65E-03	3.01E-03	82%	1.14E+00	1.14E+00	0%
2-Methyl-1-butene	19,000	7.08E-03	1.27E-02	79%	2.23E-02	5.55E-02	149%	1.01E-03	3.10E-03	206%	9.80E-04	1.70E-03	73%	8.24E-04	1.50E-03	82%	5.68E-01	5.68E-01	0%
3-Methyl-1-butene	19,000	4.36E-03	7.81E-03	79%	1.37E-02	3.42E-02	149%	6.22E-04	1.90E-03	206%	6.03E-04	1.05E-03	73%	5.07E-04	9.25E-04	82%	3.49E-01	3.50E-01	0%
1,3-Butadiene	660	8.44E-03	1.51E-02	79%	2.66E-02	6.62E-02	149%	1.20E-03	3.69E-03	206%	1.17E-03	2.03E-03	73%	9.83E-04	1.79E-03	82%	6.77E-01	6.77E-01	0%
Cyclopentane	3,400	1.12E-02	2.00E-02	79%	3.52E-02	8.75E-02	149%	1.59E-03	4.88E-03	206%	1.55E-03	2.68E-03	73%	1.30E-03	2.37E-03	82%	8.95E-01	8.96E-01	0%
Methylcyclopentane	2,600	1.69E-02	3.03E-02	79%	5.33E-02	1.32E-01	149%	2.41E-03	7.38E-03	206%	2.34E-03	4.05E-03	73%	1.97E-03	3.58E-03	82%	1.35E+00	1.35E+00	0%
Pentane	59,000	5.06E-02	9.08E-02	79%	1.60E-01	3.97E-01	149%	7.23E-03	2.21E-02	206%	7.01E-03	1.22E-02	73%	5.90E-03	1.08E-02	82%	4.06E+00	4.06E+00	0%
Isopentane	59,000	7.46E-02	1.34E-01	79%	2.35E-01	5.85E-01	149%	1.06E-02	3.26E-02	206%	1.03E-02	1.79E-02	73%	8.69E-03	1.58E-02	82%	5.98E+00	5.99E+00	0%
2-Methylpentane	3,500	2.53E-02	4.54E-02	79%	7.99E-02	1.99E-01	149%	3.61E-03	1.11E-02	206%	3.51E-03	6.08E-03	73%	2.95E-03	5.38E-03	82%	2.03E+00	2.03E+00	0%
3-Methylpentane	3,500	1.82E-02	3.27E-02	79%	5.75E-02	1.43E-01	149%	2.60E-03	7.98E-03	206%	2.53E-03	4.38E-03	73%	2.12E-03	3.87E-03	82%	1.46E+00	1.46E+00	0%
2,3-Dimethylpentane	3,500	1.96E-02	3.52E-02	79%	6.18E-02	1.54E-01	149%	2.80E-03	8.57E-03	206%	2.71E-03	4.70E-03	73%	2.28E-03	4.16E-03	82%	1.57E+00	1.57E+00	0%
2,4-Dimethylpentane	3,500	1.12E-02	2.00E-02	79%	3.52E-02	8.75E-02	149%	1.59E-03	4.88E-03	206%	1.55E-03	2.68E-03	73%	1.30E-03	2.37E-03	82%	8.95E-01	8.96E-01	0%
2,2,4-Trimethylpentane	3,500	3.38E-02	6.06E-02	79%	1.07E-01	2.65E-01	149%	4.82E-03	1.48E-02	206%	4.68E-03	8.10E-03	73%	3.93E-03	7.17E-03	82%	2.71E+00	2.71E+00	0%
2,3,4-Trimethylpentane	3,500	8.44E-03	1.51E-02	79%	2.66E-02	6.62E-02	149%	1.20E-03	3.69E-03	206%	1.17E-03	2.03E-03	73%	9.83E-04	1.79E-03	82%	6.77E-01	6.77E-01	0%
2-Methyl-2-pentene	1,800	5.72E-03	1.03E-02	79%	1.80E-02	4.48E-02	149%	8.16E-04	2.50E-03	206%	7.92E-04	1.37E-03	73%	6.66E-04	1.21E-03	82%	4.59E-01	4.59E-01	0%
trans-2-Pentene	13,000	1.36E-03	2.44E-03	79%	4.29E-03	1.07E-02	149%	1.94E-04	5.95E-04	206%	1.89E-04	3.27E-04	73%	1.59E-04	2.89E-04	82%	1.09E-01	1.09E-01	0%
Cyclohexane	3,400	5.72E-03	1.03E-02	79%	1.80E-02	4.48E-02	149%	8.16E-04	2.50E-03	206%	7.92E-04	1.37E-03	73%	6.66E-04	1.21E-03	82%	4.59E-01	4.59E-01	0%
Methylcyclohexane	3,400	1.42E-02	2.54E-02	79%	4.47E-02	1.11E-01	149%	2.02E-03	6.19E-03	206%	1.96E-03	3.40E-03	73%	1.65E-03	3.01E-03	82%	1.14E+00	1.14E+00	0%
Pentylcyclohexane	3,400	2.28E-03	4.10E-03	79%	7.21E-03	1.79E-02	149%	3.26E-04	9.99E-04	206%	3.16E-04	5.48E-04	73%	2.66E-04	4.85E-04	82%	1.83E-01	1.83E-01	0%
Dodecylcyclohexane	100	4.57E-04	8.20E-04	79%	1.44E-03	3.59E-03	149%	6.53E-05	2.00E-04	206%	6.33E-05	1.10E-04	73%	5.33E-05	9.71E-05	82%	3.67E-02	3.67E-02	0%
Tridecylcyclohexane	100	4.49E-04	8.06E-04	79%	1.42E-03	3.52E-03	149%	6.41E-05	1.96E-04	206%	6.22E-05	1.08E-04	73%	5.23E-05	9.54E-05	82%	3.60E-02	3.61E-02	0%
Tetradecylcyclohexane	100	4.33E-04	7.76E-04	79%	1.37E-03	3.39E-03	149%	6.18E-05	1.89E-04	206%	5.99E-05	1.04E-04	73%	5.04E-05	9.19E-05	82%	3.47E-02	3.47E-02	0%
Pentadecylcyclohexane	100	3.49E-04	6.25E-04	79%	1.10E-03	2.73E-03	149%	4.97E-05	1.52E-04	206%	4.83E-05	8.36E-05	73%	4.06E-05	7.40E-05	82%	2.80E-02	2.80E-02	0%
2-Methylhexane	3,070	1.55E-02	2.78E-02	79%	4.90E-02	1.22E-01	149%	2.22E-03	6.79E-03	206%	2.15E-03	3.72E-03	73%	1.81E-03	3.30E-03	82%	1.24E+00	1.25E+00	0%
3-Methylhexane	3,070	8.44E-03	1.51E-02	79%	2.66E-02	6.62E-02	149%	1.20E-03	3.69E-03	206%	1.17E-03	2.03E-03	73%	9.83E-04	1.79E-03	82%	6.77E-01	6.77E-01	0%
3-Ethylhexane	3,500	5.72E-03	1.03E-02	79%	1.80E-02	4.48E-02	149%	8.16E-04	2.50E-03	206%	7.92E-04	1.37E-03	73%	6.66E-04	1.21E-03	82%	4.59E-01	4.59E-01	0%
2,3-Dimethylhexane	3,500	4.36E-03	7.81E-03	79%	1.37E-02	3.42E-02	149%	6.22E-04	1.90E-03	206%	6.03E-04	1.05E-03	73%	5.07E-04	9.25E-04	82%	3.49E-01	3.50E-01	0%
2,4-Dimethylhexane	3,500	1.36E-03	2.44E-03	79%	4.29E-03	1.07E-02	149%	1.94E-04	5.95E-04	206%	1.89E-04	3.27E-04	73%	1.59E-04	2.89E-04	82%	1.09E-01	1.09E-01	0%
2,5-Dimethylhexane	3,500	1.36E-03	2.44E-03	79%	4.29E-03	1.07E-02	149%	1.94E-04	5.95E-04	206%	1.89E-04	3.27E-04	73%	1.59E-04	2.89E-04	82%	1.09E-01	1.09E-01	0%
cis-2-Hexene	1,000	2.72E-03	4.88E-03	79%	8.59E-03	2.14E-02	149%	3.89E-04	1.19E-03	206%	3.77E-04	6.53E-04	73%	3.17E-04	5.78E-04	82%	2.18E-01	2.19E-01	0%

**Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	1,000	4.36E-03	7.81E-03	79%	1.37E-02	3.42E-02	149%	6.22E-04	1.90E-03	206%	6.03E-04	1.05E-03	73%	5.07E-04	9.25E-04	82%	3.49E-01	3.50E-01	0%
Heptane	3,500	1.28E-02	2.30E-02	79%	4.04E-02	1.00E-01	149%	1.83E-03	5.59E-03	206%	1.77E-03	3.07E-03	73%	1.49E-03	2.72E-03	82%	1.03E+00	1.03E+00	0%
2-Methylheptane	3,500	2.72E-03	4.88E-03	79%	8.59E-03	2.14E-02	149%	3.89E-04	1.19E-03	206%	3.77E-04	6.53E-04	73%	3.17E-04	5.78E-04	82%	2.18E-01	2.19E-01	0%
Octane	3,500	7.08E-03	1.27E-02	79%	2.23E-02	5.55E-02	149%	1.01E-03	3.10E-03	206%	9.80E-04	1.70E-03	73%	8.24E-04	1.50E-03	82%	5.68E-01	5.68E-01	0%
Nonane	10,500	4.36E-03	7.81E-03	79%	1.37E-02	3.42E-02	149%	6.22E-04	1.90E-03	206%	6.03E-04	1.05E-03	73%	5.07E-04	9.25E-04	82%	3.49E-01	3.50E-01	0%
Dodecane	3,500	1.37E-02	2.46E-02	79%	4.32E-02	1.07E-01	149%	1.95E-03	5.99E-03	206%	1.90E-03	3.29E-03	73%	1.60E-03	2.91E-03	82%	1.10E+00	1.10E+00	0%
Tridecane	3,500	1.30E-02	2.33E-02	79%	4.10E-02	1.02E-01	149%	1.85E-03	5.68E-03	206%	1.80E-03	3.12E-03	73%	1.51E-03	2.76E-03	82%	1.04E+00	1.04E+00	0%
Tetradecane	3,500	1.71E-02	3.07E-02	79%	5.40E-02	1.34E-01	149%	2.44E-03	7.49E-03	206%	2.37E-03	4.11E-03	73%	1.99E-03	3.64E-03	82%	1.37E+00	1.37E+00	0%
n-Pentadecane	100	1.08E-02	1.94E-02	79%	3.42E-02	8.50E-02	149%	1.55E-03	4.74E-03	206%	1.50E-03	2.60E-03	73%	1.26E-03	2.30E-03	82%	8.69E-01	8.70E-01	0%
Hexadecane	3,500	1.94E-02	3.47E-02	79%	6.11E-02	1.52E-01	149%	2.76E-03	8.46E-03	206%	2.68E-03	4.64E-03	73%	2.25E-03	4.11E-03	82%	1.55E+00	1.55E+00	0%
n-Heptadecane	100	1.67E-02	3.00E-02	79%	5.27E-02	1.31E-01	149%	2.39E-03	7.31E-03	206%	2.32E-03	4.01E-03	73%	1.95E-03	3.55E-03	82%	1.34E+00	1.34E+00	0%
n-Octadecane	100	1.64E-02	2.94E-02	79%	5.16E-02	1.28E-01	149%	2.34E-03	7.15E-03	206%	2.27E-03	3.93E-03	73%	1.91E-03	3.47E-03	82%	1.31E+00	1.31E+00	0%
n-Nonadecane	100	1.12E-02	2.01E-02	79%	3.53E-02	8.78E-02	149%	1.60E-03	4.89E-03	206%	1.55E-03	2.68E-03	73%	1.30E-03	2.38E-03	82%	8.98E-01	8.98E-01	0%
n-Eicosane	100	5.61E-03	1.01E-02	79%	1.77E-02	4.40E-02	149%	8.01E-04	2.45E-03	206%	7.77E-04	1.35E-03	73%	6.53E-04	1.19E-03	82%	4.50E-01	4.50E-01	0%
n-Heneicosane	100	1.79E-03	3.21E-03	79%	5.65E-03	1.40E-02	149%	2.56E-04	7.83E-04	206%	2.48E-04	4.30E-04	73%	2.09E-04	3.80E-04	82%	1.44E-01	1.44E-01	0%
Farnesane	3,500	1.18E-02	2.12E-02	79%	3.73E-02	9.27E-02	149%	1.69E-03	5.17E-03	206%	1.64E-03	2.84E-03	73%	1.38E-03	2.51E-03	82%	9.48E-01	9.48E-01	0%
Pristane	100	1.21E-02	2.16E-02	79%	3.81E-02	9.46E-02	149%	1.72E-03	5.27E-03	206%	1.67E-03	2.89E-03	73%	1.40E-03	2.56E-03	82%	9.68E-01	9.68E-01	0%
C ₂ -C ₆ aliphatic	3,400	8.19E-01	1.43E+00	74%	2.55E+00	6.25E+00	145%	1.17E-01	3.51E-01	201%	1.20E-01	1.94E-01	62%	1.06E-01	1.84E-01	74%	6.40E+01	6.40E+01	0%
>C ₆ -C ₈ aliphatic	3,500	1.46E-01	2.63E-01	79%	4.62E-01	1.15E+00	149%	2.09E-02	6.40E-02	206%	2.03E-02	3.51E-02	73%	1.71E-02	3.11E-02	82%	1.18E+01	1.18E+01	0%
>C ₈ -C ₁₀ aliphatic	3,500	4.36E-03	7.81E-03	79%	1.37E-02	3.42E-02	149%	6.22E-04	1.90E-03	206%	6.03E-04	1.05E-03	73%	5.07E-04	9.25E-04	82%	3.49E-01	3.50E-01	0%
>C ₁₀ -C ₁₂ aliphatic	3,500	1.64E-02	2.94E-02	79%	5.17E-02	1.28E-01	149%	2.34E-03	7.16E-03	206%	2.27E-03	3.93E-03	73%	1.91E-03	3.48E-03	82%	1.31E+00	1.32E+00	0%
>C ₁₂ -C ₁₆ aliphatic	3,500	9.42E-02	1.69E-01	79%	2.97E-01	7.39E-01	149%	1.34E-02	4.12E-02	206%	1.30E-02	2.26E-02	73%	1.10E-02	2.00E-02	82%	7.56E+00	7.56E+00	0%
>C ₁₆ -C ₂₁ aliphatic	100	9.34E-02	1.68E-01	79%	2.95E-01	7.33E-01	149%	1.33E-02	4.09E-02	206%	1.29E-02	2.24E-02	73%	1.09E-02	1.98E-02	82%	7.50E+00	7.50E+00	0%
C ₆ -C ₈ aromatic	27	2.05E-01	3.51E-01	71%	6.38E-01	1.54E+00	141%	2.96E-02	8.72E-02	195%	3.14E-02	4.88E-02	56%	2.89E-02	4.80E-02	66%	1.57E+01	1.57E+01	0%
>C ₈ -C ₁₀ aromatic	1,250	2.26E-02	4.05E-02	79%	7.13E-02	1.77E-01	149%	3.23E-03	9.88E-03	206%	3.13E-03	5.42E-03	73%	2.63E-03	4.80E-03	82%	1.81E+00	1.81E+00	0%
Dioxins and Furans^(a)																			
2378 - TCDD	-	6.13E-12	6.13E-12	0%	1.69E-11	1.69E-11	0%	1.29E-12	1.29E-12	0%	1.69E-12	1.69E-12	0%	1.63E-12	1.63E-12	0%	9.29E-10	9.29E-10	0%
12378 - PeCDD	-	9.91E-12	9.91E-12	0%	2.73E-11	2.73E-11	0%	2.08E-12	2.08E-12	0%	2.74E-12	2.74E-12	0%	2.64E-12	2.64E-12	0%	1.50E-09	1.50E-09	0%
123478 - HxCDD	-	2.16E-12	2.16E-12	0%	5.96E-12	5.96E-12	0%	4.54E-13	4.54E-13	0%	5.98E-13	5.98E-13	0%	5.77E-13	5.77E-13	0%	3.28E-10	3.28E-10	0%
123678 - HxCDD	-	5.77E-12	5.77E-12	0%	1.59E-11	1.59E-11	0%	1.21E-12	1.21E-12	0%	1.59E-12	1.59E-12	0%	1.54E-12	1.54E-12	0%	8.74E-10	8.74E-10	0%
123789 - HxCDD	-	8.83E-12	8.83E-12	0%	2.44E-11	2.44E-11	0%	1.86E-12	1.86E-12	0%	2.44E-12	2.44E-12	0%	2.36E-12	2.36E-12	0%	1.34E-09	1.34E-09	0%
1234678 - HpCDD	-	1.64E-11	1.64E-11	0%	4.52E-11	4.52E-11	0%	3.44E-12	3.44E-12	0%	4.53E-12	4.53E-12	0%	4.37E-12	4.37E-12	0%	2.48E-09	2.48E-09	0%
1,2,3,4,6,7,8,9-Octa CDD	-	1.67E-11	1.67E-11	0%	4.59E-11	4.59E-11	0%	3.50E-12	3.50E-12	0%	4.61E-12	4.61E-12	0%	4.44E-12	4.44E-12	0%	2.52E-09	2.52E-09	0%
2378 - TCDF	-	1.00E-10	1.00E-10	0%	2.77E-10	2.77E-10	0%	2.11E-11	2.11E-11	0%	2.78E-11	2.78E-11	0%	2.68E-11	2.68E-11	0%	1.52E-08	1.52E-08	0%
12378 - PeCDF	-	5.25E-11	5.25E-11	0%	1.45E-10	1.45E-10	0%	1.10E-11	1.10E-11	0%	1.45E-11	1.45E-11	0%	1.40E-11	1.40E-11	0%	7.95E-09	7.95E-09	0%
23478 - PeCDF	-	9.04E-11	9.04E-11	0%	2.49E-10	2.49E-10	0%	1.90E-11	1.90E-11	0%	2.50E-11	2.50E-11	0%	2.41E-11	2.41E-11	0%	1.37E-08	1.37E-08	0%
123478 - HxCDF	-	9.19E-11	9.19E-11	0%	2.53E-10	2.53E-10	0%	1.93E-11	1.93E-11	0%	2.54E-11	2.54E-11	0%	2.45E-11	2.45E-11	0%	1.39E-08	1.39E-08	0%

Table B-4 Screening of Predicted 1-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	-	4.94E-11	4.94E-11	0%	1.36E-10	1.36E-10	0%	1.04E-11	1.04E-11	0%	1.36E-11	1.36E-11	0%	1.32E-11	1.32E-11	0%	7.48E-09	7.48E-09	0%
234678 - HxCDF	-	1.91E-11	1.91E-11	0%	5.26E-11	5.26E-11	0%	4.01E-12	4.01E-12	0%	5.28E-12	5.28E-12	0%	5.09E-12	5.09E-12	0%	2.89E-09	2.89E-09	0%
123789 - HxCDF	-	1.98E-12	1.98E-12	0%	5.47E-12	5.47E-12	0%	4.16E-13	4.16E-13	0%	5.48E-13	5.48E-13	0%	5.29E-13	5.29E-13	0%	3.00E-10	3.00E-10	0%
1234678 - HpCDF	-	7.50E-11	7.50E-11	0%	2.07E-10	2.07E-10	0%	1.57E-11	1.57E-11	0%	2.07E-11	2.07E-11	0%	2.00E-11	2.00E-11	0%	1.14E-08	1.14E-08	0%
1234789 - HpCDF	-	8.47E-12	8.47E-12	0%	2.34E-11	2.34E-11	0%	1.78E-12	1.78E-12	0%	2.34E-12	2.34E-12	0%	2.26E-12	2.26E-12	0%	1.28E-09	1.28E-09	0%
1,2,3,4,6,7,8,9-Octa CDF	-	7.77E-12	7.77E-12	0%	2.14E-11	2.14E-11	0%	1.63E-12	1.63E-12	0%	2.15E-12	2.15E-12	0%	2.07E-12	2.07E-12	0%	1.18E-09	1.18E-09	0%
Total PCDDs (TEQ)	-	1.79E-11	1.79E-11	0%	4.93E-11	4.93E-11	0%	3.76E-12	3.76E-12	0%	4.95E-12	4.95E-12	0%	4.77E-12	4.77E-12	0%	2.71E-09	2.71E-09	0%
Total PCDFs (TEQ)	-	5.58E-11	5.58E-11	0%	1.54E-10	1.54E-10	0%	1.17E-11	1.17E-11	0%	1.54E-11	1.54E-11	0%	1.49E-11	1.49E-11	0%	8.46E-09	8.46E-09	0%
Total PCDDs + PCDFs	-	1.86E-09	1.86E-09	0%	5.14E-09	5.14E-09	0%	3.91E-10	3.91E-10	0%	5.15E-10	5.15E-10	0%	4.97E-10	4.97E-10	0%	2.82E-07	2.82E-07	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 1-hour (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

>= greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																
Carbon monoxide	7,000	1.45E+00	1.56E+00	8%	1.97E+02	1.98E+02	0%	5.61E+01	5.61E+01	0%	4.44E+01	4.46E+01	1%	2.48E+01	2.50E+01	1%
Carbon monoxide (8 hour)	6,000	2.66E+00	2.74E+00	3%	3.62E+02	3.62E+02	0%	7.76E+01	7.76E+01		5.31E+01	5.35E+01		3.14E+01	3.15E+01	
Nitrogen dioxide	200	3.78E+00	3.89E+00	3%	9.60E+01	9.60E+01	0%	6.44E+01	6.44E+01	0%	6.02E+01	6.04E+01	0%	4.99E+01	5.03E+01	1%
Sulphur dioxide	20	5.57E-03	5.89E-03	6%	1.41E+00	1.42E+00	0%	4.03E-01	4.03E-01	0%	1.96E-01	1.96E-01	0%	1.53E-01	1.54E-01	1%
Total Suspended Particulates (TSP)	120	3.41E+00	3.62E+00	6%	1.12E+02	1.12E+02	0%	1.12E+01	1.60E+01	42%	6.57E+01	6.57E+01	0%	6.26E+00	9.27E+00	48%
PM _{2.5}	25	2.25E+00	2.31E+00	3%	3.09E+01	3.10E+01	0%	1.02E+01	1.12E+01	9%	9.22E+00	9.22E+00	0%	5.02E+00	5.05E+00	0%
PM ₁₀	50	3.02E+00	3.30E+00	9%	5.16E+01	5.16E+01	0%	1.61E+01	2.01E+01	25%	4.26E+01	4.26E+01	0%	5.33E+00	8.26E+00	55%
Metals																
Aluminum	120	1.85E-02	3.25E-02	76%	4.66E+00	4.66E+00	0%	5.17E-01	8.18E-01	58%	3.76E+00	3.76E+00	0%	1.32E-01	3.93E-01	197%
Antimony	25	5.16E-07	9.02E-07	75%	1.35E-04	1.35E-04	0%	1.43E-05	2.27E-05	58%	1.05E-04	1.05E-04	0%	3.68E-06	1.09E-05	197%
Arsenic	0.3	4.55E-06	5.05E-06	11%	1.33E-03	1.33E-03	0%	2.08E-04	2.08E-04	0%	5.11E-04	5.11E-04	0%	9.83E-05	9.94E-05	1%
Barium	10	1.68E-04	2.70E-04	60%	6.80E-02	6.80E-02	0%	4.22E-03	6.69E-03	59%	4.88E-02	4.88E-02	0%	1.28E-03	3.21E-03	151%
Beryllium	0.01	3.17E-06	3.21E-06	1%	9.46E-04	9.46E-04	0%	1.45E-04	1.45E-04	0%	1.46E-04	1.46E-04	0%	6.92E-05	6.95E-05	0%
Cadmium	0.03	5.53E-05	5.71E-05	3%	1.07E-02	1.07E-02	0%	2.56E-03	2.56E-03	0%	2.32E-03	2.32E-03	0%	9.04E-04	9.04E-04	0%
Chromium (VI) ^(b)	0.39	6.34E-05	8.95E-05	41%	3.73E-02	3.73E-02	0%	2.34E-03	2.34E-03	0%	2.96E-02	2.96E-02	0%	7.32E-04	1.00E-03	37%
Chromium (III) ^(b)	0.5	6.34E-05	8.95E-05	41%	3.73E-02	3.73E-02	0%	2.34E-03	2.34E-03	0%	2.96E-02	2.96E-02	0%	7.32E-04	1.00E-03	37%
Cobalt	0.1	1.11E-05	1.18E-05	7%	3.83E-03	3.83E-03	0%	4.30E-04	4.30E-04	0%	1.89E-03	1.89E-03	0%	1.73E-04	1.73E-04	0%
Copper	50	1.69E-05	1.83E-05	9%	3.80E-03	3.80E-03	0%	7.29E-04	7.29E-04	0%	1.55E-03	1.55E-03	0%	2.66E-04	2.67E-04	0%
Iron	4	4.95E-03	7.86E-03	59%	2.06E+00	2.06E+00	0%	1.23E-01	1.94E-01	58%	1.50E+00	1.50E+00	0%	3.88E-02	9.31E-02	140%
Lead	0.5	1.86E-05	2.00E-05	7%	3.21E-03	3.21E-03	0%	8.62E-04	8.62E-04	0%	1.19E-03	1.19E-03	0%	3.08E-04	3.09E-04	0%
Manganese	0.1	8.11E-05	1.24E-04	53%	3.89E-02	3.89E-02	0%	2.57E-03	2.99E-03	16%	2.86E-02	2.86E-02	0%	8.31E-04	1.42E-03	71%
Mercury	2	3.68E-06	3.77E-06	2%	9.82E-04	9.82E-04	0%	1.65E-04	1.65E-04	0%	3.81E-04	3.81E-04	0%	7.83E-05	7.83E-05	0%
Molybdenum	120	4.12E-07	6.74E-07	64%	1.53E-04	1.53E-04	0%	1.06E-05	1.68E-05	58%	1.05E-04	1.05E-04	0%	2.86E-06	8.04E-06	181%
Nickel	0.1	3.32E-05	3.48E-05	5%	3.18E-02	3.18E-02	0%	1.95E-03	1.95E-03	0%	3.10E-02	3.10E-02	0%	6.24E-04	6.24E-04	0%
Selenium	10	1.56E-05	1.56E-05	0%	4.65E-03	4.65E-03	0%	7.05E-04	7.05E-04	0%	5.04E-04	5.04E-04	0%	3.38E-04	3.38E-04	0%
Silver	1	8.80E-06	9.12E-06	4%	1.79E-03	1.79E-03	0%	4.02E-04	4.02E-04	0%	3.77E-04	3.77E-04	0%	1.43E-04	1.43E-04	0%
Strontium	120	1.07E-04	1.74E-04	63%	4.01E-02	4.01E-02	0%	2.73E-03	4.32E-03	58%	2.77E-02	2.77E-02	0%	7.51E-04	2.07E-03	176%
Tellurium	10	2.84E-08	4.81E-08	69%	8.89E-06	8.89E-06	0%	7.60E-07	1.20E-06	58%	5.82E-06	5.82E-06	0%	1.95E-07	5.77E-07	197%
Thallium	-	3.54E-07	6.25E-07	77%	8.58E-05	8.58E-05	0%	9.96E-06	1.58E-05	58%	7.18E-05	7.18E-05	0%	2.55E-06	7.57E-06	197%
Titanium	120	4.16E-04	7.10E-04	71%	1.25E-01	1.25E-01	0%	1.12E-02	1.78E-02	58%	8.52E-02	8.52E-02	0%	2.88E-03	8.54E-03	197%
Tungsten	-	1.20E-06	2.11E-06	75%	3.06E-04	3.06E-04	0%	3.35E-05	5.31E-05	58%	2.44E-04	2.44E-04	0%	8.59E-06	2.55E-05	197%
Uranium	0.15	1.50E-06	2.59E-06	73%	4.23E-04	4.23E-04	0%	4.11E-05	6.51E-05	58%	3.07E-04	3.07E-04	0%	1.05E-05	3.13E-05	197%
Vanadium	1	1.02E-05	1.64E-05	61%	3.98E-03	3.98E-03	0%	2.57E-04	4.07E-04	59%	2.81E-03	2.81E-03	0%	7.46E-05	1.95E-04	162%
Zinc	120	7.23E-05	7.76E-05	7%	1.69E-02	1.69E-02	0%	3.12E-03	3.12E-03	0%	4.40E-03	4.41E-03	0%	1.14E-03	1.14E-03	0%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	-	2.10E-05	3.77E-05	80%	3.20E-03	3.22E-03	0%	1.05E-03	1.05E-03	0%	1.85E-03	1.88E-03	2%	5.86E-04	6.26E-04	7%
1-Methylphenanthrene	-	9.44E-07	1.70E-06	80%	1.44E-04	1.45E-04	0%	4.71E-05	4.71E-05	0%	8.31E-05	8.47E-05	2%	2.64E-05	2.81E-05	7%
2-Methylantracene	-	5.78E-07	1.04E-06	80%	8.82E-05	8.85E-05	0%	2.88E-05	2.88E-05	0%	5.08E-05	5.18E-05	2%	1.61E-05	1.72E-05	7%
2-Methylfluorene	-	1.95E-08	3.50E-08	80%	2.97E-06	2.99E-06	0%	9.71E-07	9.71E-07	0%	1.71E-06	1.75E-06	2%	5.44E-07	5.81E-07	7%
2-methylnaphthalene	-	3.39E-05	6.10E-05	80%	5.18E-03	5.20E-03	0%	1.69E-03	1.69E-03	0%	2.99E-03	3.05E-03	2%	9.48E-04	1.01E-03	7%
2-Methylphenanthrene	-	2.33E-06	4.19E-06	80%	3.56E-04	3.57E-04	0%	1.16E-04	1.16E-04	0%	2.05E-04	2.09E-04	2%	6.52E-05	6.95E-05	7%
2-Methylpyrene	-	1.73E-07	3.11E-07	80%	2.64E-05	2.65E-05	0%	8.61E-06	8.61E-06	0%	1.52E-05	1.55E-05	2%	4.83E-06	5.15E-06	7%
3-Methyldibenzothiophene	-	3.57E-08	6.42E-08	80%	5.45E-06	5.47E-06	0%	1.78E-06	1.78E-06	0%	3.14E-06	3.21E-06	2%	9.98E-07	1.06E-06	7%
3-Methylphenanthrene	-	1.68E-06	3.02E-06	80%	2.57E-04	2.58E-04	0%	8.39E-05	8.39E-05	0%	1.48E-04	1.51E-04	2%	4.70E-05	5.02E-05	7%
4-+9-Methylphenanthrene	-	1.27E-06	2.28E-06	80%	1.94E-04	1.95E-04	0%	6.34E-05	6.34E-05	0%	1.12E-04	1.14E-04	2%	3.55E-05	3.79E-05	7%
4-Methyldibenzothiophene	-	2.27E-08	4.08E-08	80%	3.47E-06	3.48E-06	0%	1.13E-06	1.13E-06	0%	2.00E-06	2.04E-06	2%	6.35E-07	6.78E-07	7%
9-Methylphenanthrene	-	1.71E-08	1.71E-08	0%	2.77E-06	2.77E-06	0%	2.47E-07	2.47E-07	0%	4.71E-07	4.71E-07	0%	1.93E-07	1.93E-07	0%
Acenaphthene	-	5.17E-06	5.59E-06	8%	6.48E-04	6.48E-04	0%	7.48E-05	7.77E-05	4%	1.07E-04	1.09E-04	2%	8.24E-05	8.25E-05	0%
Acenaphthylene	-	1.07E-05	1.38E-05	29%	1.28E-03	1.29E-03	0%	1.97E-04	1.97E-04	0%	3.43E-04	3.50E-04	2%	1.66E-04	1.67E-04	0%
Acphenanthrylene	-	6.66E-07	1.20E-06	80%	1.02E-04	1.02E-04	0%	3.32E-05	3.32E-05	0%	5.86E-05	5.98E-05	2%	1.86E-05	1.99E-05	7%
Anthracene	-	1.62E-06	2.17E-06	34%	1.77E-04	1.78E-04	1%	3.54E-05	3.54E-05	0%	6.19E-05	6.31E-05	2%	2.29E-05	2.29E-05	0%
Benz(a)anthracene	-	7.02E-07	7.98E-07	14%	8.67E-05	8.67E-05	0%	1.04E-05	1.09E-05	4%	1.71E-05	1.74E-05	2%	1.11E-05	1.11E-05	0%
Benzo(a)fluorene	-	2.10E-07	3.77E-07	80%	3.20E-05	3.21E-05	0%	1.04E-05	1.04E-05	0%	1.84E-05	1.88E-05	2%	5.86E-06	6.25E-06	7%
Benzo(a)pyrene	-	2.90E-07	3.55E-07	23%	3.54E-05	3.54E-05	0%	4.66E-06	4.76E-06	2%	8.07E-06	8.24E-06	2%	4.58E-06	4.58E-06	0%
Benzo(b)fluoranthene	-	1.62E-06	2.23E-06	38%	1.65E-04	1.66E-04	1%	3.96E-05	3.96E-05	0%	6.89E-05	7.02E-05	2%	2.23E-05	2.37E-05	6%
Benzo(e)pyrene	-	1.93E-08	2.85E-08	48%	2.28E-06	2.34E-06	3%	7.57E-07	7.57E-07	0%	1.23E-06	1.25E-06	2%	4.82E-07	5.06E-07	5%
Benzo(g,h,i)fluoranthene	-	3.23E-07	5.81E-07	80%	4.93E-05	4.95E-05	0%	1.61E-05	1.61E-05	0%	2.84E-05	2.90E-05	2%	9.03E-06	9.63E-06	7%
Benzo(g,h,i)perylene	-	6.55E-07	8.22E-07	26%	7.80E-05	7.83E-05	0%	1.17E-05	1.17E-05	0%	2.01E-05	2.05E-05	2%	1.01E-05	1.01E-05	0%
Benzo(k)fluoranthene	-	2.49E-07	3.19E-07	28%	3.02E-05	3.03E-05	0%	4.43E-06	4.43E-06	0%	7.70E-06	7.86E-06	2%	3.92E-06	3.92E-06	0%
Biphenyl	-	7.19E-08	7.19E-08	0%	1.17E-05	1.17E-05	0%	1.04E-06	1.04E-06	0%	1.98E-06	1.98E-06	0%	8.12E-07	8.12E-07	0%
Chrysene	-	1.62E-06	1.64E-06	1%	2.10E-04	2.10E-04	0%	2.19E-05	2.20E-05	1%	3.01E-05	3.01E-05	0%	2.62E-05	2.62E-05	0%
Coronene	-	1.62E-09	2.92E-09	80%	2.48E-07	2.49E-07	0%	8.09E-08	8.09E-08	0%	1.43E-07	1.46E-07	2%	4.53E-08	4.84E-08	7%
Cyclopenta(c,d)pyrene	-	1.14E-07	2.06E-07	80%	1.75E-05	1.75E-05	0%	5.70E-06	5.70E-06	0%	1.01E-05	1.03E-05	2%	3.20E-06	3.41E-06	7%
Dibenzo(a,h)anthracene	-	5.12E-07	7.04E-07	37%	5.17E-05	5.20E-05	1%	1.27E-05	1.27E-05	0%	2.22E-05	2.26E-05	2%	7.08E-06	7.53E-06	6%
Dibenzothiophene	-	1.38E-08	2.48E-08	80%	2.11E-06	2.12E-06	0%	6.89E-07	6.89E-07	0%	1.22E-06	1.24E-06	2%	3.86E-07	4.12E-07	7%
Fluoranthene	-	6.05E-06	8.40E-06	39%	6.03E-04	6.07E-04	1%	1.51E-04	1.51E-04	0%	2.63E-04	2.69E-04	2%	8.53E-05	9.08E-05	6%
Fluorene	-	1.51E-05	1.95E-05	29%	1.79E-03	1.80E-03	0%	2.82E-04	2.82E-04	0%	4.91E-04	5.00E-04	2%	2.32E-04	2.32E-04	0%
Indeno(1,2,3-cd)fluoranthene	-	8.11E-09	1.46E-08	80%	1.24E-06	1.24E-06	0%	4.04E-07	4.04E-07	0%	7.14E-07	7.28E-07	2%	2.27E-07	2.42E-07	7%
Indeno(1,2,3-cd)pyrene	-	4.28E-07	4.28E-07	0%	5.68E-05	5.68E-05	0%	5.85E-06	5.85E-06	0%	7.75E-06	7.75E-06	0%	6.98E-06	6.98E-06	0%
Indeno(1,2,3-W)pyrene	-	1.46E-07	2.62E-07	80%	2.23E-05	2.23E-05	0%	7.27E-06	7.27E-06	0%	1.28E-05	1.31E-05	2%	4.07E-06	4.35E-06	7%
Naphthalene	-	1.90E-04	2.56E-04	35%	1.94E-02	1.95E-02	1%	4.58E-03	4.58E-03	0%	8.01E-03	8.16E-03	2%	2.56E-03	2.71E-03	6%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	-	1.30E-07	2.33E-07	80%	1.98E-05	1.99E-05	0%	6.47E-06	6.47E-06	0%	1.14E-05	1.16E-05	2%	3.62E-06	3.87E-06	7%
Perylene	-	1.62E-09	2.92E-09	80%	2.48E-07	2.49E-07	0%	8.09E-08	8.09E-08	0%	1.43E-07	1.46E-07	2%	4.53E-08	4.84E-08	7%
Phenanthrene	-	4.30E-05	4.37E-05	2%	5.57E-03	5.57E-03	0%	5.81E-04	5.85E-04	1%	8.01E-04	8.01E-04	0%	6.95E-04	6.95E-04	0%
Picene	-	1.62E-09	2.92E-09	80%	2.48E-07	2.49E-07	0%	8.09E-08	8.09E-08	0%	1.43E-07	1.46E-07	2%	4.53E-08	4.84E-08	7%
Pyrene	-	6.86E-06	1.00E-05	46%	6.11E-04	6.13E-04	0%	2.04E-04	2.04E-04	0%	3.55E-04	3.62E-04	2%	1.15E-04	1.22E-04	7%
Volatile Organic Compounds																
Methacrolein	-	2.46E-03	2.89E-03	17%	8.43E-01	8.46E-01	0%	1.25E-01	1.25E-01	0%	1.38E-01	1.39E-01	1%	7.16E-02	7.25E-02	1%
Acrolein	-	2.10E-03	2.46E-03	17%	7.17E-01	7.19E-01	0%	1.06E-01	1.06E-01	0%	1.17E-01	1.18E-01	1%	6.09E-02	6.17E-02	1%
Benzaldehyde	-	2.34E-03	2.74E-03	17%	8.01E-01	8.04E-01	0%	1.18E-01	1.18E-01	0%	1.31E-01	1.32E-01	1%	6.81E-02	6.89E-02	1%
2,5-dimethylbenzaldehyde	-	2.53E-03	2.96E-03	17%	8.65E-01	8.67E-01	0%	1.28E-01	1.28E-01	0%	1.41E-01	1.42E-01	1%	7.34E-02	7.44E-02	1%
Butanal (Butyraldehyde)	-	8.01E-04	9.39E-04	17%	2.74E-01	2.75E-01	0%	4.05E-02	4.05E-02	0%	4.48E-02	4.51E-02	1%	2.33E-02	2.36E-02	1%
Formaldehyde	50	1.43E-02	1.67E-02	17%	4.72E+00	4.74E+00	0%	7.15E-01	7.15E-01	0%	7.89E-01	7.94E-01	1%	4.11E-01	4.16E-01	1%
Acetaldehyde	500	2.58E-02	3.02E-02	17%	8.81E+00	8.84E+00	0%	1.30E+00	1.30E+00	0%	1.44E+00	1.45E+00	1%	7.49E-01	7.58E-01	1%
Propanal	500	8.62E-03	1.01E-02	17%	2.95E+00	2.96E+00	0%	4.36E-01	4.36E-01	0%	4.82E-01	4.86E-01	1%	2.51E-01	2.54E-01	1%
Crotonaldehyde	-	8.25E-03	9.68E-03	17%	2.83E+00	2.83E+00	0%	4.18E-01	4.18E-01	0%	4.62E-01	4.65E-01	1%	2.40E-01	2.43E-01	1%
Hexanal	-	1.36E-03	1.59E-03	17%	4.64E-01	4.65E-01	0%	6.86E-02	6.86E-02	0%	7.58E-02	7.63E-02	1%	3.94E-02	3.99E-02	1%
Heptanal	-	1.97E-03	2.31E-03	17%	6.75E-01	6.77E-01	0%	9.97E-02	9.97E-02	0%	1.10E-01	1.11E-01	1%	5.73E-02	5.80E-02	1%
Octanal	-	1.91E-03	2.24E-03	17%	6.54E-01	6.56E-01	0%	9.66E-02	9.66E-02	0%	1.07E-01	1.08E-01	1%	5.55E-02	5.62E-02	1%
Nonanal	-	2.71E-03	3.18E-03	17%	9.28E-01	9.31E-01	0%	1.37E-01	1.37E-01	0%	1.52E-01	1.53E-01	1%	7.88E-02	7.98E-02	1%
Decanal	-	1.72E-03	2.02E-03	17%	5.90E-01	5.92E-01	0%	8.73E-02	8.73E-02	0%	9.65E-02	9.71E-02	1%	5.02E-02	5.08E-02	1%
Undecanal	-	1.60E-03	1.88E-03	17%	5.48E-01	5.50E-01	0%	8.10E-02	8.10E-02	0%	8.96E-02	9.02E-02	1%	4.66E-02	4.72E-02	1%
Dodecanal	-	7.39E-04	8.67E-04	17%	2.53E-01	2.54E-01	0%	3.74E-02	3.74E-02	0%	4.14E-02	4.16E-02	1%	2.15E-02	2.18E-02	1%
Tridecanal	-	1.23E-03	1.44E-03	17%	4.22E-01	4.23E-01	0%	6.23E-02	6.23E-02	0%	6.89E-02	6.94E-02	1%	3.58E-02	3.63E-02	1%
1,2,4-Trimethylbenzene	220	5.42E-04	6.35E-04	17%	1.86E-01	1.86E-01	0%	2.74E-02	2.74E-02	0%	3.03E-02	3.05E-02	1%	1.58E-02	1.60E-02	1%
1,3,5-Trimethylbenzene	220	1.60E-04	1.88E-04	17%	5.48E-02	5.50E-02	0%	8.10E-03	8.10E-03	0%	8.96E-03	9.02E-03	1%	4.66E-03	4.72E-03	1%
Benzene	29	2.37E-03	2.66E-03	12%	5.86E-01	5.87E-01	0%	8.98E-02	8.98E-02	0%	9.50E-02	9.56E-02	1%	5.26E-02	5.32E-02	1%
Ethylbenzene	21,710	2.91E-04	3.41E-04	17%	9.92E-02	9.95E-02	0%	1.47E-02	1.47E-02	0%	1.63E-02	1.64E-02	1%	8.46E-03	8.57E-03	1%
Propylbenzene	-	6.16E-05	7.22E-05	17%	2.11E-02	2.11E-02	0%	3.12E-03	3.12E-03	0%	3.45E-03	3.47E-03	1%	1.79E-03	1.81E-03	1%
Indanone	-	4.28E-05	5.02E-05	17%	1.47E-02	1.47E-02	0%	2.17E-03	2.17E-03	0%	2.39E-03	2.41E-03	1%	1.24E-03	1.26E-03	1%
Toluene	3,800	2.81E-03	3.23E-03	15%	8.47E-01	8.49E-01	0%	1.29E-01	1.29E-01	0%	1.41E-01	1.42E-01	1%	7.49E-02	7.58E-02	1%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	-	1.29E-04	1.52E-04	17%	4.43E-02	4.44E-02	0%	6.54E-03	6.54E-03	0%	7.24E-03	7.28E-03	1%	3.76E-03	3.81E-03	1%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	-	3.20E-04	3.76E-04	17%	1.10E-01	1.10E-01	0%	1.62E-02	1.62E-02	0%	1.79E-02	1.80E-02	1%	9.31E-03	9.43E-03	1%
Acetone	11,880	1.36E-02	1.59E-02	17%	4.64E+00	4.65E+00	0%	6.86E-01	6.86E-01	0%	7.58E-01	7.63E-01	1%	3.94E-01	3.99E-01	1%
Acetophenone	-	3.14E-03	3.68E-03	17%	1.08E+00	1.08E+00	0%	1.59E-01	1.59E-01	0%	1.76E-01	1.77E-01	1%	9.14E-02	9.25E-02	1%
Methyl Ethyl Ketone	1,000	4.62E-03	5.42E-03	17%	1.58E+00	1.59E+00	0%	2.34E-01	2.34E-01	0%	2.58E-01	2.60E-01	1%	1.34E-01	1.36E-01	1%
Xylene	730	1.61E-03	1.85E-03	15%	4.93E-01	4.95E-01	0%	7.37E-02	7.37E-02	0%	8.04E-02	8.10E-02	1%	4.27E-02	4.32E-02	1%
o-Xylene	730	5.13E-04	6.01E-04	17%	1.75E-01	1.76E-01	0%	2.59E-02	2.59E-02	0%	2.87E-02	2.89E-02	1%	1.49E-02	1.51E-02	1%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	-	5.27E-03	6.18E-03	17%	1.81E+00	1.81E+00	0%	2.67E-01	2.67E-01	0%	2.95E-01	2.97E-01	1%	1.53E-01	1.55E-01	1%
1,1,1-Trichloroethane (Methyl chloroform)	115,000	3.78E-06	3.78E-06	0%	3.45E-04	3.45E-04	0%	1.40E-04	1.40E-04	0%	1.47E-04	1.47E-04	0%	7.85E-05	7.85E-05	0%
Butane	-	2.36E-03	2.77E-03	17%	8.08E-01	8.10E-01	0%	1.19E-01	1.19E-01	0%	1.32E-01	1.33E-01	1%	6.86E-02	6.95E-02	1%
2,2-Dimethylbutane	-	1.91E-04	2.24E-04	17%	6.54E-02	6.56E-02	0%	9.66E-03	9.66E-03	0%	1.07E-02	1.08E-02	1%	5.55E-03	5.62E-03	1%
2,3-Dimethylbutane	-	3.51E-04	4.12E-04	17%	1.20E-01	1.21E-01	0%	1.78E-02	1.78E-02	0%	1.96E-02	1.98E-02	1%	1.02E-02	1.03E-02	1%
Isobutene	-	7.02E-04	8.23E-04	17%	2.40E-01	2.41E-01	0%	3.55E-02	3.55E-02	0%	3.93E-02	3.95E-02	1%	2.04E-02	2.07E-02	1%
cis-2-Butene	-	1.60E-04	1.88E-04	17%	5.48E-02	5.50E-02	0%	8.10E-03	8.10E-03	0%	8.96E-03	9.02E-03	1%	4.66E-03	4.72E-03	1%
trans-2-Butene	-	3.20E-04	3.76E-04	17%	1.10E-01	1.10E-01	0%	1.62E-02	1.62E-02	0%	1.79E-02	1.80E-02	1%	9.31E-03	9.43E-03	1%
2-Methyl-1-butene	-	1.60E-04	1.88E-04	17%	5.48E-02	5.50E-02	0%	8.10E-03	8.10E-03	0%	8.96E-03	9.02E-03	1%	4.66E-03	4.72E-03	1%
3-Methyl-1-butene	-	9.85E-05	1.16E-04	17%	3.37E-02	3.38E-02	0%	4.99E-03	4.99E-03	0%	5.51E-03	5.55E-03	1%	2.87E-03	2.90E-03	1%
1,3-Butadiene	950	1.91E-04	2.24E-04	17%	6.54E-02	6.56E-02	0%	9.66E-03	9.66E-03	0%	1.07E-02	1.08E-02	1%	5.55E-03	5.62E-03	1%
Cyclopentane	-	2.53E-04	2.96E-04	17%	8.65E-02	8.67E-02	0%	1.28E-02	1.28E-02	0%	1.41E-02	1.42E-02	1%	7.34E-03	7.44E-03	1%
Methylcyclopentane	-	3.82E-04	4.48E-04	17%	1.31E-01	1.31E-01	0%	1.93E-02	1.93E-02	0%	2.14E-02	2.15E-02	1%	1.11E-02	1.12E-02	1%
Pentane	-	1.15E-03	1.34E-03	17%	3.92E-01	3.93E-01	0%	5.80E-02	5.80E-02	0%	6.41E-02	6.45E-02	1%	3.33E-02	3.37E-02	1%
Isopentane	-	1.69E-03	1.98E-03	17%	5.78E-01	5.79E-01	0%	8.54E-02	8.54E-02	0%	9.44E-02	9.50E-02	1%	4.91E-02	4.97E-02	1%
2-Methylpentane	-	5.73E-04	6.72E-04	17%	1.96E-01	1.97E-01	0%	2.90E-02	2.90E-02	0%	3.20E-02	3.23E-02	1%	1.67E-02	1.69E-02	1%
3-Methylpentane	-	4.13E-04	4.84E-04	17%	1.41E-01	1.42E-01	0%	2.09E-02	2.09E-02	0%	2.31E-02	2.32E-02	1%	1.20E-02	1.22E-02	1%
2,3-Dimethylpentane	-	4.43E-04	5.20E-04	17%	1.52E-01	1.52E-01	0%	2.24E-02	2.24E-02	0%	2.48E-02	2.50E-02	1%	1.29E-02	1.31E-02	1%
2,4-Dimethylpentane	-	2.53E-04	2.96E-04	17%	8.65E-02	8.67E-02	0%	1.28E-02	1.28E-02	0%	1.41E-02	1.42E-02	1%	7.34E-03	7.44E-03	1%
2,2,4-Trimethylpentane	-	7.64E-04	8.95E-04	17%	2.61E-01	2.62E-01	0%	3.86E-02	3.86E-02	0%	4.27E-02	4.30E-02	1%	2.22E-02	2.25E-02	1%
2,3,4-Trimethylpentane	-	1.91E-04	2.24E-04	17%	6.54E-02	6.56E-02	0%	9.66E-03	9.66E-03	0%	1.07E-02	1.08E-02	1%	5.55E-03	5.62E-03	1%
2-Methyl-2-pentene	-	1.29E-04	1.52E-04	17%	4.43E-02	4.44E-02	0%	6.54E-03	6.54E-03	0%	7.24E-03	7.28E-03	1%	3.76E-03	3.81E-03	1%
trans-2-Pentene	-	3.08E-05	3.61E-05	17%	1.05E-02	1.06E-02	0%	1.56E-03	1.56E-03	0%	1.72E-03	1.73E-03	1%	8.96E-04	9.07E-04	1%
Cyclohexane	6,100	1.29E-04	1.52E-04	17%	4.43E-02	4.44E-02	0%	6.54E-03	6.54E-03	0%	7.24E-03	7.28E-03	1%	3.76E-03	3.81E-03	1%
Methylcyclohexane	-	3.20E-04	3.76E-04	17%	1.10E-01	1.10E-01	0%	1.62E-02	1.62E-02	0%	1.79E-02	1.80E-02	1%	9.31E-03	9.43E-03	1%
Pentylcyclohexane	-	5.17E-05	6.06E-05	17%	1.77E-02	1.77E-02	0%	2.61E-03	2.61E-03	0%	2.89E-03	2.91E-03	1%	1.50E-03	1.52E-03	1%
Dodecylcyclohexane	-	1.03E-05	1.21E-05	17%	3.54E-03	3.55E-03	0%	5.24E-04	5.24E-04	0%	5.79E-04	5.83E-04	1%	3.01E-04	3.05E-04	1%
Tridecylcyclohexane	-	1.19E-05	1.19E-05	17%	3.48E-03	3.49E-03	0%	5.14E-04	5.14E-04	0%	5.69E-04	5.72E-04	1%	2.96E-04	2.99E-04	1%
Tetradecylcyclohexane	-	9.79E-06	1.15E-05	17%	3.35E-03	3.36E-03	0%	4.95E-04	4.95E-04	0%	5.48E-04	5.52E-04	1%	2.85E-04	2.88E-04	1%
Pentadecylcyclohexane	-	7.88E-06	9.24E-06	17%	2.70E-03	2.71E-03	0%	3.99E-04	3.99E-04	0%	4.41E-04	4.44E-04	1%	2.29E-04	2.32E-04	1%
2-Methylhexane	-	3.51E-04	4.12E-04	17%	1.20E-01	1.21E-01	0%	1.78E-02	1.78E-02	0%	1.96E-02	1.98E-02	1%	1.02E-02	1.03E-02	1%
3-Methylhexane	-	1.91E-04	2.24E-04	17%	6.54E-02	6.56E-02	0%	9.66E-03	9.66E-03	0%	1.07E-02	1.08E-02	1%	5.55E-03	5.62E-03	1%
3-Ethylhexane	-	1.29E-04	1.52E-04	17%	4.43E-02	4.44E-02	0%	6.54E-03	6.54E-03	0%	7.24E-03	7.28E-03	1%	3.76E-03	3.81E-03	1%
2,3-Dimethylhexane	-	9.85E-05	1.16E-04	17%	3.37E-02	3.38E-02	0%	4.99E-03	4.99E-03	0%	5.51E-03	5.55E-03	1%	2.87E-03	2.90E-03	1%
2,4-Dimethylhexane	-	3.08E-05	3.61E-05	17%	1.05E-02	1.06E-02	0%	1.56E-03	1.56E-03	0%	1.72E-03	1.73E-03	1%	8.96E-04	9.07E-04	1%
2,5-Dimethylhexane	-	3.08E-05	3.61E-05	17%	1.05E-02	1.06E-02	0%	1.56E-03	1.56E-03	0%	1.72E-03	1.73E-03	1%	8.96E-04	9.07E-04	1%
cis-2-Hexene	-	6.16E-05	7.22E-05	17%	2.11E-02	2.11E-02	0%	3.12E-03	3.12E-03	0%	3.45E-03	3.47E-03	1%	1.79E-03	1.81E-03	1%

**Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A**

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	-	9.85E-05	1.16E-04	17%	3.37E-02	3.38E-02	0%	4.99E-03	4.99E-03	0%	5.51E-03	5.55E-03	1%	2.87E-03	2.90E-03	1%
Heptane	11,000	2.89E-04	3.39E-04	17%	9.91E-02	9.94E-02	0%	1.46E-02	1.46E-02	0%	1.62E-02	1.63E-02	1%	8.42E-03	8.52E-03	1%
2-Methylheptane	-	6.16E-05	7.22E-05	17%	2.11E-02	2.11E-02	0%	3.12E-03	3.12E-03	0%	3.45E-03	3.47E-03	1%	1.79E-03	1.81E-03	1%
Octane	-	1.60E-04	1.88E-04	17%	5.48E-02	5.50E-02	0%	8.10E-03	8.10E-03	0%	8.96E-03	9.02E-03	1%	4.66E-03	4.72E-03	1%
Nonane	-	9.85E-05	1.16E-04	17%	3.37E-02	3.38E-02	0%	4.99E-03	4.99E-03	0%	5.51E-03	5.55E-03	1%	2.87E-03	2.90E-03	1%
Dodecane	-	3.10E-04	3.63E-04	17%	1.06E-01	1.06E-01	0%	1.57E-02	1.57E-02	0%	1.73E-02	1.74E-02	1%	9.01E-03	9.12E-03	1%
Tridecane	-	2.94E-04	3.44E-04	17%	1.01E-01	1.01E-01	0%	1.49E-02	1.49E-02	0%	1.64E-02	1.65E-02	1%	8.54E-03	8.65E-03	1%
Tetradecane	-	3.87E-04	4.54E-04	17%	1.33E-01	1.33E-01	0%	1.96E-02	1.96E-02	0%	2.17E-02	2.18E-02	1%	1.13E-02	1.14E-02	1%
n-Pentadecane	-	2.45E-04	2.87E-04	17%	8.39E-02	8.42E-02	0%	1.24E-02	1.24E-02	0%	1.37E-02	1.38E-02	1%	7.13E-03	7.22E-03	1%
Hexadecane	-	4.38E-04	5.13E-04	17%	1.50E-01	1.50E-01	0%	2.22E-02	2.22E-02	0%	2.45E-02	2.47E-02	1%	1.27E-02	1.29E-02	1%
n-Heptadecane	-	3.78E-04	4.43E-04	17%	1.29E-01	1.30E-01	0%	1.91E-02	1.91E-02	0%	2.12E-02	2.13E-02	1%	1.10E-02	1.11E-02	1%
n-Octadecane	-	3.70E-04	4.34E-04	17%	1.27E-01	1.27E-01	0%	1.87E-02	1.87E-02	0%	2.07E-02	2.08E-02	1%	1.08E-02	1.09E-02	1%
n-Nonadecane	-	2.53E-04	2.97E-04	17%	8.67E-02	8.69E-02	0%	1.28E-02	1.28E-02	0%	1.42E-02	1.43E-02	1%	7.36E-03	7.45E-03	1%
n-Eicosane	-	1.27E-04	1.49E-04	17%	4.34E-02	4.36E-02	0%	6.42E-03	6.42E-03	0%	7.10E-03	7.15E-03	1%	3.69E-03	3.74E-03	1%
n-Heneicosane	-	4.05E-05	4.75E-05	17%	1.39E-02	1.39E-02	0%	2.05E-03	2.05E-03	0%	2.27E-03	2.28E-03	1%	1.18E-03	1.19E-03	1%
Farnesane	-	2.67E-04	3.13E-04	17%	9.15E-02	9.18E-02	0%	1.35E-02	1.35E-02	0%	1.50E-02	1.51E-02	1%	7.77E-03	7.87E-03	1%
Pristane	-	2.73E-04	3.20E-04	17%	9.34E-02	9.37E-02	0%	1.38E-02	1.38E-02	0%	1.53E-02	1.54E-02	1%	7.94E-03	8.03E-03	1%
C ₂ -C ₆ aliphatic	6,100	2.05E-02	2.36E-02	15%	6.20E+00	6.21E+00	0%	9.27E-01	9.27E-01	0%	1.01E+00	1.02E+00	1%	5.36E-01	5.43E-01	1%
>C ₆ -C ₈ aliphatic	11,000	3.31E-03	3.89E-03	17%	1.13E+00	1.14E+00	0%	1.68E-01	1.68E-01	0%	1.85E-01	1.87E-01	1%	9.64E-02	9.76E-02	1%
>C ₈ -C ₁₀ aliphatic	-	9.85E-05	1.16E-04	17%	3.37E-02	3.38E-02	0%	4.99E-03	4.99E-03	0%	5.51E-03	5.55E-03	1%	2.87E-03	2.90E-03	1%
>C ₁₀ -C ₁₂ aliphatic	-	3.71E-04	4.35E-04	17%	1.27E-01	1.27E-01	0%	1.88E-02	1.88E-02	0%	2.07E-02	2.09E-02	1%	1.08E-02	1.09E-02	1%
>C ₁₂ -C ₁₆ aliphatic	-	2.13E-03	2.50E-03	17%	7.30E-01	7.32E-01	0%	1.08E-01	1.08E-01	0%	1.19E-01	1.20E-01	1%	6.20E-02	6.28E-02	1%
>C ₁₆ -C ₂₁ aliphatic	-	2.11E-03	2.48E-03	17%	7.24E-01	7.26E-01	0%	1.07E-01	1.07E-01	0%	1.18E-01	1.19E-01	1%	6.15E-02	6.22E-02	1%
C ₆ -C ₈ aromatic	29	5.47E-03	6.23E-03	14%	1.53E+00	1.54E+00	0%	2.34E-01	2.34E-01	0%	2.53E-01	2.54E-01	1%	1.36E-01	1.38E-01	1%
>C ₈ -C ₁₀ aromatic	220	5.11E-04	5.99E-04	17%	1.75E-01	1.76E-01	0%	2.59E-02	2.59E-02	0%	2.86E-02	2.88E-02	1%	1.49E-02	1.51E-02	1%
Dioxins and Furans^(a)																
2378 - TCDD	-	1.68E-13	1.68E-13	0%	3.82E-11	3.82E-11	0%	3.09E-12	3.09E-12	0%	2.61E-11	2.61E-11	0%	3.39E-12	3.39E-12	0%
12378 - PeCDD	-	2.72E-13	2.72E-13	0%	6.18E-11	6.18E-11	0%	5.00E-12	5.00E-12	0%	4.23E-11	4.23E-11	0%	5.49E-12	5.49E-12	0%
123478 - HxCDD	-	5.93E-14	5.93E-14	0%	1.35E-11	1.35E-11	0%	1.09E-12	1.09E-12	0%	9.23E-12	9.23E-12	0%	1.20E-12	1.20E-12	0%
123678 - HxCDD	-	1.58E-13	1.58E-13	0%	3.60E-11	3.60E-11	0%	2.91E-12	2.91E-12	0%	2.46E-11	2.46E-11	0%	3.19E-12	3.19E-12	0%
123789 - HxCDD	-	2.42E-13	2.42E-13	0%	5.51E-11	5.51E-11	0%	4.45E-12	4.45E-12	0%	3.77E-11	3.77E-11	0%	4.89E-12	4.89E-12	0%
1234678 - HpCDD	-	4.49E-13	4.49E-13	0%	1.02E-10	1.02E-10	0%	8.26E-12	8.26E-12	0%	6.99E-11	6.99E-11	0%	9.06E-12	9.06E-12	0%
1,2,3,4,6,7,8,9-Octa CDD	-	4.57E-13	4.57E-13	0%	1.04E-10	1.04E-10	0%	8.40E-12	8.40E-12	0%	7.11E-11	7.11E-11	0%	9.22E-12	9.22E-12	0%
2378 - TCDF	-	2.75E-12	2.75E-12	0%	6.26E-10	6.26E-10	0%	5.06E-11	5.06E-11	0%	4.28E-10	4.28E-10	0%	5.56E-11	5.56E-11	0%
12378 - PeCDF	-	1.44E-12	1.44E-12	0%	3.27E-10	3.27E-10	0%	2.65E-11	2.65E-11	0%	2.24E-10	2.24E-10	0%	2.90E-11	2.90E-11	0%
23478 - PeCDF	-	2.48E-12	2.48E-12	0%	5.64E-10	5.64E-10	0%	4.56E-11	4.56E-11	0%	3.86E-10	3.86E-10	0%	5.00E-11	5.00E-11	0%
123478 - HxCDF	-	2.52E-12	2.52E-12	0%	5.73E-10	5.73E-10	0%	4.63E-11	4.63E-11	0%	3.92E-10	3.92E-10	0%	5.08E-11	5.08E-11	0%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	-	1.35E-12	1.35E-12	0%	3.08E-10	3.08E-10	0%	2.49E-11	2.49E-11	0%	2.11E-10	2.11E-10	0%	2.73E-11	2.73E-11	0%
234678 - HxCDF	-	5.23E-13	5.23E-13	0%	1.19E-10	1.19E-10	0%	9.62E-12	9.62E-12	0%	8.14E-11	8.14E-11	0%	1.06E-11	1.06E-11	0%
123789 - HxCDF	-	5.43E-14	5.43E-14	0%	1.24E-11	1.24E-11	0%	9.99E-13	9.99E-13	0%	8.46E-12	8.46E-12	0%	1.10E-12	1.10E-12	0%
1234678 - HpCDF	-	2.05E-12	2.05E-12	0%	4.68E-10	4.68E-10	0%	3.78E-11	3.78E-11	0%	3.20E-10	3.20E-10	0%	4.15E-11	4.15E-11	0%
1234789 - HpCDF	-	2.32E-13	2.32E-13	0%	5.28E-11	5.28E-11	0%	4.27E-12	4.27E-12	0%	3.61E-11	3.61E-11	0%	4.69E-12	4.69E-12	0%
1,2,3,4,6,7,8,9-Octa CDF	-	2.13E-13	2.13E-13	0%	4.85E-11	4.85E-11	0%	3.92E-12	3.92E-12	0%	3.31E-11	3.31E-11	0%	4.30E-12	4.30E-12	0%
Total PCDDs (TEQ)	0.0000001	4.90E-13	4.90E-13	0%	1.12E-10	1.12E-10	0%	9.01E-12	9.01E-12	0%	7.63E-11	7.63E-11	0%	9.90E-12	9.90E-12	0%
Total PCDFs (TEQ)	0.0000001	1.53E-12	1.53E-12	0%	3.48E-10	3.48E-10	0%	2.81E-11	2.81E-11	0%	2.38E-10	2.38E-10	0%	3.09E-11	3.09E-11	0%
Total PCDDs + PCDFs	-	5.10E-11	5.10E-11	0%	1.16E-08	1.16E-08	0%	9.39E-10	9.39E-10	0%	7.94E-09	7.94E-09	0%	1.03E-09	1.03E-09	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 24-hour (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																			
Carbon monoxide	7,000	1.08E+01	1.16E+01	8%	4.10E+01	4.64E+01	13%	1.34E+00	1.47E+00	10%	3.85E+00	4.02E+00	4%	3.61E+00	3.77E+00	4%	5.61E+02	5.62E+02	0%
Carbon monoxide (8 hour)	6,000	2.34E+01	2.34E+01		7.12E+01	7.27E+01		2.74E+00	3.05E+00		5.64E+00	5.86E+00		5.86E+00	6.08E+00		9.82E+02	9.83E+02	
Nitrogen dioxide	200	2.24E+01	2.46E+01	10%	4.99E+01	6.06E+01	21%	3.90E+00	4.22E+00	8%	1.16E+01	1.19E+01	3%	1.08E+01	1.11E+01	3%	1.40E+02	1.47E+02	5%
Sulphur dioxide	20	5.52E-02	5.54E-02	0%	1.27E-01	1.56E-01	23%	4.58E-03	5.11E-03	11%	1.91E-01	1.42E-02	-93%	1.25E-02	1.31E-02	5%	5.91E+00	5.91E+00	0%
Total Suspended Particulates (TSP)	120	7.53E+00	9.39E+00	25%	1.39E+02	1.58E+02	14%	3.42E+00	3.88E+00	13%	3.44E+00	3.52E+00	2%	3.38E+00	3.57E+00	5%	1.10E+03	3.05E+03	178%
PM _{2.5}	25	7.75E+00	8.14E+00	5%	2.50E+01	2.75E+01	10%	2.69E+00	2.73E+00	1%	2.60E+00	2.68E+00	3%	2.57E+00	2.65E+00	3%	9.37E+01	2.82E+02	201%
PM ₁₀	50	9.50E+00	1.11E+01	17%	1.30E+02	1.41E+02	8%	3.17E+00	3.96E+00	25%	3.22E+00	3.51E+00	9%	3.17E+00	3.45E+00	9%	5.79E+02	1.85E+03	219%
Metals																			
Aluminum	120	2.81E-01	4.00E-01	43%	8.62E+00	9.87E+00	14%	1.84E-02	4.73E-02	156%	1.97E-02	2.51E-02	27%	1.66E-02	2.68E-02	61%	6.96E+01	1.93E+02	177%
Antimony	25	5.13E-07	1.11E-05	2065%	2.39E-04	2.74E-04	14%	5.13E-07	1.31E-06	156%	5.49E-07	6.97E-07	27%	4.63E-07	7.46E-07	61%	1.93E-03	5.35E-03	177%
Arsenic	0.3	4.79E-06	4.65E-05	870%	1.02E-03	1.17E-03	14%	4.79E-06	6.85E-06	43%	1.09E-05	1.14E-05	4%	9.74E-06	1.02E-05	4%	8.09E-03	2.24E-02	177%
Barium	10	1.62E-04	3.27E-03	1914%	7.05E-02	8.07E-02	14%	1.62E-04	3.98E-04	145%	1.78E-04	2.14E-04	20%	1.51E-04	2.35E-04	56%	5.69E-01	1.58E+00	177%
Beryllium	0.01	3.00E-06	2.82E-05	842%	2.57E-04	2.92E-04	14%	3.00E-06	3.33E-06	11%	7.75E-06	7.86E-06	2%	6.93E-06	7.04E-06	2%	1.96E-03	5.44E-03	177%
Cadmium	0.03	5.90E-05	5.54E-04	840%	1.25E-03	1.64E-03	31%	5.90E-05	6.93E-05	18%	1.59E-04	1.70E-04	7%	1.48E-04	1.59E-04	7%	1.69E-02	2.37E-02	40%
Chromium (VI) ^(b)	0.39	6.33E-05	1.02E-03	1510%	2.21E-02	2.53E-02	15%	6.33E-05	1.38E-04	118%	6.81E-05	7.49E-05	10%	5.84E-05	8.81E-05	51%	1.77E-01	4.93E-01	178%
Chromium (III) ^(b)	0.5	6.33E-05	1.02E-03	1510%	2.21E-02	2.53E-02	15%	6.33E-05	1.38E-04	118%	6.81E-05	7.49E-05	10%	5.84E-05	8.81E-05	51%	1.77E-01	4.93E-01	178%
Cobalt	0.1	1.11E-05	9.32E-05	738%	9.04E-04	1.03E-03	14%	1.11E-05	1.40E-05	26%	2.66E-05	2.89E-05	9%	2.46E-05	2.68E-05	9%	6.73E-03	2.09E-02	210%
Copper	50	1.76E-05	1.25E-04	612%	2.39E-03	2.72E-03	14%	1.76E-05	2.24E-05	28%	4.21E-05	4.51E-05	7%	3.85E-05	4.14E-05	7%	1.85E-02	5.34E-02	189%
Iron	4	4.76E-03	9.48E-02	1892%	2.05E+00	2.34E+00	14%	4.76E-03	1.16E-02	144%	5.25E-03	6.25E-03	19%	4.45E-03	6.91E-03	55%	1.65E+01	4.57E+01	177%
Lead	0.5	1.98E-05	1.40E-04	607%	2.22E-03	2.52E-03	14%	1.98E-05	2.44E-05	23%	4.93E-05	5.22E-05	6%	4.50E-05	4.77E-05	6%	1.70E-02	4.94E-02	190%
Manganese	0.1	8.26E-05	1.45E-03	1654%	3.13E-02	3.59E-02	14%	8.26E-05	1.88E-04	128%	8.72E-05	1.01E-04	16%	7.44E-05	1.16E-04	55%	2.52E-01	7.00E-01	178%
Mercury	2	3.53E-06	3.32E-05	841%	4.84E-04	5.51E-04	14%	3.53E-06	4.18E-06	18%	8.76E-06	8.99E-06	3%	7.85E-06	8.05E-06	3%	3.78E-03	1.05E-02	177%
Molybdenum	120	3.99E-07	8.19E-06	1954%	1.77E-04	2.02E-04	14%	3.99E-07	9.90E-07	148%	4.37E-07	5.31E-07	21%	3.70E-07	5.80E-07	57%	1.43E-03	3.95E-03	177%
Nickel	0.1	2.39E-05	3.47E-04	1354%	2.99E-03	3.38E-03	13%	2.39E-05	2.87E-05	20%	2.84E-05	2.99E-05	5%	2.32E-05	2.69E-05	16%	2.28E-02	6.32E-02	177%
Selenium	10	1.38E-05	1.40E-04	915%	2.70E-04	2.70E-04	0%	1.38E-05	1.38E-05	0%	3.80E-05	3.81E-05	0%	3.41E-05	3.41E-05	0%	4.87E-03	4.87E-03	0%
Silver	1	9.38E-06	9.20E-05	882%	2.10E-04	2.81E-04	34%	9.38E-06	1.11E-05	19%	2.51E-05	2.71E-05	8%	2.34E-05	2.53E-05	8%	2.83E-03	4.15E-03	47%
Strontium	120	1.03E-04	2.11E-03	1949%	4.55E-02	5.21E-02	14%	1.03E-04	2.56E-04	148%	1.13E-04	1.37E-04	21%	9.57E-05	1.50E-04	57%	3.68E-01	1.02E+00	177%
Tellurium	10	2.78E-08	5.88E-07	2013%	1.27E-05	1.45E-05	14%	2.78E-08	7.03E-08	153%	3.01E-08	3.75E-08	24%	2.55E-08	4.05E-08	59%	1.02E-04	2.84E-04	177%
Thallium	-	3.53E-07	7.71E-06	2083%	1.66E-04	1.90E-04	14%	3.53E-07	9.09E-07	157%	3.77E-07	4.82E-07	28%	3.18E-07	5.14E-07	62%	1.34E-03	3.72E-03	177%
Titanium	120	4.09E-04	8.70E-03	2025%	1.88E-01	2.15E-01	14%	4.09E-04	1.04E-03	153%	4.42E-04	5.52E-04	25%	3.73E-04	5.96E-04	60%	1.51E+00	4.20E+00	177%
Tungsten	-	1.20E-06	2.59E-05	2071%	5.59E-04	6.40E-04	14%	1.20E-06	3.07E-06	157%	1.28E-06	1.63E-06	27%	1.08E-06	1.74E-06	61%	4.52E-03	1.25E-02	177%
Uranium	0.15	1.48E-06	3.18E-05	2045%	6.86E-04	7.85E-04	14%	1.48E-06	3.78E-06	155%	1.60E-06	2.01E-06	26%	1.35E-06	2.16E-06	60%	5.54E-03	1.54E-02	177%
Vanadium	1	9.80E-06	1.99E-04	1930%	4.29E-03	4.91E-03	14%	9.80E-06	2.42E-05	146%	1.08E-05	1.30E-05	20%	9.12E-06	1.42E-05	56%	3.46E-02	9.59E-02	177%
Zinc	120	7.61E-05	6.53E-04	758%	6.99E-03	7.95E-03	14%	7.61E-05	9.69E-05	27%	1.90E-04	2.07E-04	9%	1.77E-04	1.92E-04	9%	5.25E-02	1.61E-01	207%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																			
1-Methylnaphthalene	-	2.14E-04	1.16E-03	443%	1.44E-03	2.76E-03	91%	2.56E-05	7.52E-05	194%	3.06E-05	4.88E-05	60%	2.63E-05	4.59E-05	74%	7.33E-03	3.65E-02	398%
1-Methylphenanthrene	-	9.62E-06	5.22E-05	443%	6.49E-05	1.24E-04	91%	1.15E-06	3.38E-06	194%	1.37E-06	2.19E-06	60%	1.18E-06	2.06E-06	74%	3.30E-04	1.64E-03	398%
2-Methylantracene	-	5.88E-06	3.19E-05	443%	3.97E-05	7.60E-05	91%	7.04E-07	2.07E-06	194%	8.41E-07	1.34E-06	60%	7.24E-07	1.26E-06	74%	2.02E-04	1.00E-03	398%
2-Methylfluorene	-	1.98E-07	1.08E-06	443%	1.34E-06	2.56E-06	91%	2.37E-08	6.98E-08	194%	2.84E-08	4.52E-08	60%	2.44E-08	4.25E-08	74%	6.80E-06	3.39E-05	398%
2-methylnaphthalene	-	3.46E-04	1.88E-03	443%	2.33E-03	4.46E-03	91%	4.14E-05	1.22E-04	194%	4.94E-05	7.88E-05	60%	4.25E-05	7.41E-05	74%	1.19E-02	5.90E-02	398%
2-Methylphenanthrene	-	2.38E-05	1.29E-04	443%	1.60E-04	3.07E-04	91%	2.84E-06	8.36E-06	194%	3.40E-06	5.42E-06	60%	2.92E-06	5.09E-06	74%	8.15E-04	4.06E-03	398%
2-Methylpyrene	-	1.76E-06	9.55E-06	443%	1.19E-05	2.27E-05	91%	2.11E-07	6.19E-07	194%	2.52E-07	4.01E-07	60%	2.17E-07	3.77E-07	74%	6.04E-05	3.01E-04	398%
3-Methyldibenzothiophene	-	3.64E-07	1.97E-06	443%	2.46E-06	4.70E-06	91%	4.35E-08	1.28E-07	194%	5.20E-08	8.29E-08	60%	4.47E-08	7.80E-08	74%	1.25E-05	6.21E-05	398%
3-Methylphenanthrene	-	1.71E-05	9.30E-05	443%	1.16E-04	2.21E-04	91%	2.05E-06	6.03E-06	194%	2.45E-06	3.91E-06	60%	2.11E-06	3.68E-06	74%	5.88E-04	2.93E-03	398%
4-+9-Methylphenanthrene	-	1.30E-05	7.03E-05	443%	8.75E-05	1.67E-04	91%	1.55E-06	4.56E-06	194%	1.85E-06	2.95E-06	60%	1.59E-06	2.78E-06	74%	4.44E-04	2.21E-03	398%
4-Methyldibenzothiophene	-	2.32E-07	1.26E-06	443%	1.56E-06	2.99E-06	91%	2.77E-08	8.15E-08	194%	3.31E-08	5.28E-08	60%	2.85E-08	4.97E-08	74%	7.94E-06	3.95E-05	398%
9-Methylphenanthrene	-	6.96E-08	6.96E-08	0%	1.10E-07	1.10E-07	0%	1.12E-08	1.12E-08	0%	2.13E-08	2.13E-08	0%	2.01E-08	2.01E-08	0%	1.19E-05	1.19E-05	0%
Acenaphthene	-	2.58E-05	5.99E-05	132%	7.58E-05	1.42E-04	87%	5.73E-06	6.56E-06	14%	1.60E-05	1.71E-05	6%	1.51E-05	1.61E-05	7%	8.66E-04	1.86E-03	115%
Acenaphthylene	-	6.05E-05	2.16E-04	256%	2.68E-04	5.12E-04	91%	1.19E-05	1.49E-05	25%	3.33E-05	3.70E-05	11%	3.13E-05	3.49E-05	12%	1.75E-03	6.77E-03	287%
Acephenanthrylene	-	6.79E-06	3.68E-05	443%	4.58E-05	8.76E-05	91%	8.12E-07	2.39E-06	194%	9.70E-07	1.55E-06	60%	8.35E-07	1.46E-06	74%	2.33E-04	1.16E-03	398%
Anthracene	-	9.74E-06	3.85E-05	295%	4.79E-05	9.14E-05	91%	1.68E-06	2.50E-06	49%	4.68E-06	5.35E-06	14%	4.41E-06	5.06E-06	15%	2.42E-04	1.21E-03	398%
Benz(a)anthracene	-	3.63E-06	9.26E-06	155%	1.18E-05	2.20E-05	86%	7.80E-07	9.07E-07	16%	2.19E-06	2.35E-06	7%	2.05E-06	2.21E-06	8%	1.17E-04	2.88E-04	145%
Benzo(a)fluorene	-	2.14E-06	1.16E-05	443%	1.44E-05	2.76E-05	91%	2.56E-07	7.51E-07	194%	3.05E-07	4.87E-07	60%	2.63E-07	4.58E-07	74%	7.32E-05	3.65E-04	398%
Benzo(a)pyrene	-	1.58E-06	5.08E-06	222%	6.32E-06	1.21E-05	91%	3.24E-07	3.95E-07	22%	9.05E-07	9.93E-07	10%	8.51E-07	9.36E-07	10%	4.79E-05	1.59E-04	233%
Benzo(b)fluoranthene	-	1.03E-05	4.27E-05	314%	5.32E-05	1.01E-04	90%	1.59E-06	2.78E-06	75%	4.44E-06	5.18E-06	17%	4.19E-06	4.90E-06	17%	2.69E-04	1.34E-03	398%
Benzo(e)pyrene	-	1.75E-07	7.46E-07	326%	9.32E-07	1.75E-06	88%	2.26E-08	5.07E-08	124%	2.61E-08	3.74E-08	43%	2.30E-08	3.51E-08	52%	7.51E-06	2.26E-05	200%
Benzo(g,h,i)fluoranthene	-	3.29E-06	1.79E-05	443%	2.22E-05	4.25E-05	91%	3.94E-07	1.16E-06	194%	4.71E-07	7.51E-07	60%	4.05E-07	7.06E-07	74%	1.13E-04	5.62E-04	398%
Benzo(g,h,i)perylene	-	3.63E-06	1.17E-05	224%	1.48E-05	2.78E-05	88%	7.23E-07	8.84E-07	22%	2.03E-06	2.23E-06	10%	1.91E-06	2.10E-06	10%	1.07E-04	3.65E-04	240%
Benzo(k)fluoranthene	-	1.40E-06	4.84E-06	246%	6.03E-06	1.15E-05	91%	2.80E-07	3.47E-07	24%	7.80E-07	8.64E-07	11%	7.34E-07	8.15E-07	11%	4.11E-05	1.52E-04	270%
Biphenyl	-	2.94E-07	2.94E-07	0%	4.65E-07	4.65E-07	0%	4.70E-08	4.70E-08	0%	9.00E-08	9.00E-08	0%	8.47E-08	8.47E-08	0%	5.03E-05	5.03E-05	0%
Chrysene	-	7.33E-06	1.04E-05	43%	1.66E-05	2.47E-05	48%	1.78E-06	1.92E-06	8%	4.97E-06	5.15E-06	4%	4.66E-06	4.84E-06	4%	2.72E-04	3.24E-04	19%
Coronene	-	1.65E-08	8.97E-08	443%	1.12E-07	2.13E-07	91%	1.98E-09	5.82E-09	194%	2.36E-09	3.77E-09	60%	2.03E-09	3.54E-09	74%	5.67E-07	2.82E-06	398%
Cyclopenta(c,d)pyrene	-	1.17E-06	6.32E-06	443%	7.87E-06	1.50E-05	91%	1.39E-07	4.10E-07	194%	1.67E-07	2.66E-07	60%	1.43E-07	2.50E-07	74%	4.00E-05	1.99E-04	398%
Dibenzo(a,h)anthracene	-	3.27E-06	1.33E-05	308%	1.67E-05	3.17E-05	90%	5.01E-07	8.78E-07	75%	1.40E-06	1.63E-06	17%	1.32E-06	1.54E-06	17%	8.40E-05	4.18E-04	398%
Dibenzothiophene	-	1.41E-07	7.64E-07	443%	9.50E-07	1.82E-06	91%	1.68E-08	4.95E-08	194%	2.01E-08	3.21E-08	60%	1.73E-08	3.02E-08	74%	4.83E-06	2.40E-05	398%
Fluoranthene	-	3.90E-05	1.63E-04	319%	2.04E-04	3.88E-04	90%	5.85E-06	1.07E-05	82%	1.63E-05	1.92E-05	17%	1.54E-05	1.81E-05	18%	1.03E-03	5.12E-03	398%
Fluorene	-	8.50E-05	3.07E-04	261%	3.82E-04	7.29E-04	91%	1.66E-05	2.09E-05	26%	4.64E-05	5.17E-05	11%	4.37E-05	4.88E-05	12%	2.44E-03	9.64E-03	296%
Indeno(1,2,3-cd)fluoranthene	-	8.27E-08	4.49E-07	443%	5.58E-07	1.07E-06	91%	9.89E-09	2.91E-08	194%	1.18E-08	1.88E-08	60%	1.02E-08	1.77E-08	74%	2.83E-06	1.41E-05	398%
Indeno(1,2,3-cd)pyrene	-	1.96E-06	1.96E-06	0%	3.92E-06	3.92E-06	0%	4.64E-07	4.64E-07	0%	1.30E-06	1.30E-06	0%	1.22E-06	1.22E-06	0%	7.26E-05	7.26E-05	0%
Indeno(1,2,3-W)pyrene	-	1.49E-06	8.06E-06	443%	1.00E-05	1.92E-05	91%	1.78E-07	5.23E-07	194%	2.12E-07	3.39E-07	60%	1.83E-07	3.18E-07	74%	5.09E-05	2.54E-04	398%
Naphthalene	-	1.18E-03	4.62E-03	291%	5.82E-03	1.10E-02	89%	1.88E-04	3.09E-04	65%	5.24E-04	6.04E-04	15%	4.93E-04	5.71E-04	16%	2.90E-02	1.45E-01	398%

**Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	-	1.32E-06	7.17E-06	443%	8.92E-06	1.71E-05	91%	1.58E-07	4.65E-07	194%	1.89E-07	3.01E-07	60%	1.63E-07	2.83E-07	74%	4.53E-05	2.26E-04	398%
Perylene	-	1.65E-08	8.97E-08	443%	1.12E-07	2.13E-07	91%	1.98E-09	5.82E-09	194%	2.36E-09	3.77E-09	60%	2.03E-09	3.54E-09	74%	5.67E-07	2.82E-06	398%
Phenanthrene	-	1.94E-04	2.88E-04	48%	4.42E-04	6.82E-04	54%	4.71E-05	5.11E-05	8%	1.32E-04	1.37E-04	4%	1.24E-04	1.28E-04	4%	7.21E-03	8.99E-03	25%
Picene	-	1.65E-08	8.97E-08	443%	1.12E-07	2.13E-07	91%	1.98E-09	5.82E-09	194%	2.36E-09	3.77E-09	60%	2.03E-09	3.54E-09	74%	5.67E-07	2.82E-06	398%
Pyrene	-	4.88E-05	2.21E-04	354%	2.76E-04	5.26E-04	91%	6.00E-06	1.44E-05	140%	1.67E-05	2.06E-05	23%	1.58E-05	1.95E-05	24%	1.39E-03	6.95E-03	398%
Volatile Organic Compounds																			
Methacrolein	-	2.44E-02	3.67E-02	50%	1.24E-01	1.42E-01	14%	2.59E-03	3.86E-03	49%	3.73E-03	4.18E-03	12%	3.20E-03	3.70E-03	15%	3.46E+00	3.46E+00	0%
Acrolein	-	2.08E-02	3.12E-02	50%	1.06E-01	1.21E-01	14%	2.20E-03	3.28E-03	49%	3.17E-03	3.56E-03	12%	2.75E-03	3.16E-03	15%	2.94E+00	2.94E+00	0%
Benzaldehyde	-	2.32E-02	3.49E-02	50%	1.18E-01	1.35E-01	14%	2.46E-03	3.67E-03	49%	3.54E-03	3.97E-03	12%	3.04E-03	3.51E-03	15%	3.29E+00	3.29E+00	0%
2,5-dimethylbenzaldehyde	-	2.50E-02	3.76E-02	50%	1.27E-01	1.46E-01	14%	2.65E-03	3.96E-03	49%	3.82E-03	4.29E-03	12%	3.28E-03	3.79E-03	15%	3.55E+00	3.55E+00	0%
Butanal (Butyraldehyde)	-	7.94E-03	1.19E-02	50%	4.04E-02	4.62E-02	14%	8.41E-04	1.25E-03	49%	1.21E-03	1.36E-03	12%	1.04E-03	1.20E-03	15%	1.12E+00	1.13E+00	0%
Formaldehyde	50	1.39E-01	2.05E-01	48%	6.97E-01	7.98E-01	14%	1.48E-02	2.21E-02	49%	2.15E-02	2.41E-02	12%	1.89E-02	2.17E-02	15%	1.93E+01	1.93E+01	0%
Acetaldehyde	500	2.55E-01	3.83E-01	50%	1.30E+00	1.49E+00	14%	2.71E-02	4.03E-02	49%	3.90E-02	4.37E-02	12%	3.35E-02	3.87E-02	15%	3.62E+01	3.62E+01	0%
Propanal	500	8.55E-02	1.28E-01	50%	4.35E-01	4.98E-01	14%	9.06E-03	1.35E-02	49%	1.30E-02	1.46E-02	12%	1.12E-02	1.29E-02	15%	1.21E+01	1.21E+01	0%
Crotonaldehyde	-	8.19E-02	1.23E-01	50%	4.16E-01	4.76E-01	14%	8.67E-03	1.29E-02	49%	1.25E-02	1.40E-02	12%	1.07E-02	1.24E-02	15%	1.16E+01	1.16E+01	0%
Hexanal	-	1.34E-02	2.02E-02	50%	6.83E-02	7.82E-02	14%	1.42E-03	2.12E-03	49%	2.05E-03	2.30E-03	12%	1.76E-03	2.03E-03	15%	1.90E+00	1.90E+00	0%
Heptanal	-	1.96E-02	2.93E-02	50%	9.94E-02	1.14E-01	14%	2.07E-03	3.09E-03	49%	2.98E-03	3.35E-03	12%	2.56E-03	2.96E-03	15%	2.77E+00	2.77E+00	0%
Octanal	-	1.89E-02	2.84E-02	50%	9.63E-02	1.10E-01	14%	2.01E-03	2.99E-03	49%	2.89E-03	3.24E-03	12%	2.48E-03	2.86E-03	15%	2.68E+00	2.68E+00	0%
Nonanal	-	2.69E-02	4.04E-02	50%	1.37E-01	1.56E-01	14%	2.85E-03	4.24E-03	49%	4.10E-03	4.60E-03	12%	3.52E-03	4.06E-03	15%	3.81E+00	3.81E+00	0%
Decanal	-	1.71E-02	2.57E-02	50%	8.70E-02	9.95E-02	14%	1.81E-03	2.70E-03	49%	2.61E-03	2.93E-03	12%	2.24E-03	2.59E-03	15%	2.42E+00	2.42E+00	0%
Undecanal	-	1.59E-02	2.38E-02	50%	8.07E-02	9.24E-02	14%	1.68E-03	2.51E-03	49%	2.42E-03	2.72E-03	12%	2.08E-03	2.40E-03	15%	2.25E+00	2.25E+00	0%
Dodecanal	-	7.33E-03	1.10E-02	50%	3.73E-02	4.27E-02	14%	7.77E-04	1.16E-03	49%	1.12E-03	1.26E-03	12%	9.60E-04	1.11E-03	15%	1.04E+00	1.04E+00	0%
Tridecanal	-	1.22E-02	1.83E-02	50%	6.21E-02	7.11E-02	14%	1.29E-03	1.93E-03	49%	1.86E-03	2.09E-03	12%	1.60E-03	1.85E-03	15%	1.73E+00	1.73E+00	0%
1,2,4-Trimethylbenzene	220	5.38E-03	8.07E-03	50%	2.73E-02	3.13E-02	14%	5.70E-04	8.49E-04	49%	8.20E-04	9.20E-04	12%	7.04E-04	8.13E-04	15%	7.61E-01	7.62E-01	0%
1,3,5-Trimethylbenzene	220	1.59E-03	2.38E-03	50%	8.07E-03	9.24E-03	14%	1.68E-04	2.51E-04	49%	2.42E-04	2.72E-04	12%	2.08E-04	2.40E-04	15%	2.25E-01	2.25E-01	0%
Benzene	29	1.92E-02	2.54E-02	32%	8.77E-02	1.00E-01	14%	1.88E-03	2.76E-03	46%	4.85E-03	5.20E-03	7%	4.57E-03	4.91E-03	7%	2.38E+00	2.38E+00	0%
Ethylbenzene	21,710	2.88E-03	4.32E-03	50%	1.46E-02	1.67E-02	14%	3.06E-04	4.55E-04	49%	4.41E-04	4.94E-04	12%	3.79E-04	4.37E-04	15%	4.07E-01	4.07E-01	0%
Propylbenzene	-	6.11E-04	9.17E-04	50%	3.11E-03	3.56E-03	14%	6.47E-05	9.65E-05	49%	9.32E-05	1.05E-04	12%	8.00E-05	9.24E-05	15%	8.65E-02	8.65E-02	0%
Indanone	-	4.25E-04	6.37E-04	50%	2.16E-03	2.47E-03	14%	4.50E-05	6.70E-05	49%	6.48E-05	7.27E-05	12%	5.56E-05	6.42E-05	15%	6.01E-02	6.01E-02	0%
Toluene	3,800	2.57E-02	3.69E-02	43%	1.25E-01	1.43E-01	14%	2.69E-03	3.99E-03	48%	4.47E-03	4.98E-03	11%	4.21E-03	4.71E-03	12%	3.45E+00	3.45E+00	0%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	-	1.28E-03	1.93E-03	50%	6.52E-03	7.47E-03	14%	1.36E-04	2.03E-04	49%	1.96E-04	2.20E-04	12%	1.68E-04	1.94E-04	15%	1.82E-01	1.82E-01	0%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	-	3.18E-03	4.77E-03	50%	1.61E-02	1.85E-02	14%	3.37E-04	5.02E-04	49%	4.85E-04	5.44E-04	12%	4.16E-04	4.80E-04	15%	4.50E-01	4.50E-01	0%
Acetone	11,880	1.34E-01	2.02E-01	50%	6.83E-01	7.82E-01	14%	1.42E-02	2.12E-02	49%	2.05E-02	2.30E-02	12%	1.76E-02	2.03E-02	15%	1.90E+01	1.90E+01	0%
Acetophenone	-	3.12E-02	4.68E-02	50%	1.58E-01	1.81E-01	14%	3.30E-03	4.92E-03	49%	4.75E-03	5.33E-03	12%	4.08E-03	4.71E-03	15%	4.41E+00	4.41E+00	0%
Methyl Ethyl Ketone	1,000	4.58E-02	6.88E-02	50%	2.33E-01	2.67E-01	14%	4.85E-03	7.24E-03	49%	6.99E-03	7.84E-03	12%	6.00E-03	6.93E-03	15%	6.49E+00	6.49E+00	0%
Xylene	730	1.49E-02	2.15E-02	44%	7.30E-02	8.35E-02	14%	1.54E-03	2.28E-03	48%	2.60E-03	2.90E-03	11%	2.46E-03	2.74E-03	12%	2.02E+00	2.02E+00	0%
o-Xylene	730	5.08E-03	7.62E-03	50%	2.58E-02	2.95E-02	14%	5.38E-04	8.02E-04	49%	7.76E-04	8.70E-04	12%	6.67E-04	7.70E-04	15%	7.18E-01	7.18E-01	0%

**Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	-	5.23E-02	7.85E-02	50%	2.66E-01	3.04E-01	14%	5.54E-03	8.26E-03	49%	7.98E-03	8.95E-03	12%	6.85E-03	7.91E-03	15%	7.40E+00	7.41E+00	0%
1,1,1-Trichloroethane (Methyl chloroform)	115,000	2.65E-05	2.65E-05	0%	6.03E-05	6.03E-05	0%	3.79E-06	3.79E-06	0%	6.70E-06	6.70E-06	0%	6.04E-06	6.04E-06	0%	8.07E-04	8.07E-04	0%
Butane	-	2.34E-02	3.51E-02	50%	1.19E-01	1.36E-01	14%	2.48E-03	3.69E-03	49%	3.57E-03	4.01E-03	12%	3.07E-03	3.54E-03	15%	3.31E+00	3.31E+00	0%
2,2-Dimethylbutane	-	1.89E-03	2.84E-03	50%	9.63E-03	1.10E-02	14%	2.01E-04	2.99E-04	49%	2.89E-04	3.24E-04	12%	2.48E-04	2.86E-04	15%	2.68E-01	2.68E-01	0%
2,3-Dimethylbutane	-	3.48E-03	5.23E-03	50%	1.77E-02	2.03E-02	14%	3.69E-04	5.50E-04	49%	5.31E-04	5.96E-04	12%	4.56E-04	5.27E-04	15%	4.93E-01	4.93E-01	0%
Isobutene	-	6.96E-03	1.05E-02	50%	3.54E-02	4.05E-02	14%	7.38E-04	1.10E-03	49%	1.06E-03	1.19E-03	12%	9.12E-04	1.05E-03	15%	9.86E-01	9.87E-01	0%
cis-2-Butene	-	1.59E-03	2.38E-03	50%	8.07E-03	9.24E-03	14%	1.68E-04	2.51E-04	49%	2.42E-04	2.72E-04	12%	2.08E-04	2.40E-04	15%	2.25E-01	2.25E-01	0%
trans-2-Butene	-	3.18E-03	4.77E-03	50%	1.61E-02	1.85E-02	14%	3.37E-04	5.02E-04	49%	4.85E-04	5.44E-04	12%	4.16E-04	4.80E-04	15%	4.50E-01	4.50E-01	0%
2-Methyl-1-butene	-	1.59E-03	2.38E-03	50%	8.07E-03	9.24E-03	14%	1.68E-04	2.51E-04	49%	2.42E-04	2.72E-04	12%	2.08E-04	2.40E-04	15%	2.25E-01	2.25E-01	0%
3-Methyl-1-butene	-	9.78E-04	1.47E-03	50%	4.97E-03	5.69E-03	14%	1.04E-04	1.54E-04	49%	1.49E-04	1.67E-04	12%	1.28E-04	1.48E-04	15%	1.38E-01	1.38E-01	0%
1,3-Butadiene	950	1.89E-03	2.84E-03	50%	9.63E-03	1.10E-02	14%	2.01E-04	2.99E-04	49%	2.89E-04	3.24E-04	12%	2.48E-04	2.86E-04	15%	2.68E-01	2.68E-01	0%
Cyclopentane	-	2.50E-03	3.76E-03	50%	1.27E-02	1.46E-02	14%	2.65E-04	3.96E-04	49%	3.82E-04	4.29E-04	12%	3.28E-04	3.79E-04	15%	3.55E-01	3.55E-01	0%
Methylcyclopentane	-	3.79E-03	5.69E-03	50%	1.93E-02	2.20E-02	14%	4.01E-04	5.98E-04	49%	5.78E-04	6.48E-04	12%	4.96E-04	5.73E-04	15%	5.36E-01	5.37E-01	0%
Pentane	-	1.14E-02	1.71E-02	50%	5.78E-02	6.61E-02	14%	1.20E-03	1.79E-03	49%	1.73E-03	1.95E-03	12%	1.49E-03	1.72E-03	15%	1.61E+00	1.61E+00	0%
Isopentane	-	1.67E-02	2.51E-02	50%	8.51E-02	9.74E-02	14%	1.77E-03	2.64E-03	49%	2.55E-03	2.87E-03	12%	2.19E-03	2.53E-03	15%	2.37E+00	2.37E+00	0%
2-Methylpentane	-	5.68E-03	8.53E-03	50%	2.89E-02	3.31E-02	14%	6.02E-04	8.97E-04	49%	8.67E-04	9.73E-04	12%	7.44E-04	8.59E-04	15%	8.04E-01	8.05E-01	0%
3-Methylpentane	-	4.09E-03	6.15E-03	50%	2.08E-02	2.38E-02	14%	4.34E-04	6.46E-04	49%	6.24E-04	7.01E-04	12%	5.36E-04	6.19E-04	15%	5.79E-01	5.80E-01	0%
2,3-Dimethylpentane	-	4.40E-03	6.60E-03	50%	2.24E-02	2.56E-02	14%	4.66E-04	6.95E-04	49%	6.71E-04	7.53E-04	12%	5.76E-04	6.65E-04	15%	6.23E-01	6.23E-01	0%
2,4-Dimethylpentane	-	2.50E-03	3.76E-03	50%	1.27E-02	1.46E-02	14%	2.65E-04	3.96E-04	49%	3.82E-04	4.29E-04	12%	3.28E-04	3.79E-04	15%	3.55E-01	3.55E-01	0%
2,2,4-Trimethylpentane	-	7.58E-03	1.14E-02	50%	3.85E-02	4.41E-02	14%	8.03E-04	1.20E-03	49%	1.16E-03	1.30E-03	12%	9.92E-04	1.15E-03	15%	1.07E+00	1.07E+00	0%
2,3,4-Trimethylpentane	-	1.89E-03	2.84E-03	50%	9.63E-03	1.10E-02	14%	2.01E-04	2.99E-04	49%	2.89E-04	3.24E-04	12%	2.48E-04	2.86E-04	15%	2.68E-01	2.68E-01	0%
2-Methyl-2-pentene	-	1.28E-03	1.93E-03	50%	6.52E-03	7.47E-03	14%	1.36E-04	2.03E-04	49%	1.96E-04	2.20E-04	12%	1.68E-04	1.94E-04	15%	1.82E-01	1.82E-01	0%
trans-2-Pentene	-	3.05E-04	4.59E-04	50%	1.55E-03	1.78E-03	14%	3.24E-05	4.82E-05	49%	4.66E-05	5.23E-05	12%	4.00E-05	4.62E-05	15%	4.32E-02	4.33E-02	0%
Cyclohexane	6,100	1.28E-03	1.93E-03	50%	6.52E-03	7.47E-03	14%	1.36E-04	2.03E-04	49%	1.96E-04	2.20E-04	12%	1.68E-04	1.94E-04	15%	1.82E-01	1.82E-01	0%
Methylcyclohexane	-	3.18E-03	4.77E-03	50%	1.61E-02	1.85E-02	14%	3.37E-04	5.02E-04	49%	4.85E-04	5.44E-04	12%	4.16E-04	4.80E-04	15%	4.50E-01	4.50E-01	0%
Pentylcyclohexane	-	5.13E-04	7.70E-04	50%	2.61E-03	2.98E-03	14%	5.43E-05	8.09E-05	49%	7.82E-05	8.78E-05	12%	6.72E-05	7.75E-05	15%	7.26E-02	7.26E-02	0%
Dodecylcyclohexane	-	1.03E-04	1.54E-04	50%	5.22E-04	5.97E-04	14%	1.09E-05	1.62E-05	49%	1.57E-05	1.76E-05	12%	1.34E-05	1.55E-05	15%	1.45E-02	1.45E-02	0%
Tridecylcyclohexane	-	1.01E-04	1.51E-04	50%	5.12E-04	5.87E-04	14%	1.07E-05	1.59E-05	49%	1.54E-05	1.73E-05	12%	1.32E-05	1.52E-05	15%	1.43E-02	1.43E-02	0%
Tetradecylcyclohexane	-	9.71E-05	1.46E-04	50%	4.94E-04	5.65E-04	14%	1.03E-05	1.53E-05	49%	1.48E-05	1.66E-05	12%	1.27E-05	1.47E-05	15%	1.38E-02	1.38E-02	0%
Pentadecylcyclohexane	-	7.82E-05	1.17E-04	50%	3.97E-04	4.55E-04	14%	8.28E-06	1.23E-05	49%	1.19E-05	1.34E-05	12%	1.02E-05	1.18E-05	15%	1.11E-02	1.11E-02	0%
2-Methylhexane	-	3.48E-03	5.23E-03	50%	1.77E-02	2.03E-02	14%	3.69E-04	5.50E-04	49%	5.31E-04	5.96E-04	12%	4.56E-04	5.27E-04	15%	4.93E-01	4.93E-01	0%
3-Methylhexane	-	1.89E-03	2.84E-03	50%	9.63E-03	1.10E-02	14%	2.01E-04	2.99E-04	49%	2.89E-04	3.24E-04	12%	2.48E-04	2.86E-04	15%	2.68E-01	2.68E-01	0%
3-Ethylhexane	-	1.28E-03	1.93E-03	50%	6.52E-03	7.47E-03	14%	1.36E-04	2.03E-04	49%	1.96E-04	2.20E-04	12%	1.68E-04	1.94E-04	15%	1.82E-01	1.82E-01	0%
2,3-Dimethylhexane	-	9.78E-04	1.47E-03	50%	4.97E-03	5.69E-03	14%	1.04E-04	1.54E-04	49%	1.49E-04	1.67E-04	12%	1.28E-04	1.48E-04	15%	1.38E-01	1.38E-01	0%
2,4-Dimethylhexane	-	3.05E-04	4.59E-04	50%	1.55E-03	1.78E-03	14%	3.24E-05	4.82E-05	49%	4.66E-05	5.23E-05	12%	4.00E-05	4.62E-05	15%	4.32E-02	4.33E-02	0%
2,5-Dimethylhexane	-	3.05E-04	4.59E-04	50%	1.55E-03	1.78E-03	14%	3.24E-05	4.82E-05	49%	4.66E-05	5.23E-05	12%	4.00E-05	4.62E-05	15%	4.32E-02	4.33E-02	0%
cis-2-Hexene	-	6.11E-04	9.17E-04	50%	3.11E-03	3.56E-03	14%	6.47E-05	9.65E-05	49%	9.32E-05	1.05E-04	12%	8.00E-05	9.24E-05	15%	8.65E-02	8.65E-02	0%

**Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	-	9.78E-04	1.47E-03	50%	4.97E-03	5.69E-03	14%	1.04E-04	1.54E-04	49%	1.49E-04	1.67E-04	12%	1.28E-04	1.48E-04	15%	1.38E-01	1.38E-01	0%
Heptane	11,000	2.87E-03	4.31E-03	50%	1.46E-02	1.67E-02	14%	3.04E-04	4.53E-04	49%	4.38E-04	4.92E-04	12%	3.76E-04	4.34E-04	15%	4.06E-01	4.07E-01	0%
2-Methylheptane	-	6.11E-04	9.17E-04	50%	3.11E-03	3.56E-03	14%	6.47E-05	9.65E-05	49%	9.32E-05	1.05E-04	12%	8.00E-05	9.24E-05	15%	8.65E-02	8.65E-02	0%
Octane	-	1.59E-03	2.38E-03	50%	8.07E-03	9.24E-03	14%	1.68E-04	2.51E-04	49%	2.42E-04	2.72E-04	12%	2.08E-04	2.40E-04	15%	2.25E-01	2.25E-01	0%
Nonane	-	9.78E-04	1.47E-03	50%	4.97E-03	5.69E-03	14%	1.04E-04	1.54E-04	49%	1.49E-04	1.67E-04	12%	1.28E-04	1.48E-04	15%	1.38E-01	1.38E-01	0%
Dodecane	-	3.07E-03	4.61E-03	50%	1.56E-02	1.79E-02	14%	3.26E-04	4.85E-04	49%	4.69E-04	5.26E-04	12%	4.03E-04	4.65E-04	15%	4.35E-01	4.35E-01	0%
Tridecane	-	2.91E-03	4.37E-03	50%	1.48E-02	1.70E-02	14%	3.09E-04	4.60E-04	49%	4.45E-04	4.99E-04	12%	3.82E-04	4.41E-04	15%	4.13E-01	4.13E-01	0%
Tetradecane	-	3.84E-03	5.77E-03	50%	1.95E-02	2.24E-02	14%	4.07E-04	6.07E-04	49%	5.86E-04	6.58E-04	12%	5.03E-04	5.81E-04	15%	5.44E-01	5.44E-01	0%
n-Pentadecane	-	2.43E-03	3.65E-03	50%	1.24E-02	1.41E-02	14%	2.58E-04	3.84E-04	49%	3.71E-04	4.16E-04	12%	3.19E-04	3.68E-04	15%	3.44E-01	3.44E-01	0%
Hexadecane	-	4.34E-03	6.52E-03	50%	2.21E-02	2.53E-02	14%	4.60E-04	6.86E-04	49%	6.63E-04	7.44E-04	12%	5.69E-04	6.57E-04	15%	6.15E-01	6.15E-01	0%
n-Heptadecane	-	3.75E-03	5.63E-03	50%	1.91E-02	2.18E-02	14%	3.97E-04	5.92E-04	49%	5.72E-04	6.42E-04	12%	4.91E-04	5.67E-04	15%	5.31E-01	5.31E-01	0%
n-Octadecane	-	3.67E-03	5.51E-03	50%	1.87E-02	2.14E-02	14%	3.89E-04	5.80E-04	49%	5.60E-04	6.29E-04	12%	4.81E-04	5.55E-04	15%	5.20E-01	5.20E-01	0%
n-Nonadecane	-	2.51E-03	3.77E-03	50%	1.28E-02	1.46E-02	14%	2.66E-04	3.96E-04	49%	3.83E-04	4.30E-04	12%	3.29E-04	3.80E-04	15%	3.55E-01	3.56E-01	0%
n-Eicosane	-	1.26E-03	1.89E-03	50%	6.40E-03	7.32E-03	14%	1.33E-04	1.99E-04	49%	1.92E-04	2.15E-04	12%	1.65E-04	1.90E-04	15%	1.78E-01	1.78E-01	0%
n-Heneicosane	-	4.02E-04	6.03E-04	50%	2.04E-03	2.34E-03	14%	4.26E-05	6.35E-05	49%	6.13E-05	6.88E-05	12%	5.27E-05	6.08E-05	15%	5.69E-02	5.69E-02	0%
Farnesane	-	2.65E-03	3.98E-03	50%	1.35E-02	1.54E-02	14%	2.81E-04	4.19E-04	49%	4.04E-04	4.54E-04	12%	3.47E-04	4.01E-04	15%	3.75E-01	3.76E-01	0%
Pristane	-	2.71E-03	4.06E-03	50%	1.38E-02	1.57E-02	14%	2.87E-04	4.27E-04	49%	4.13E-04	4.63E-04	12%	3.55E-04	4.09E-04	15%	3.83E-01	3.83E-01	0%
C ₂ -C ₆ aliphatic	6,100	1.88E-01	2.69E-01	43%	9.18E-01	1.05E+00	14%	1.93E-02	2.86E-02	48%	3.38E-02	3.75E-02	11%	3.19E-02	3.55E-02	11%	2.53E+01	2.53E+01	0%
>C ₆ -C ₈ aliphatic	11,000	3.29E-02	4.93E-02	50%	1.67E-01	1.91E-01	14%	3.48E-03	5.19E-03	49%	5.01E-03	5.63E-03	12%	4.31E-03	4.97E-03	15%	4.65E+00	4.66E+00	0%
>C ₈ -C ₁₀ aliphatic	-	9.78E-04	1.47E-03	50%	4.97E-03	5.69E-03	14%	1.04E-04	1.54E-04	49%	1.49E-04	1.67E-04	12%	1.28E-04	1.48E-04	15%	1.38E-01	1.38E-01	0%
>C ₁₀ -C ₁₂ aliphatic	-	3.68E-03	5.52E-03	50%	1.87E-02	2.14E-02	14%	3.89E-04	5.81E-04	49%	5.61E-04	6.29E-04	12%	4.82E-04	5.56E-04	15%	5.20E-01	5.21E-01	0%
>C ₁₂ -C ₁₆ aliphatic	-	2.11E-02	3.17E-02	50%	1.07E-01	1.23E-01	14%	2.24E-03	3.34E-03	49%	3.22E-03	3.62E-03	12%	2.77E-03	3.20E-03	15%	2.99E+00	2.99E+00	0%
>C ₁₆ -C ₂₁ aliphatic	-	2.10E-02	3.15E-02	50%	1.07E-01	1.22E-01	14%	2.22E-03	3.31E-03	49%	3.20E-03	3.59E-03	12%	2.75E-03	3.17E-03	15%	2.97E+00	2.97E+00	0%
C ₆ -C ₈ aromatic	29	4.78E-02	6.66E-02	39%	2.28E-01	2.60E-01	14%	4.88E-03	7.20E-03	47%	9.72E-03	1.06E-02	9%	9.17E-03	1.01E-02	10%	6.23E+00	6.23E+00	0%
>C ₈ -C ₁₀ aromatic	220	5.07E-03	7.61E-03	50%	2.58E-02	2.95E-02	14%	5.37E-04	8.01E-04	49%	7.73E-04	8.68E-04	12%	6.64E-04	7.67E-04	15%	7.18E-01	7.18E-01	0%
Dioxins and Furans^(a)																			
2378 - TCDD	-	9.56E-13	9.56E-13	0%	1.92E-12	1.92E-12	0%	1.72E-13	1.72E-13	0%	3.72E-13	3.72E-13	0%	3.99E-13	3.99E-13	0%	1.65E-10	1.65E-10	0%
12378 - PeCDD	-	1.55E-12	1.55E-12	0%	3.11E-12	3.11E-12	0%	2.79E-13	2.79E-13	0%	6.01E-13	6.01E-13	0%	6.46E-13	6.46E-13	0%	2.67E-10	2.67E-10	0%
123478 - HxCDD	-	3.37E-13	3.37E-13	0%	6.78E-13	6.78E-13	0%	6.09E-14	6.09E-14	0%	1.31E-13	1.31E-13	0%	1.41E-13	1.41E-13	0%	5.83E-11	5.83E-11	0%
123678 - HxCDD	-	9.00E-13	9.00E-13	0%	1.81E-12	1.81E-12	0%	1.62E-13	1.62E-13	0%	3.50E-13	3.50E-13	0%	3.76E-13	3.76E-13	0%	1.55E-10	1.55E-10	0%
123789 - HxCDD	-	1.38E-12	1.38E-12	0%	2.77E-12	2.77E-12	0%	2.49E-13	2.49E-13	0%	5.35E-13	5.35E-13	0%	5.76E-13	5.76E-13	0%	2.38E-10	2.38E-10	0%
1234678 - HpCDD	-	2.56E-12	2.56E-12	0%	5.14E-12	5.14E-12	0%	4.61E-13	4.61E-13	0%	9.93E-13	9.93E-13	0%	1.07E-12	1.07E-12	0%	4.41E-10	4.41E-10	0%
1,2,3,4,6,7,8,9-Octa CDD	-	2.60E-12	2.60E-12	0%	5.22E-12	5.22E-12	0%	4.69E-13	4.69E-13	0%	1.01E-12	1.01E-12	0%	1.09E-12	1.09E-12	0%	4.49E-10	4.49E-10	0%
2378 - TCDF	-	1.57E-11	1.57E-11	0%	3.15E-11	3.15E-11	0%	2.83E-12	2.83E-12	0%	6.09E-12	6.09E-12	0%	6.54E-12	6.54E-12	0%	2.71E-09	2.71E-09	0%
12378 - PeCDF	-	8.19E-12	8.19E-12	0%	1.65E-11	1.65E-11	0%	1.48E-12	1.48E-12	0%	3.18E-12	3.18E-12	0%	3.42E-12	3.42E-12	0%	1.41E-09	1.41E-09	0%
23478 - PeCDF	-	1.41E-11	1.41E-11	0%	2.83E-11	2.83E-11	0%	2.54E-12	2.54E-12	0%	5.48E-12	5.48E-12	0%	5.89E-12	5.89E-12	0%	2.44E-09	2.44E-09	0%
123478 - HxCDF	-	1.43E-11	1.43E-11	0%	2.88E-11	2.88E-11	0%	2.59E-12	2.59E-12	0%	5.57E-12	5.57E-12	0%	5.99E-12	5.99E-12	0%	2.48E-09	2.48E-09	0%

Table B-5 Screening of Predicted 24-Hour Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	-	7.70E-12	7.70E-12	0%	1.55E-11	1.55E-11	0%	1.39E-12	1.39E-12	0%	2.99E-12	2.99E-12	0%	3.22E-12	3.22E-12	0%	1.33E-09	1.33E-09	0%
234678 - HxCDF	-	2.98E-12	2.98E-12	0%	5.98E-12	5.98E-12	0%	5.37E-13	5.37E-13	0%	1.16E-12	1.16E-12	0%	1.24E-12	1.24E-12	0%	5.14E-10	5.14E-10	0%
123789 - HxCDF	-	3.09E-13	3.09E-13	0%	6.22E-13	6.22E-13	0%	5.58E-14	5.58E-14	0%	1.20E-13	1.20E-13	0%	1.29E-13	1.29E-13	0%	5.34E-11	5.34E-11	0%
1234678 - HpCDF	-	1.17E-11	1.17E-11	0%	2.35E-11	2.35E-11	0%	2.11E-12	2.11E-12	0%	4.54E-12	4.54E-12	0%	4.88E-12	4.88E-12	0%	2.02E-09	2.02E-09	0%
1234789 - HpCDF	-	1.32E-12	1.32E-12	0%	2.66E-12	2.66E-12	0%	2.38E-13	2.38E-13	0%	5.13E-13	5.13E-13	0%	5.52E-13	5.52E-13	0%	2.28E-10	2.28E-10	0%
1,2,3,4,6,7,8,9-Octa CDF	-	1.21E-12	1.21E-12	0%	2.44E-12	2.44E-12	0%	2.19E-13	2.19E-13	0%	4.71E-13	4.71E-13	0%	5.06E-13	5.06E-13	0%	2.09E-10	2.09E-10	0%
Total PCDDs (TEQ)	0.0000001	2.79E-12	2.79E-12	0%	5.61E-12	5.61E-12	0%	5.03E-13	5.03E-13	0%	1.08E-12	1.08E-12	0%	1.17E-12	1.17E-12	0%	4.82E-10	4.82E-10	0%
Total PCDFs (TEQ)	0.0000001	8.71E-12	8.71E-12	0%	1.75E-11	1.75E-11	0%	1.57E-12	1.57E-12	0%	3.38E-12	3.38E-12	0%	3.64E-12	3.64E-12	0%	1.50E-09	1.50E-09	0%
Total PCDDs + PCDFs	-	2.91E-10	2.91E-10	0%	5.84E-10	5.84E-10	0%	5.24E-11	5.24E-11	0%	1.13E-10	1.13E-10	0%	1.21E-10	1.21E-10	0%	5.02E-08	5.02E-08	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 24-hour (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																
Carbon monoxide	7,000	1.45E+00	2.06E+00	43%	1.97E+02	2.01E+02	2%	5.61E+01	5.62E+01	0%	4.44E+01	8.28E+01	87%	2.48E+01	2.53E+01	2%
Carbon monoxide (8 hour)	6,000	2.66E+00	3.24E+00	22%	3.62E+02	3.62E+02	0%	7.76E+01	7.79E+01		5.31E+01	9.40E+01		3.14E+01	3.15E+01	
Nitrogen dioxide	200	3.78E+00	4.37E+00	16%	9.60E+01	9.61E+01	0%	6.44E+01	6.29E+01	-2%	6.02E+01	7.51E+01	25%	4.99E+01	4.88E+01	-2%
Sulphur dioxide	20	5.57E-03	6.30E-03	13%	1.41E+00	1.42E+00	0%	4.03E-01	4.03E-01	0%	1.96E-01	2.55E-01	31%	1.53E-01	1.54E-01	1%
Total Suspended Particulates (TSP)	120	3.41E+00	3.61E+00	6%	1.12E+02	1.12E+02	0%	1.12E+01	1.60E+01	42%	6.57E+01	4.77E+01	-27%	6.26E+00	9.64E+00	54%
PM _{2.5}	25	2.25E+00	2.34E+00	4%	3.09E+01	3.10E+01	0%	1.02E+01	1.05E+01	3%	9.22E+00	7.72E+00	-16%	5.02E+00	5.00E+00	-1%
PM ₁₀	50	3.02E+00	3.18E+00	6%	5.16E+01	5.15E+01	0%	1.61E+01	1.49E+01	-7%	4.26E+01	2.34E+01	-45%	5.33E+00	7.13E+00	34%
Metals																
Aluminum	120	1.85E-02	3.14E-02	70%	4.66E+00	4.66E+00	0%	5.17E-01	8.13E-01	57%	3.76E+00	2.20E+00	-42%	1.32E-01	4.12E-01	211%
Antimony	25	5.16E-07	8.74E-07	69%	1.35E-04	1.34E-04	0%	1.43E-05	2.26E-05	57%	1.05E-04	6.21E-05	-41%	3.68E-06	1.14E-05	211%
Arsenic	0.3	4.55E-06	4.81E-06	6%	1.33E-03	1.33E-03	0%	2.08E-04	2.08E-04	0%	5.11E-04	3.85E-04	-25%	9.83E-05	9.84E-05	0%
Barium	10	1.68E-04	2.64E-04	57%	6.80E-02	6.80E-02	0%	4.22E-03	6.71E-03	59%	4.88E-02	4.00E-02	-18%	1.28E-03	3.40E-03	167%
Beryllium	0.01	3.17E-06	3.18E-06	0%	9.46E-04	9.46E-04	0%	1.45E-04	1.45E-04	0%	1.46E-04	9.43E-05	-35%	6.92E-05	6.91E-05	0%
Cadmium	0.03	5.53E-05	6.50E-05	18%	1.07E-02	1.07E-02	0%	2.56E-03	2.56E-03	0%	2.32E-03	2.48E-03	7%	9.04E-04	9.03E-04	0%
Chromium (VI) ^(b)	0.39	6.34E-05	9.00E-05	42%	3.73E-02	3.73E-02	0%	2.34E-03	2.34E-03	0%	2.96E-02	2.58E-02	-13%	7.32E-04	1.09E-03	49%
Chromium (III) ^(b)	0.5	6.34E-05	9.00E-05	42%	3.73E-02	3.73E-02	0%	2.34E-03	2.34E-03	0%	2.96E-02	2.58E-02	-13%	7.32E-04	1.09E-03	49%
Cobalt	0.1	1.11E-05	1.28E-05	15%	3.83E-03	3.83E-03	0%	4.30E-04	4.30E-04	0%	1.89E-03	1.69E-03	-10%	1.73E-04	1.72E-04	0%
Copper	50	1.69E-05	1.93E-05	15%	3.80E-03	3.80E-03	0%	7.29E-04	7.30E-04	0%	1.55E-03	1.27E-03	-18%	2.66E-04	2.65E-04	0%
Iron	4	4.95E-03	7.71E-03	56%	2.06E+00	2.06E+00	0%	1.23E-01	1.95E-01	58%	1.50E+00	1.24E+00	-17%	3.88E-02	9.90E-02	155%
Lead	0.5	1.86E-05	2.08E-05	12%	3.21E-03	3.21E-03	0%	8.62E-04	8.62E-04	0%	1.19E-03	8.43E-04	-29%	3.08E-04	3.10E-04	1%
Manganese	0.1	8.11E-05	1.23E-04	52%	3.89E-02	3.89E-02	0%	2.57E-03	3.03E-03	18%	2.86E-02	2.42E-02	-15%	8.31E-04	1.53E-03	84%
Mercury	2	3.68E-06	3.72E-06	1%	9.82E-04	9.81E-04	0%	1.65E-04	1.65E-04	0%	3.81E-04	3.03E-04	-20%	7.83E-05	7.77E-05	-1%
Molybdenum	120	4.12E-07	6.58E-07	60%	1.53E-04	1.53E-04	0%	1.06E-05	1.68E-05	59%	1.05E-04	8.39E-05	-20%	2.86E-06	8.51E-06	197%
Nickel	0.1	3.32E-05	3.50E-05	5%	3.18E-02	3.18E-02	0%	1.95E-03	1.95E-03	0%	3.10E-02	2.85E-02	-8%	6.24E-04	6.10E-04	-2%
Selenium	10	1.56E-05	1.55E-05	0%	4.65E-03	4.65E-03	0%	7.05E-04	7.05E-04	0%	5.04E-04	2.63E-04	-48%	3.38E-04	3.38E-04	0%
Silver	1	8.80E-06	1.05E-05	19%	1.79E-03	1.80E-03	0%	4.02E-04	4.02E-04	0%	3.77E-04	4.16E-04	10%	1.43E-04	1.43E-04	0%
Strontium	120	1.07E-04	1.70E-04	59%	4.01E-02	4.01E-02	0%	2.73E-03	4.33E-03	59%	2.77E-02	2.23E-02	-19%	7.51E-04	2.20E-03	192%
Tellurium	10	2.84E-08	4.67E-08	65%	8.89E-06	8.89E-06	0%	7.60E-07	1.20E-06	58%	5.82E-06	4.29E-06	-26%	1.95E-07	6.09E-07	213%
Thallium	-	3.54E-07	6.05E-07	71%	8.58E-05	8.58E-05	0%	9.96E-06	1.56E-05	57%	7.18E-05	4.15E-05	-42%	2.55E-06	7.94E-06	211%
Titanium	120	4.16E-04	6.90E-04	66%	1.25E-01	1.25E-01	0%	1.12E-02	1.77E-02	58%	8.52E-02	5.89E-02	-31%	2.88E-03	8.99E-03	212%
Tungsten	-	1.20E-06	2.04E-06	70%	3.06E-04	3.06E-04	0%	3.35E-05	5.27E-05	57%	2.44E-04	1.43E-04	-41%	8.59E-06	2.67E-05	211%
Uranium	0.15	1.50E-06	2.51E-06	68%	4.23E-04	4.23E-04	0%	4.11E-05	6.48E-05	58%	3.07E-04	1.89E-04	-38%	1.05E-05	3.29E-05	212%
Vanadium	1	1.02E-05	1.61E-05	58%	3.98E-03	3.98E-03	0%	2.57E-04	4.08E-04	59%	2.81E-03	2.29E-03	-19%	7.46E-05	2.07E-04	178%
Zinc	120	7.23E-05	8.83E-05	22%	1.69E-02	1.69E-02	0%	3.12E-03	3.12E-03	0%	4.40E-03	4.20E-03	-5%	1.14E-03	1.14E-03	0%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	-	2.10E-05	5.52E-05	163%	3.20E-03	3.34E-03	4%	1.05E-03	1.06E-03	1%	1.85E-03	6.08E-03	229%	5.86E-04	7.16E-04	22%
1-Methylphenanthrene	-	9.44E-07	2.48E-06	163%	1.44E-04	1.50E-04	4%	4.71E-05	4.75E-05	1%	8.31E-05	2.73E-04	229%	2.64E-05	3.22E-05	22%
2-Methylantracene	-	5.78E-07	1.52E-06	163%	8.82E-05	9.19E-05	4%	2.88E-05	2.90E-05	1%	5.08E-05	1.67E-04	229%	1.61E-05	1.97E-05	22%
2-Methylfluorene	-	1.95E-08	5.12E-08	163%	2.97E-06	3.10E-06	4%	9.71E-07	9.80E-07	1%	1.71E-06	5.64E-06	229%	5.44E-07	6.64E-07	22%
2-methylnaphthalene	-	3.39E-05	8.92E-05	163%	5.18E-03	5.40E-03	4%	1.69E-03	1.71E-03	1%	2.99E-03	9.83E-03	229%	9.48E-04	1.16E-03	22%
2-Methylphenanthrene	-	2.33E-06	6.13E-06	163%	3.56E-04	3.71E-04	4%	1.16E-04	1.17E-04	1%	2.05E-04	6.76E-04	229%	6.52E-05	7.95E-05	22%
2-Methylpyrene	-	1.73E-07	4.55E-07	163%	2.64E-05	2.75E-05	4%	8.61E-06	8.69E-06	1%	1.52E-05	5.01E-05	229%	4.83E-06	5.89E-06	22%
3-Methyldibenzothiophene	-	3.57E-08	9.39E-08	163%	5.45E-06	5.68E-06	4%	1.78E-06	1.80E-06	1%	3.14E-06	1.03E-05	229%	9.98E-07	1.22E-06	22%
3-Methylphenanthrene	-	1.68E-06	4.43E-06	163%	2.57E-04	2.68E-04	4%	8.39E-05	8.46E-05	1%	1.48E-04	4.87E-04	229%	4.70E-05	5.74E-05	22%
4-+9-Methylphenanthrene	-	1.27E-06	3.34E-06	163%	1.94E-04	2.02E-04	4%	6.34E-05	6.40E-05	1%	1.12E-04	3.68E-04	229%	3.55E-05	4.34E-05	22%
4-Methyldibenzothiophene	-	2.27E-08	5.98E-08	163%	3.47E-06	3.62E-06	4%	1.13E-06	1.14E-06	1%	2.00E-06	6.58E-06	229%	6.35E-07	7.75E-07	22%
9-Methylphenanthrene	-	1.71E-08	1.71E-08	0%	2.77E-06	2.77E-06	0%	2.47E-07	2.47E-07	0%	4.71E-07	4.71E-07	0%	1.93E-07	1.93E-07	0%
Acenaphthene	-	5.17E-06	6.48E-06	25%	6.48E-04	6.48E-04	0%	7.48E-05	8.01E-05	7%	1.07E-04	3.11E-04	189%	8.24E-05	8.26E-05	0%
Acenaphthylene	-	1.07E-05	1.71E-05	59%	1.28E-03	1.29E-03	1%	1.97E-04	2.01E-04	2%	3.43E-04	1.13E-03	229%	1.66E-04	1.67E-04	0%
Acphenanthrylene	-	6.66E-07	1.75E-06	163%	1.02E-04	1.06E-04	4%	3.32E-05	3.35E-05	1%	5.86E-05	1.93E-04	229%	1.86E-05	2.27E-05	22%
Anthracene	-	1.62E-06	2.75E-06	70%	1.77E-04	1.79E-04	1%	3.54E-05	3.58E-05	1%	6.19E-05	2.01E-04	225%	2.29E-05	2.40E-05	5%
Benz(a)anthracene	-	7.02E-07	9.35E-07	33%	8.67E-05	8.67E-05	0%	1.04E-05	1.13E-05	8%	1.71E-05	4.80E-05	181%	1.11E-05	1.11E-05	0%
Benzo(a)fluorene	-	2.10E-07	5.51E-07	163%	3.20E-05	3.33E-05	4%	1.04E-05	1.05E-05	1%	1.84E-05	6.07E-05	229%	5.86E-06	7.15E-06	22%
Benzo(a)pyrene	-	2.90E-07	4.31E-07	49%	3.54E-05	3.55E-05	0%	4.66E-06	4.97E-06	7%	8.07E-06	2.66E-05	229%	4.58E-06	4.59E-06	0%
Benzo(b)fluoranthene	-	1.62E-06	2.87E-06	77%	1.65E-04	1.67E-04	1%	3.96E-05	3.99E-05	1%	6.89E-05	2.23E-04	224%	2.23E-05	2.70E-05	21%
Benzo(e)pyrene	-	1.93E-08	3.93E-08	104%	2.28E-06	2.41E-06	6%	7.57E-07	7.63E-07	1%	1.23E-06	3.84E-06	213%	4.82E-07	5.62E-07	17%
Benzo(g,h,i)fluoranthene	-	3.23E-07	8.50E-07	163%	4.93E-05	5.14E-05	4%	1.61E-05	1.63E-05	1%	2.84E-05	9.36E-05	229%	9.03E-06	1.10E-05	22%
Benzo(g,h,i)perylene	-	6.55E-07	9.97E-07	52%	7.80E-05	7.86E-05	1%	1.17E-05	1.18E-05	1%	2.01E-05	6.10E-05	204%	1.01E-05	1.01E-05	0%
Benzo(k)fluoranthene	-	2.49E-07	3.91E-07	57%	3.02E-05	3.04E-05	1%	4.43E-06	4.56E-06	3%	7.70E-06	2.53E-05	229%	3.92E-06	3.93E-06	0%
Biphenyl	-	7.19E-08	7.19E-08	0%	1.17E-05	1.17E-05	0%	1.04E-06	1.04E-06	0%	1.98E-06	1.98E-06	0%	8.12E-07	8.12E-07	0%
Chrysene	-	1.62E-06	1.66E-06	3%	2.10E-04	2.10E-04	0%	2.19E-05	2.24E-05	2%	3.01E-05	5.41E-05	80%	2.62E-05	2.62E-05	0%
Coronene	-	1.62E-09	4.27E-09	163%	2.48E-07	2.58E-07	4%	8.09E-08	8.16E-08	1%	1.43E-07	4.70E-07	229%	4.53E-08	5.53E-08	22%
Cyclopenta(c,d)pyrene	-	1.14E-07	3.01E-07	163%	1.75E-05	1.82E-05	4%	5.70E-06	5.75E-06	1%	1.01E-05	3.31E-05	229%	3.20E-06	3.90E-06	22%
Dibenzo(a,h)anthracene	-	5.12E-07	9.04E-07	76%	5.17E-05	5.23E-05	1%	1.27E-05	1.28E-05	1%	2.22E-05	6.97E-05	214%	7.08E-06	8.55E-06	21%
Dibenzothiophene	-	1.38E-08	3.63E-08	163%	2.11E-06	2.20E-06	4%	6.89E-07	6.95E-07	1%	1.22E-06	4.00E-06	229%	3.86E-07	4.71E-07	22%
Fluoranthene	-	6.05E-06	1.08E-05	79%	6.03E-04	6.10E-04	1%	1.51E-04	1.53E-04	1%	2.63E-04	8.54E-04	224%	8.53E-05	1.03E-04	21%
Fluorene	-	1.51E-05	2.41E-05	60%	1.79E-03	1.80E-03	1%	2.82E-04	2.85E-04	1%	4.91E-04	1.61E-03	227%	2.32E-04	2.32E-04	0%
Indeno(1,2,3-cd)fluoranthene	-	8.11E-09	2.13E-08	163%	1.24E-06	1.29E-06	4%	4.04E-07	4.08E-07	1%	7.14E-07	2.35E-06	229%	2.27E-07	2.77E-07	22%
Indeno(1,2,3-cd)pyrene	-	4.28E-07	4.28E-07	0%	5.68E-05	5.68E-05	0%	5.85E-06	5.85E-06	0%	7.75E-06	7.64E-06	-1%	6.98E-06	6.98E-06	0%
Indeno(1,2,3-W)pyrene	-	1.46E-07	3.83E-07	163%	2.23E-05	2.32E-05	4%	7.27E-06	7.33E-06	1%	1.28E-05	4.22E-05	229%	4.07E-06	4.97E-06	22%
Naphthalene	-	1.90E-04	3.25E-04	71%	1.94E-02	1.96E-02	1%	4.58E-03	4.62E-03	1%	8.01E-03	2.41E-02	200%	2.56E-03	3.06E-03	20%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	-	1.30E-07	3.41E-07	163%	1.98E-05	2.06E-05	4%	6.47E-06	6.52E-06	1%	1.14E-05	3.76E-05	229%	3.62E-06	4.42E-06	22%
Perylene	-	1.62E-09	4.27E-09	163%	2.48E-07	2.58E-07	4%	8.09E-08	8.16E-08	1%	1.43E-07	4.70E-07	229%	4.53E-08	5.53E-08	22%
Phenanthrene	-	4.30E-05	4.42E-05	3%	5.57E-03	5.57E-03	0%	5.81E-04	5.96E-04	3%	8.01E-04	1.50E-03	87%	6.95E-04	6.96E-04	0%
Picene	-	1.62E-09	4.27E-09	163%	2.48E-07	2.58E-07	4%	8.09E-08	8.16E-08	1%	1.43E-07	4.70E-07	229%	4.53E-08	5.53E-08	22%
Pyrene	-	6.86E-06	1.34E-05	95%	6.11E-04	6.36E-04	4%	2.04E-04	2.05E-04	1%	3.55E-04	1.16E-03	226%	1.15E-04	1.39E-04	21%
Volatile Organic Compounds																
Methacrolein	-	2.46E-03	4.76E-03	93%	8.43E-01	8.56E-01	1%	1.25E-01	1.25E-01	0%	1.38E-01	2.73E-01	98%	7.16E-02	7.46E-02	4%
Acrolein	-	2.10E-03	4.05E-03	93%	7.17E-01	7.27E-01	1%	1.06E-01	1.06E-01	0%	1.17E-01	2.32E-01	98%	6.09E-02	6.35E-02	4%
Benzaldehyde	-	2.34E-03	4.52E-03	93%	8.01E-01	8.13E-01	1%	1.18E-01	1.19E-01	0%	1.31E-01	2.60E-01	98%	6.81E-02	7.09E-02	4%
2,5-dimethylbenzaldehyde	-	2.53E-03	4.88E-03	93%	8.65E-01	8.77E-01	1%	1.28E-01	1.28E-01	0%	1.41E-01	2.80E-01	98%	7.34E-02	7.65E-02	4%
Butanal (Butyraldehyde)	-	8.01E-04	1.55E-03	93%	2.74E-01	2.78E-01	1%	4.05E-02	4.06E-02	0%	4.48E-02	8.89E-02	98%	2.33E-02	2.42E-02	4%
Formaldehyde	50	1.43E-02	2.71E-02	89%	4.72E+00	4.79E+00	1%	7.15E-01	7.16E-01	0%	7.89E-01	1.52E+00	93%	4.11E-01	4.27E-01	4%
Acetaldehyde	500	2.58E-02	4.98E-02	93%	8.81E+00	8.94E+00	1%	1.30E+00	1.31E+00	0%	1.44E+00	2.86E+00	98%	7.49E-01	7.80E-01	4%
Propanal	500	8.62E-03	1.67E-02	93%	2.95E+00	3.00E+00	1%	4.36E-01	4.37E-01	0%	4.82E-01	9.57E-01	98%	2.51E-01	2.61E-01	4%
Crotonaldehyde	-	8.25E-03	1.59E-02	93%	2.83E+00	2.87E+00	1%	4.18E-01	4.18E-01	0%	4.62E-01	9.16E-01	98%	2.40E-01	2.50E-01	4%
Hexanal	-	1.36E-03	2.62E-03	93%	4.64E-01	4.71E-01	1%	6.86E-02	6.87E-02	0%	7.58E-02	1.50E-01	98%	3.94E-02	4.10E-02	4%
Heptanal	-	1.97E-03	3.81E-03	93%	6.75E-01	6.85E-01	1%	9.97E-02	9.99E-02	0%	1.10E-01	2.19E-01	98%	5.73E-02	5.97E-02	4%
Octanal	-	1.91E-03	3.69E-03	93%	6.54E-01	6.63E-01	1%	9.66E-02	9.68E-02	0%	1.07E-01	2.12E-01	98%	5.55E-02	5.78E-02	4%
Nonanal	-	2.71E-03	5.24E-03	93%	9.28E-01	9.41E-01	1%	1.37E-01	1.37E-01	0%	1.52E-01	3.01E-01	98%	7.88E-02	8.21E-02	4%
Decanal	-	1.72E-03	3.33E-03	93%	5.90E-01	5.99E-01	1%	8.73E-02	8.74E-02	0%	9.65E-02	1.91E-01	98%	5.02E-02	5.22E-02	4%
Undecanal	-	1.60E-03	3.09E-03	93%	5.48E-01	5.56E-01	1%	8.10E-02	8.12E-02	0%	8.96E-02	1.78E-01	98%	4.66E-02	4.85E-02	4%
Dodecanal	-	7.39E-04	1.43E-03	93%	2.53E-01	2.57E-01	1%	3.74E-02	3.75E-02	0%	4.14E-02	8.20E-02	98%	2.15E-02	2.24E-02	4%
Tridecanal	-	1.23E-03	2.38E-03	93%	4.22E-01	4.28E-01	1%	6.23E-02	6.24E-02	0%	6.89E-02	1.37E-01	98%	3.58E-02	3.73E-02	4%
1,2,4-Trimethylbenzene	220	5.42E-04	1.05E-03	93%	1.86E-01	1.88E-01	1%	2.74E-02	2.75E-02	0%	3.03E-02	6.02E-02	98%	1.58E-02	1.64E-02	4%
1,3,5-Trimethylbenzene	220	1.60E-04	3.09E-04	93%	5.48E-02	5.56E-02	1%	8.10E-03	8.12E-03	0%	8.96E-03	1.78E-02	98%	4.66E-03	4.85E-03	4%
Benzene	29	2.37E-03	3.95E-03	66%	5.86E-01	5.94E-01	1%	8.98E-02	9.00E-02	0%	9.50E-02	1.88E-01	98%	5.26E-02	5.47E-02	4%
Ethylbenzene	21,710	2.91E-04	5.61E-04	93%	9.92E-02	1.01E-01	1%	1.47E-02	1.47E-02	0%	1.63E-02	3.22E-02	98%	8.46E-03	8.81E-03	4%
Propylbenzene	-	6.16E-05	1.19E-04	93%	2.11E-02	2.14E-02	1%	3.12E-03	3.12E-03	0%	3.45E-03	6.84E-03	98%	1.79E-03	1.87E-03	4%
Indanone	-	4.28E-05	8.27E-05	93%	1.47E-02	1.49E-02	1%	2.17E-03	2.17E-03	0%	2.39E-03	4.75E-03	98%	1.24E-03	1.30E-03	4%
Toluene	3,800	2.81E-03	5.09E-03	81%	8.47E-01	8.59E-01	1%	1.29E-01	1.30E-01	0%	1.41E-01	2.73E-01	93%	7.49E-02	7.78E-02	4%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	-	1.29E-04	2.50E-04	93%	4.43E-02	4.49E-02	1%	6.54E-03	6.56E-03	0%	7.24E-03	1.44E-02	98%	3.76E-03	3.92E-03	4%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	-	3.20E-04	6.19E-04	93%	1.10E-01	1.11E-01	1%	1.62E-02	1.62E-02	0%	1.79E-02	3.55E-02	98%	9.31E-03	9.70E-03	4%
Acetone	11,880	1.36E-02	2.62E-02	93%	4.64E+00	4.71E+00	1%	6.86E-01	6.87E-01	0%	7.58E-01	1.50E+00	98%	3.94E-01	4.10E-01	4%
Acetophenone	-	3.14E-03	6.07E-03	93%	1.08E+00	1.09E+00	1%	1.59E-01	1.59E-01	0%	1.76E-01	3.49E-01	98%	9.14E-02	9.51E-02	4%
Methyl Ethyl Ketone	1,000	4.62E-03	8.93E-03	93%	1.58E+00	1.60E+00	1%	2.34E-01	2.34E-01	0%	2.58E-01	5.13E-01	98%	1.34E-01	1.40E-01	4%
Xylene	730	1.61E-03	2.94E-03	83%	4.93E-01	5.01E-01	1%	7.37E-02	7.38E-02	0%	8.04E-02	1.59E-01	98%	4.27E-02	4.44E-02	4%
o-Xylene	730	5.13E-04	9.89E-04	93%	1.75E-01	1.78E-01	1%	2.59E-02	2.60E-02	0%	2.87E-02	5.67E-02	98%	1.49E-02	1.55E-02	4%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	-	5.27E-03	1.02E-02	93%	1.81E+00	1.83E+00	1%	2.67E-01	2.67E-01	0%	2.95E-01	5.85E-01	98%	1.53E-01	1.60E-01	4%
1,1,1-Trichloroethane (Methyl chloroform)	115,000	3.78E-06	3.73E-06	-1%	3.45E-04	3.45E-04	0%	1.40E-04	1.40E-04	0%	1.47E-04	6.25E-05	-57%	7.85E-05	7.60E-05	-3%
Butane	-	2.36E-03	4.56E-03	93%	8.08E-01	8.19E-01	1%	1.19E-01	1.20E-01	0%	1.32E-01	2.62E-01	98%	6.86E-02	7.14E-02	4%
2,2-Dimethylbutane	-	1.91E-04	3.69E-04	93%	6.54E-02	6.63E-02	1%	9.66E-03	9.68E-03	0%	1.07E-02	2.12E-02	98%	5.55E-03	5.78E-03	4%
2,3-Dimethylbutane	-	3.51E-04	6.78E-04	93%	1.20E-01	1.22E-01	1%	1.78E-02	1.78E-02	0%	1.96E-02	3.90E-02	98%	1.02E-02	1.06E-02	4%
Isobutene	-	7.02E-04	1.36E-03	93%	2.40E-01	2.44E-01	1%	3.55E-02	3.56E-02	0%	3.93E-02	7.79E-02	98%	2.04E-02	2.13E-02	4%
cis-2-Butene	-	1.60E-04	3.09E-04	93%	5.48E-02	5.56E-02	1%	8.10E-03	8.12E-03	0%	8.96E-03	1.78E-02	98%	4.66E-03	4.85E-03	4%
trans-2-Butene	-	3.20E-04	6.19E-04	93%	1.10E-01	1.11E-01	1%	1.62E-02	1.62E-02	0%	1.79E-02	3.55E-02	98%	9.31E-03	9.70E-03	4%
2-Methyl-1-butene	-	1.60E-04	3.09E-04	93%	5.48E-02	5.56E-02	1%	8.10E-03	8.12E-03	0%	8.96E-03	1.78E-02	98%	4.66E-03	4.85E-03	4%
3-Methyl-1-butene	-	9.85E-05	1.90E-04	93%	3.37E-02	3.42E-02	1%	4.99E-03	5.00E-03	0%	5.51E-03	1.09E-02	98%	2.87E-03	2.98E-03	4%
1,3-Butadiene	950	1.91E-04	3.69E-04	93%	6.54E-02	6.63E-02	1%	9.66E-03	9.68E-03	0%	1.07E-02	2.12E-02	98%	5.55E-03	5.78E-03	4%
Cyclopentane	-	2.53E-04	4.88E-04	93%	8.65E-02	8.77E-02	1%	1.28E-02	1.28E-02	0%	1.41E-02	2.80E-02	98%	7.34E-03	7.65E-03	4%
Methylcyclopentane	-	3.82E-04	7.38E-04	93%	1.31E-01	1.33E-01	1%	1.93E-02	1.94E-02	0%	2.14E-02	4.24E-02	98%	1.11E-02	1.16E-02	4%
Pentane	-	1.15E-03	2.21E-03	93%	3.92E-01	3.98E-01	1%	5.80E-02	5.81E-02	0%	6.41E-02	1.27E-01	98%	3.33E-02	3.47E-02	4%
Isopentane	-	1.69E-03	3.26E-03	93%	5.78E-01	5.86E-01	1%	8.54E-02	8.55E-02	0%	9.44E-02	1.87E-01	98%	4.91E-02	5.11E-02	4%
2-Methylpentane	-	5.73E-04	1.11E-03	93%	1.96E-01	1.99E-01	1%	2.90E-02	2.90E-02	0%	3.20E-02	6.36E-02	98%	1.67E-02	1.73E-02	4%
3-Methylpentane	-	4.13E-04	7.97E-04	93%	1.41E-01	1.43E-01	1%	2.09E-02	2.09E-02	0%	2.31E-02	4.58E-02	98%	1.20E-02	1.25E-02	4%
2,3-Dimethylpentane	-	4.43E-04	8.57E-04	93%	1.52E-01	1.54E-01	1%	2.24E-02	2.25E-02	0%	2.48E-02	4.92E-02	98%	1.29E-02	1.34E-02	4%
2,4-Dimethylpentane	-	2.53E-04	4.88E-04	93%	8.65E-02	8.77E-02	1%	1.28E-02	1.28E-02	0%	1.41E-02	2.80E-02	98%	7.34E-03	7.65E-03	4%
2,2,4-Trimethylpentane	-	7.64E-04	1.48E-03	93%	2.61E-01	2.65E-01	1%	3.86E-02	3.87E-02	0%	4.27E-02	8.48E-02	98%	2.22E-02	2.31E-02	4%
2,3,4-Trimethylpentane	-	1.91E-04	3.69E-04	93%	6.54E-02	6.63E-02	1%	9.66E-03	9.68E-03	0%	1.07E-02	2.12E-02	98%	5.55E-03	5.78E-03	4%
2-Methyl-2-pentene	-	1.29E-04	2.50E-04	93%	4.43E-02	4.49E-02	1%	6.54E-03	6.56E-03	0%	7.24E-03	1.44E-02	98%	3.76E-03	3.92E-03	4%
trans-2-Pentene	-	3.08E-05	5.95E-05	93%	1.05E-02	1.07E-02	1%	1.56E-03	1.56E-03	0%	1.72E-03	3.42E-03	98%	8.96E-04	9.33E-04	4%
Cyclohexane	6,100	1.29E-04	2.50E-04	93%	4.43E-02	4.49E-02	1%	6.54E-03	6.56E-03	0%	7.24E-03	1.44E-02	98%	3.76E-03	3.92E-03	4%
Methylcyclohexane	-	3.20E-04	6.19E-04	93%	1.10E-01	1.11E-01	1%	1.62E-02	1.62E-02	0%	1.79E-02	3.55E-02	98%	9.31E-03	9.70E-03	4%
Pentylcyclohexane	-	5.17E-05	9.98E-05	93%	1.77E-02	1.79E-02	1%	2.61E-03	2.62E-03	0%	2.89E-03	5.74E-03	98%	1.50E-03	1.56E-03	4%
Dodecylcyclohexane	-	1.03E-05	2.00E-05	93%	3.54E-03	3.59E-03	1%	5.24E-04	5.25E-04	0%	5.79E-04	1.15E-03	98%	3.01E-04	3.13E-04	4%
Tridecylcyclohexane	-	1.02E-05	1.96E-05	93%	3.48E-03	3.53E-03	1%	5.14E-04	5.15E-04	0%	5.69E-04	1.13E-03	98%	2.96E-04	3.08E-04	4%
Tetradecylcyclohexane	-	9.79E-06	1.89E-05	93%	3.35E-03	3.40E-03	1%	4.95E-04	4.96E-04	0%	5.48E-04	1.09E-03	98%	2.85E-04	2.97E-04	4%
Pentadecylcyclohexane	-	7.88E-06	1.52E-05	93%	2.70E-03	2.74E-03	1%	3.99E-04	4.00E-04	0%	4.41E-04	8.75E-04	98%	2.29E-04	2.39E-04	4%
2-Methylhexane	-	3.51E-04	6.78E-04	93%	1.20E-01	1.22E-01	1%	1.78E-02	1.78E-02	0%	1.96E-02	3.90E-02	98%	1.02E-02	1.06E-02	4%
3-Methylhexane	-	1.91E-04	3.69E-04	93%	6.54E-02	6.63E-02	1%	9.66E-03	9.68E-03	0%	1.07E-02	2.12E-02	98%	5.55E-03	5.78E-03	4%
3-Ethylhexane	-	1.29E-04	2.50E-04	93%	4.43E-02	4.49E-02	1%	6.54E-03	6.56E-03	0%	7.24E-03	1.44E-02	98%	3.76E-03	3.92E-03	4%
2,3-Dimethylhexane	-	9.85E-05	1.90E-04	93%	3.37E-02	3.42E-02	1%	4.99E-03	5.00E-03	0%	5.51E-03	1.09E-02	98%	2.87E-03	2.98E-03	4%
2,4-Dimethylhexane	-	3.08E-05	5.95E-05	93%	1.05E-02	1.07E-02	1%	1.56E-03	1.56E-03	0%	1.72E-03	3.42E-03	98%	8.96E-04	9.33E-04	4%
2,5-Dimethylhexane	-	3.08E-05	5.95E-05	93%	1.05E-02	1.07E-02	1%	1.56E-03	1.56E-03	0%	1.72E-03	3.42E-03	98%	8.96E-04	9.33E-04	4%
cis-2-Hexene	-	6.16E-05	1.19E-04	93%	2.11E-02	2.14E-02	1%	3.12E-03	3.12E-03	0%	3.45E-03	6.84E-03	98%	1.79E-03	1.87E-03	4%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	-	9.85E-05	1.90E-04	93%	3.37E-02	3.42E-02	1%	4.99E-03	5.00E-03	0%	5.51E-03	1.09E-02	98%	2.87E-03	2.98E-03	4%
Heptane	11,000	2.89E-04	5.59E-04	93%	9.91E-02	1.01E-01	1%	1.46E-02	1.47E-02	0%	1.62E-02	3.21E-02	98%	8.42E-03	8.77E-03	4%
2-Methylheptane	-	6.16E-05	1.19E-04	93%	2.11E-02	2.14E-02	1%	3.12E-03	3.12E-03	0%	3.45E-03	6.84E-03	98%	1.79E-03	1.87E-03	4%
Octane	-	1.60E-04	3.09E-04	93%	5.48E-02	5.56E-02	1%	8.10E-03	8.12E-03	0%	8.96E-03	1.78E-02	98%	4.66E-03	4.85E-03	4%
Nonane	-	9.85E-05	1.90E-04	93%	3.37E-02	3.42E-02	1%	4.99E-03	5.00E-03	0%	5.51E-03	1.09E-02	98%	2.87E-03	2.98E-03	4%
Dodecane	-	3.10E-04	5.99E-04	93%	1.06E-01	1.08E-01	1%	1.57E-02	1.57E-02	0%	1.73E-02	3.44E-02	98%	9.01E-03	9.38E-03	4%
Tridecane	-	2.94E-04	5.68E-04	93%	1.01E-01	1.02E-01	1%	1.49E-02	1.49E-02	0%	1.64E-02	3.26E-02	98%	8.54E-03	8.90E-03	4%
Tetradecane	-	3.87E-04	7.49E-04	93%	1.33E-01	1.35E-01	1%	1.96E-02	1.96E-02	0%	2.17E-02	4.30E-02	98%	1.13E-02	1.17E-02	4%
n-Pentadecane	-	2.45E-04	4.74E-04	93%	8.39E-02	8.51E-02	1%	1.24E-02	1.24E-02	0%	1.37E-02	2.72E-02	98%	7.13E-03	7.42E-03	4%
Hexadecane	-	4.38E-04	8.46E-04	93%	1.50E-01	1.52E-01	1%	2.22E-02	2.22E-02	0%	2.45E-02	4.86E-02	98%	1.27E-02	1.33E-02	4%
n-Heptadecane	-	3.78E-04	7.31E-04	93%	1.29E-01	1.31E-01	1%	1.91E-02	1.92E-02	0%	2.12E-02	4.20E-02	98%	1.10E-02	1.15E-02	4%
n-Octadecane	-	3.70E-04	7.15E-04	93%	1.27E-01	1.29E-01	1%	1.87E-02	1.88E-02	0%	2.07E-02	4.11E-02	98%	1.08E-02	1.12E-02	4%
n-Nonadecane	-	2.53E-04	4.89E-04	93%	8.67E-02	8.79E-02	1%	1.28E-02	1.28E-02	0%	1.42E-02	2.81E-02	98%	7.36E-03	7.67E-03	4%
n-Eicosane	-	1.27E-04	2.45E-04	93%	4.34E-02	4.41E-02	1%	6.42E-03	6.43E-03	0%	7.10E-03	1.41E-02	98%	3.69E-03	3.84E-03	4%
n-Heneicosane	-	4.05E-05	7.83E-05	93%	1.39E-02	1.41E-02	1%	2.05E-03	2.05E-03	0%	2.27E-03	4.50E-03	98%	1.18E-03	1.23E-03	4%
Farnesane	-	2.67E-04	5.16E-04	93%	9.15E-02	9.28E-02	1%	1.35E-02	1.36E-02	0%	1.50E-02	2.97E-02	98%	7.77E-03	8.10E-03	4%
Pristane	-	2.73E-04	5.27E-04	93%	9.34E-02	9.48E-02	1%	1.38E-02	1.38E-02	0%	1.53E-02	3.03E-02	98%	7.94E-03	8.26E-03	4%
C ₂ -C ₆ aliphatic	6100	2.05E-02	3.73E-02	82%	6.20E+00	6.29E+00	1%	9.27E-01	9.29E-01	0%	1.01E+00	2.00E+00	98%	5.36E-01	5.58E-01	4%
>C ₆ -C ₈ aliphatic	11,000	3.31E-03	6.40E-03	93%	1.13E+00	1.15E+00	1%	1.68E-01	1.68E-01	0%	1.85E-01	3.68E-01	98%	9.64E-02	1.00E-01	4%
>C ₈ -C ₁₀ aliphatic	-	9.85E-05	1.90E-04	93%	3.37E-02	3.42E-02	1%	4.99E-03	5.00E-03	0%	5.51E-03	1.09E-02	98%	2.87E-03	2.98E-03	4%
>C ₁₀ -C ₁₂ aliphatic	-	3.71E-04	7.16E-04	93%	1.27E-01	1.29E-01	1%	1.88E-02	1.88E-02	0%	2.07E-02	4.11E-02	98%	1.08E-02	1.12E-02	4%
>C ₁₂ -C ₁₆ aliphatic	-	2.13E-03	4.12E-03	93%	7.30E-01	7.40E-01	1%	1.08E-01	1.08E-01	0%	1.19E-01	2.37E-01	98%	6.20E-02	6.45E-02	4%
>C ₁₆ -C ₂₁ aliphatic	-	2.11E-03	4.08E-03	93%	7.24E-01	7.34E-01	1%	1.07E-01	1.07E-01	0%	1.18E-01	2.35E-01	98%	6.15E-02	6.40E-02	4%
C ₆ -C ₈ aromatic	29	5.47E-03	9.60E-03	75%	1.53E+00	1.55E+00	1%	2.34E-01	2.34E-01	0%	2.53E-01	4.92E-01	95%	1.36E-01	1.41E-01	4%
>C ₈ -C ₁₀ aromatic	220	5.11E-04	9.88E-04	93%	1.75E-01	1.78E-01	1%	2.59E-02	2.59E-02	0%	2.86E-02	5.67E-02	98%	1.49E-02	1.55E-02	4%
Dioxins and Furans^(a)																
2378 - TCDD	-	1.68E-13	1.68E-13	0%	3.82E-11	3.82E-11	0%	3.09E-12	3.09E-12	0%	2.61E-11	2.61E-11	0%	3.39E-12	3.39E-12	0%
12378 - PeCDD	-	2.72E-13	2.72E-13	0%	6.18E-11	6.18E-11	0%	5.00E-12	5.00E-12	0%	4.23E-11	4.23E-11	0%	5.49E-12	5.49E-12	0%
123478 - HxCDD	-	5.93E-14	5.93E-14	0%	1.35E-11	1.35E-11	0%	1.09E-12	1.09E-12	0%	9.23E-12	9.23E-12	0%	1.20E-12	1.20E-12	0%
123678 - HxCDD	-	1.58E-13	1.58E-13	0%	3.60E-11	3.60E-11	0%	2.91E-12	2.91E-12	0%	2.46E-11	2.46E-11	0%	3.19E-12	3.19E-12	0%
123789 - HxCDD	-	2.42E-13	2.42E-13	0%	5.51E-11	5.51E-11	0%	4.45E-12	4.45E-12	0%	3.77E-11	3.77E-11	0%	4.89E-12	4.89E-12	0%
1234678 - HpCDD	-	4.49E-13	4.49E-13	0%	1.02E-10	1.02E-10	0%	8.26E-12	8.26E-12	0%	6.99E-11	6.99E-11	0%	9.06E-12	9.06E-12	0%
1,2,3,4,6,7,8,9-Octa CDD	-	4.57E-13	4.57E-13	0%	1.04E-10	1.04E-10	0%	8.40E-12	8.40E-12	0%	7.11E-11	7.11E-11	0%	9.22E-12	9.22E-12	0%
2378 - TCDF	-	2.75E-12	2.75E-12	0%	6.26E-10	6.26E-10	0%	5.06E-11	5.06E-11	0%	4.28E-10	4.28E-10	0%	5.56E-11	5.56E-11	0%
12378 - PeCDF	-	1.44E-12	1.44E-12	0%	3.27E-10	3.27E-10	0%	2.65E-11	2.65E-11	0%	2.24E-10	2.24E-10	0%	2.90E-11	2.90E-11	0%
23478 - PeCDF	-	2.48E-12	2.48E-12	0%	5.64E-10	5.64E-10	0%	4.56E-11	4.56E-11	0%	3.86E-10	3.86E-10	0%	5.00E-11	5.00E-11	0%
123478 - HxCDF	-	2.52E-12	2.52E-12	0%	5.73E-10	5.73E-10	0%	4.63E-11	4.63E-11	0%	3.92E-10	3.92E-10	0%	5.08E-11	5.08E-11	0%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	-	1.35E-12	1.35E-12	0%	3.08E-10	3.08E-10	0%	2.49E-11	2.49E-11	0%	2.11E-10	2.11E-10	0%	2.73E-11	2.73E-11	0%
234678 - HxCDF	-	5.23E-13	5.23E-13	0%	1.19E-10	1.19E-10	0%	9.62E-12	9.62E-12	0%	8.14E-11	8.14E-11	0%	1.06E-11	1.06E-11	0%
123789 - HxCDF	-	5.43E-14	5.43E-14	0%	1.24E-11	1.24E-11	0%	9.99E-13	9.99E-13	0%	8.46E-12	8.46E-12	0%	1.10E-12	1.10E-12	0%
1234678 - HpCDF	-	2.05E-12	2.05E-12	0%	4.68E-10	4.68E-10	0%	3.78E-11	3.78E-11	0%	3.20E-10	3.20E-10	0%	4.15E-11	4.15E-11	0%
1234789 - HpCDF	-	2.32E-13	2.32E-13	0%	5.28E-11	5.28E-11	0%	4.27E-12	4.27E-12	0%	3.61E-11	3.61E-11	0%	4.69E-12	4.69E-12	0%
1,2,3,4,6,7,8,9-Octa CDF	-	2.13E-13	2.13E-13	0%	4.85E-11	4.85E-11	0%	3.92E-12	3.92E-12	0%	3.31E-11	3.31E-11	0%	4.30E-12	4.30E-12	0%
Total PCDDs (TEQ)	0.0000001	4.90E-13	4.90E-13	0%	1.12E-10	1.12E-10	0%	9.01E-12	9.01E-12	0%	7.63E-11	7.63E-11	0%	9.90E-12	9.90E-12	0%
Total PCDFs (TEQ)	0.0000001	1.53E-12	1.53E-12	0%	3.48E-10	3.48E-10	0%	2.81E-11	2.81E-11	0%	2.38E-10	2.38E-10	0%	3.09E-11	3.09E-11	0%
Total PCDDs + PCDFs	-	5.10E-11	5.10E-11	0%	1.16E-08	1.16E-08	0%	9.39E-10	9.39E-10	0%	7.94E-09	7.94E-09	0%	1.03E-09	1.03E-09	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 24-hour (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																			
Carbon monoxide	7,000	1.08E+01	4.26E+01	295%	4.10E+01	7.80E+01	90%	1.34E+00	2.59E+00	94%	3.85E+00	4.71E+00	22%	3.61E+00	4.45E+00	23%	5.61E+02	1.58E+03	181%
Carbon monoxide (8 hour)	6,000	2.34E+01	4.44E+01		7.12E+01	1.59E+02		2.74E+00	5.95E+00		5.64E+00	6.73E+00		5.86E+00	6.98E+00		9.82E+02	1.95E+03	
Nitrogen dioxide	200	2.24E+01	5.80E+01	159%	4.99E+01	7.38E+01	48%	3.90E+00	5.01E+00	28%	1.16E+01	1.28E+01	11%	1.08E+01	1.20E+01	11%	1.40E+02	3.21E+02	129%
Sulphur dioxide	20	5.52E-02	7.02E-02	27%	1.27E-01	1.80E-01	42%	4.58E-03	5.77E-03	26%	1.91E-01	1.50E-02	-92%	1.25E-02	1.38E-02	11%	5.91E+00	5.91E+00	0%
Total Suspended Particulates (TSP)	120	7.53E+00	1.17E+01	55%	1.39E+02	6.52E+01	-53%	3.42E+00	3.80E+00	11%	3.44E+00	3.47E+00	1%	3.38E+00	3.50E+00	3%	1.10E+03	4.30E+03	292%
PM _{2.5}	25	7.75E+00	8.68E+00	12%	2.50E+01	2.06E+01	-18%	2.69E+00	2.78E+00	3%	2.60E+00	2.73E+00	5%	2.57E+00	2.70E+00	5%	9.37E+01	3.22E+02	244%
PM ₁₀	50	9.50E+00	1.37E+01	45%	1.30E+02	7.43E+01	-43%	3.17E+00	3.84E+00	21%	3.22E+00	3.43E+00	6%	3.17E+00	3.38E+00	6%	5.79E+02	1.54E+03	165%
Metals																			
Aluminum	120	2.81E-01	5.39E-01	92%	8.62E+00	3.93E+00	-54%	1.84E-02	4.22E-02	129%	1.97E-02	2.15E-02	9%	1.66E-02	2.23E-02	35%	6.96E+01	2.71E+02	289%
Antimony	25	5.13E-07	1.50E-05	2820%	2.39E-04	1.09E-04	-54%	5.13E-07	1.17E-06	129%	5.49E-07	5.99E-07	9%	4.63E-07	6.22E-07	34%	1.93E-03	7.51E-03	288%
Arsenic	0.3	4.79E-06	6.30E-05	1214%	1.02E-03	4.57E-04	-55%	4.79E-06	6.28E-06	31%	1.09E-05	1.12E-05	3%	9.74E-06	9.99E-06	3%	8.09E-03	3.14E-02	288%
Barium	10	1.62E-04	4.47E-03	2654%	7.05E-02	3.23E-02	-54%	1.62E-04	3.61E-04	122%	1.78E-04	1.87E-04	5%	1.51E-04	2.01E-04	33%	5.69E-01	2.21E+00	288%
Beryllium	0.01	3.00E-06	2.82E-05	842%	2.57E-04	1.11E-04	-57%	3.00E-06	3.24E-06	8%	7.75E-06	7.80E-06	1%	6.93E-06	6.98E-06	1%	1.96E-03	7.62E-03	288%
Cadmium	0.03	5.90E-05	8.92E-04	1413%	1.25E-03	2.85E-03	128%	5.90E-05	8.40E-05	42%	1.59E-04	1.86E-04	17%	1.48E-04	1.75E-04	18%	1.69E-02	5.68E-02	237%
Chromium (VI) ^(b)	0.39	6.33E-05	1.44E-03	2167%	2.21E-02	1.05E-02	-52%	6.33E-05	1.31E-04	107%	6.81E-05	7.27E-05	7%	5.84E-05	7.89E-05	35%	1.77E-01	6.94E-01	291%
Chromium (III) ^(b)	0.5	6.33E-05	1.44E-03	2167%	2.21E-02	1.05E-02	-52%	6.33E-05	1.31E-04	107%	6.81E-05	7.27E-05	7%	5.84E-05	7.89E-05	35%	1.77E-01	6.94E-01	291%
Cobalt	0.1	1.11E-05	1.53E-04	1278%	9.04E-04	7.17E-04	-21%	1.11E-05	1.66E-05	49%	2.66E-05	3.15E-05	19%	2.46E-05	2.95E-05	20%	6.73E-03	3.13E-02	366%
Copper	50	1.76E-05	1.75E-04	892%	2.39E-03	1.37E-03	-43%	1.76E-05	2.44E-05	38%	4.21E-05	4.74E-05	13%	3.85E-05	4.37E-05	13%	1.85E-02	7.70E-02	317%
Iron	4	4.76E-03	1.30E-01	2630%	2.05E+00	9.40E-01	-54%	4.76E-03	1.06E-02	122%	5.25E-03	5.48E-03	4%	4.45E-03	5.93E-03	33%	1.65E+01	6.41E+01	289%
Lead	0.5	1.98E-05	1.68E-04	748%	2.22E-03	1.28E-03	-42%	1.98E-05	2.63E-05	32%	4.93E-05	5.45E-05	11%	4.50E-05	5.01E-05	11%	1.70E-02	7.13E-02	319%
Manganese	0.1	8.26E-05	2.01E-03	2329%	3.13E-02	1.47E-02	-53%	8.26E-05	1.75E-04	112%	8.72E-05	9.02E-05	3%	7.44E-05	1.01E-04	36%	2.52E-01	9.84E-01	291%
Mercury	2	3.53E-06	3.32E-05	841%	4.84E-04	2.15E-04	-56%	3.53E-06	4.05E-06	15%	8.76E-06	8.90E-06	2%	7.85E-06	7.97E-06	2%	3.78E-03	1.47E-02	288%
Molybdenum	120	3.99E-07	1.12E-05	2700%	1.77E-04	8.08E-05	-54%	3.99E-07	8.95E-07	124%	4.37E-07	4.62E-07	6%	3.70E-07	4.94E-07	34%	1.43E-03	5.54E-03	288%
Nickel	0.1	2.39E-05	3.47E-04	1354%	2.99E-03	2.06E-03	-31%	2.39E-05	3.36E-05	41%	2.84E-05	3.11E-05	10%	2.32E-05	2.77E-05	20%	2.28E-02	1.45E-01	537%
Selenium	10	1.38E-05	1.40E-04	915%	2.70E-04	2.63E-04	-3%	1.38E-05	1.38E-05	0%	3.80E-05	3.80E-05	0%	3.41E-05	3.40E-05	0%	4.87E-03	4.87E-03	0%
Silver	1	9.38E-06	1.48E-04	1484%	2.10E-04	4.76E-04	127%	9.38E-06	1.36E-05	45%	2.51E-05	2.98E-05	18%	2.34E-05	2.80E-05	20%	2.83E-03	9.70E-03	243%
Strontium	120	1.03E-04	2.88E-03	2694%	4.55E-02	2.08E-02	-54%	1.03E-04	2.31E-04	124%	1.13E-04	1.19E-04	6%	9.57E-05	1.28E-04	33%	3.68E-01	1.43E+00	288%
Tellurium	10	2.78E-08	7.97E-07	2763%	1.27E-05	5.79E-06	-54%	2.78E-08	6.31E-08	127%	3.01E-08	3.24E-08	8%	2.55E-08	3.41E-08	34%	1.02E-04	3.98E-04	288%
Thallium	-	3.53E-07	1.04E-05	2839%	1.66E-04	7.56E-05	-55%	3.53E-07	8.10E-07	129%	3.77E-07	4.13E-07	10%	3.18E-07	4.27E-07	35%	1.34E-03	5.21E-03	288%
Titanium	120	4.09E-04	1.18E-02	2776%	1.88E-01	8.55E-02	-54%	4.09E-04	9.30E-04	127%	4.42E-04	4.77E-04	8%	3.73E-04	5.01E-04	34%	1.51E+00	5.88E+00	288%
Tungsten	-	1.20E-06	3.50E-05	2826%	5.59E-04	2.54E-04	-54%	1.20E-06	2.73E-06	129%	1.28E-06	1.40E-06	9%	1.08E-06	1.45E-06	34%	4.52E-03	1.75E-02	288%
Uranium	0.15	1.48E-06	4.30E-05	2797%	6.86E-04	3.13E-04	-54%	1.48E-06	3.38E-06	128%	1.60E-06	1.73E-06	8%	1.35E-06	1.81E-06	34%	5.54E-03	2.15E-02	288%
Vanadium	1	9.80E-06	2.72E-04	2672%	4.29E-03	1.97E-03	-54%	9.80E-06	2.19E-05	123%	1.08E-05	1.13E-05	5%	9.12E-06	1.22E-05	33%	3.46E-02	1.34E-01	288%
Zinc	120	7.61E-05	1.08E-03	1315%	6.99E-03	5.23E-03	-25%	7.61E-05	1.13E-04	48%	1.90E-04	2.24E-04	18%	1.77E-04	2.10E-04	19%	5.25E-02	2.40E-01	358%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																			
1-Methylnaphthalene	-	2.14E-04	1.82E-03	750%	1.44E-03	4.06E-03	181%	2.56E-05	1.26E-04	393%	3.06E-05	6.90E-05	126%	2.63E-05	6.54E-05	149%	7.33E-03	6.27E-02	756%
1-Methylphenanthrene	-	9.62E-06	8.18E-05	750%	6.49E-05	1.82E-04	181%	1.15E-06	5.67E-06	393%	1.37E-06	3.10E-06	126%	1.18E-06	2.94E-06	149%	3.30E-04	2.82E-03	756%
2-Methylantracene	-	5.88E-06	5.00E-05	750%	3.97E-05	1.12E-04	181%	7.04E-07	3.47E-06	393%	8.41E-07	1.90E-06	126%	7.24E-07	1.80E-06	149%	2.02E-04	1.73E-03	756%
2-Methylfluorene	-	1.98E-07	1.69E-06	750%	1.34E-06	3.77E-06	181%	2.37E-08	1.17E-07	393%	2.84E-08	6.40E-08	126%	2.44E-08	6.07E-08	149%	6.80E-06	5.82E-05	756%
2-methylnaphthalene	-	3.46E-04	2.94E-03	750%	2.33E-03	6.56E-03	181%	4.14E-05	2.04E-04	393%	4.94E-05	1.12E-04	126%	4.25E-05	1.06E-04	149%	1.19E-02	1.01E-01	756%
2-Methylphenanthrene	-	2.38E-05	2.02E-04	750%	1.60E-04	4.51E-04	181%	2.84E-06	1.40E-05	393%	3.40E-06	7.67E-06	126%	2.92E-06	7.26E-06	149%	8.15E-04	6.97E-03	756%
2-Methylpyrene	-	1.76E-06	1.50E-05	750%	1.19E-05	3.34E-05	181%	2.11E-07	1.04E-06	393%	2.52E-07	5.68E-07	126%	2.17E-07	5.38E-07	149%	6.04E-05	5.16E-04	756%
3-Methyldibenzothiophene	-	3.64E-07	3.09E-06	750%	2.46E-06	6.90E-06	181%	4.35E-08	2.14E-07	393%	5.20E-08	1.17E-07	126%	4.47E-08	1.11E-07	149%	1.25E-05	1.07E-04	756%
3-Methylphenanthrene	-	1.71E-05	1.46E-04	750%	1.16E-04	3.25E-04	181%	2.05E-06	1.01E-05	393%	2.45E-06	5.53E-06	126%	2.11E-06	5.24E-06	149%	5.88E-04	5.03E-03	756%
4-+9-Methylphenanthrene	-	1.30E-05	1.10E-04	750%	8.75E-05	2.46E-04	181%	1.55E-06	7.64E-06	393%	1.85E-06	4.18E-06	126%	1.59E-06	3.96E-06	149%	4.44E-04	3.80E-03	756%
4-Methyldibenzothiophene	-	2.32E-07	1.97E-06	750%	1.56E-06	4.39E-06	181%	2.77E-08	1.37E-07	393%	3.31E-08	7.47E-08	126%	2.85E-08	7.08E-08	149%	7.94E-06	6.79E-05	756%
9-Methylphenanthrene	-	6.96E-08	6.96E-08	0%	1.10E-07	1.10E-07	0%	1.12E-08	1.12E-08	0%	2.13E-08	2.13E-08	0%	2.01E-08	2.01E-08	0%	1.19E-05	1.19E-05	0%
Acenaphthene	-	2.58E-05	9.33E-05	262%	7.58E-05	2.08E-04	174%	5.73E-06	7.35E-06	28%	1.60E-05	1.80E-05	12%	1.51E-05	1.71E-05	13%	8.66E-04	3.20E-03	270%
Acenaphthylene	-	6.05E-05	3.38E-04	458%	2.68E-04	7.53E-04	180%	1.19E-05	2.34E-05	96%	3.33E-05	4.05E-05	22%	3.13E-05	3.86E-05	23%	1.75E-03	1.16E-02	565%
Acephenanthrylene	-	6.79E-06	5.77E-05	750%	4.58E-05	1.29E-04	181%	8.12E-07	4.00E-06	393%	9.70E-07	2.19E-06	126%	8.35E-07	2.08E-06	149%	2.33E-04	1.99E-03	756%
Anthracene	-	9.74E-06	6.02E-05	518%	4.79E-05	1.34E-04	180%	1.68E-06	4.18E-06	149%	4.68E-06	5.98E-06	28%	4.41E-06	5.70E-06	29%	2.42E-04	2.07E-03	756%
Benz(a)anthracene	-	3.63E-06	1.44E-05	297%	1.18E-05	3.22E-05	173%	7.80E-07	1.03E-06	32%	2.19E-06	2.49E-06	14%	2.05E-06	2.36E-06	15%	1.17E-04	4.95E-04	321%
Benzo(a)fluorene	-	2.14E-06	1.82E-05	750%	1.44E-05	4.05E-05	181%	2.56E-07	1.26E-06	393%	3.05E-07	6.89E-07	126%	2.63E-07	6.53E-07	149%	7.32E-05	6.26E-04	756%
Benzo(a)pyrene	-	1.58E-06	7.95E-06	404%	6.32E-06	1.77E-05	180%	3.24E-07	5.51E-07	70%	9.05E-07	1.08E-06	19%	8.51E-07	1.02E-06	20%	4.79E-05	2.74E-04	472%
Benzo(b)fluoranthene	-	1.03E-05	6.68E-05	547%	5.32E-05	1.49E-04	180%	1.59E-06	4.65E-06	192%	4.44E-06	5.87E-06	32%	4.19E-06	5.62E-06	34%	2.69E-04	2.30E-03	756%
Benzo(e)pyrene	-	1.75E-07	1.15E-06	558%	9.32E-07	2.56E-06	175%	2.26E-08	8.21E-08	264%	2.61E-08	4.99E-08	91%	2.30E-08	4.72E-08	105%	7.51E-06	3.88E-05	416%
Benzo(g,h,i)fluoranthene	-	3.29E-06	2.80E-05	750%	2.22E-05	6.25E-05	181%	3.94E-07	1.94E-06	393%	4.71E-07	1.06E-06	126%	4.05E-07	1.01E-06	149%	1.13E-04	9.66E-04	756%
Benzo(g,h,i)perylene	-	3.63E-06	1.83E-05	405%	1.48E-05	4.08E-05	176%	7.23E-07	1.29E-06	79%	2.03E-06	2.42E-06	19%	1.91E-06	2.30E-06	21%	1.07E-04	6.28E-04	484%
Benzo(k)fluoranthene	-	1.40E-06	7.59E-06	442%	6.03E-06	1.69E-05	180%	2.80E-07	5.25E-07	88%	7.80E-07	9.43E-07	21%	7.34E-07	8.97E-07	22%	4.11E-05	2.61E-04	536%
Biphenyl	-	2.94E-07	2.94E-07	0%	4.65E-07	4.65E-07	0%	4.70E-08	4.70E-08	0%	9.00E-08	9.00E-08	0%	8.47E-08	8.47E-08	0%	5.03E-05	5.03E-05	0%
Chrysene	-	7.33E-06	1.63E-05	122%	1.66E-05	3.61E-05	118%	1.78E-06	2.06E-06	16%	4.97E-06	5.32E-06	7%	4.66E-06	5.01E-06	7%	2.72E-04	5.56E-04	104%
Coronene	-	1.65E-08	1.41E-07	750%	1.12E-07	3.14E-07	181%	1.98E-09	9.75E-09	393%	2.36E-09	5.33E-09	126%	2.03E-09	5.05E-09	149%	5.67E-07	4.85E-06	756%
Cyclopenta(c,d)pyrene	-	1.17E-06	9.91E-06	750%	7.87E-06	2.21E-05	181%	1.39E-07	6.87E-07	393%	1.67E-07	3.76E-07	126%	1.43E-07	3.56E-07	149%	4.00E-05	3.42E-04	756%
Dibenzo(a,h)anthracene	-	3.27E-06	2.09E-05	538%	1.67E-05	4.65E-05	179%	5.01E-07	1.46E-06	191%	1.40E-06	1.85E-06	32%	1.32E-06	1.76E-06	34%	8.40E-05	7.18E-04	756%
Dibenzothiophene	-	1.41E-07	1.20E-06	750%	9.50E-07	2.67E-06	181%	1.68E-08	8.30E-08	393%	2.01E-08	4.54E-08	126%	1.73E-08	4.30E-08	149%	4.83E-06	4.13E-05	756%
Fluoranthene	-	3.90E-05	2.56E-04	555%	2.04E-04	5.70E-04	180%	5.85E-06	1.78E-05	204%	1.63E-05	2.18E-05	34%	1.54E-05	2.09E-05	36%	1.03E-03	8.80E-03	756%
Fluorene	-	8.50E-05	4.81E-04	465%	3.82E-04	1.07E-03	180%	1.66E-05	3.33E-05	100%	4.64E-05	5.67E-05	22%	4.37E-05	5.40E-05	24%	2.44E-03	1.66E-02	580%
Indeno(1,2,3-cd)fluoranthene	-	8.27E-08	7.03E-07	750%	5.58E-07	1.57E-06	181%	9.89E-09	4.87E-08	393%	1.18E-08	2.67E-08	126%	1.02E-08	2.53E-08	149%	2.83E-06	2.42E-05	756%
Indeno(1,2,3-cd)pyrene	-	1.96E-06	1.96E-06	0%	3.92E-06	3.92E-06	0%	4.64E-07	4.64E-07	0%	1.30E-06	1.30E-06	0%	1.22E-06	1.22E-06	0%	7.26E-05	7.26E-05	0%
Indeno(1,2,3-W)pyrene	-	1.49E-06	1.26E-05	750%	1.00E-05	2.82E-05	181%	1.78E-07	8.76E-07	393%	2.12E-07	4.79E-07	126%	1.83E-07	4.54E-07	149%	5.09E-05	4.36E-04	756%
Naphthalene	-	1.18E-03	7.22E-03	510%	5.82E-03	1.61E-02	177%	1.88E-04	5.10E-04	172%	5.24E-04	6.79E-04	29%	4.93E-04	6.48E-04	31%	2.90E-02	2.48E-01	756%

**Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	-	1.32E-06	1.12E-05	750%	8.92E-06	2.51E-05	181%	1.58E-07	7.79E-07	393%	1.89E-07	4.26E-07	126%	1.63E-07	4.04E-07	149%	4.53E-05	3.88E-04	756%
Perylene	-	1.65E-08	1.41E-07	750%	1.12E-07	3.14E-07	181%	1.98E-09	9.75E-09	393%	2.36E-09	5.33E-09	126%	2.03E-09	5.05E-09	149%	5.67E-07	4.85E-06	756%
Phenanthrene	-	1.94E-04	4.50E-04	132%	4.42E-04	1.00E-03	127%	4.71E-05	5.49E-05	17%	1.32E-04	1.41E-04	7%	1.24E-04	1.33E-04	8%	7.21E-03	1.55E-02	114%
Picene	-	1.65E-08	1.41E-07	750%	1.12E-07	3.14E-07	181%	1.98E-09	9.75E-09	393%	2.36E-09	5.33E-09	126%	2.03E-09	5.05E-09	149%	5.67E-07	4.85E-06	756%
Pyrene	-	4.88E-05	3.47E-04	610%	2.76E-04	7.72E-04	180%	6.00E-06	2.41E-05	302%	1.67E-05	2.42E-05	44%	1.58E-05	2.32E-05	47%	1.39E-03	1.19E-02	756%
Volatile Organic Compounds																			
Methacrolein	-	2.44E-02	1.35E-01	454%	1.24E-01	2.55E-01	106%	2.59E-03	9.99E-03	286%	3.73E-03	6.21E-03	66%	3.20E-03	5.86E-03	83%	3.46E+00	4.77E+00	38%
Acrolein	-	2.08E-02	1.15E-01	454%	1.06E-01	2.17E-01	105%	2.20E-03	8.50E-03	286%	3.17E-03	5.28E-03	66%	2.75E-03	5.01E-03	82%	2.94E+00	4.05E+00	38%
Benzaldehyde	-	2.32E-02	1.29E-01	454%	1.18E-01	2.43E-01	106%	2.46E-03	9.49E-03	286%	3.54E-03	5.90E-03	66%	3.04E-03	5.57E-03	83%	3.29E+00	4.53E+00	38%
2,5-dimethylbenzaldehyde	-	2.50E-02	1.39E-01	454%	1.27E-01	2.62E-01	106%	2.65E-03	1.02E-02	286%	3.82E-03	6.36E-03	66%	3.28E-03	6.01E-03	83%	3.55E+00	4.88E+00	38%
Butanal (Butyraldehyde)	-	7.94E-03	4.40E-02	454%	4.04E-02	8.30E-02	106%	8.41E-04	3.25E-03	286%	1.21E-03	2.02E-03	66%	1.04E-03	1.91E-03	83%	1.12E+00	1.55E+00	38%
Formaldehyde	50	1.39E-01	7.56E-01	444%	6.97E-01	1.43E+00	104%	1.48E-02	5.63E-02	281%	2.15E-02	3.53E-02	64%	1.89E-02	3.38E-02	78%	1.93E+01	2.66E+01	38%
Acetaldehyde	500	2.55E-01	1.42E+00	454%	1.30E+00	2.67E+00	106%	2.71E-02	1.04E-01	286%	3.90E-02	6.49E-02	66%	3.35E-02	6.14E-02	83%	3.62E+01	4.98E+01	38%
Propanal	500	8.55E-02	4.74E-01	454%	4.35E-01	8.94E-01	106%	9.06E-03	3.50E-02	286%	1.30E-02	2.17E-02	66%	1.12E-02	2.05E-02	83%	1.21E+01	1.67E+01	38%
Crotonaldehyde	-	8.19E-02	4.54E-01	454%	4.16E-01	8.55E-01	106%	8.67E-03	3.35E-02	286%	1.25E-02	2.08E-02	66%	1.07E-02	1.96E-02	83%	1.16E+01	1.60E+01	38%
Hexanal	-	1.34E-02	7.45E-02	454%	6.83E-02	1.40E-01	106%	1.42E-03	5.50E-03	286%	2.05E-03	3.41E-03	66%	1.76E-03	3.23E-03	83%	1.90E+00	2.62E+00	38%
Heptanal	-	1.96E-02	1.08E-01	454%	9.94E-02	2.04E-01	106%	2.07E-03	8.00E-03	286%	2.98E-03	4.96E-03	66%	2.56E-03	4.69E-03	83%	2.77E+00	3.81E+00	38%
Octanal	-	1.89E-02	1.05E-01	454%	9.63E-02	1.98E-01	106%	2.01E-03	7.75E-03	286%	2.89E-03	4.81E-03	66%	2.48E-03	4.54E-03	83%	2.68E+00	3.69E+00	38%
Nonanal	-	2.69E-02	1.49E-01	454%	1.37E-01	2.81E-01	106%	2.85E-03	1.10E-02	286%	4.10E-03	6.83E-03	66%	3.52E-03	6.45E-03	83%	3.81E+00	5.24E+00	38%
Decanal	-	1.71E-02	9.48E-02	454%	8.70E-02	1.79E-01	106%	1.81E-03	7.00E-03	286%	2.61E-03	4.34E-03	66%	2.24E-03	4.10E-03	83%	2.42E+00	3.34E+00	38%
Undecanal	-	1.59E-02	8.81E-02	454%	8.07E-02	1.66E-01	106%	1.68E-03	6.50E-03	286%	2.42E-03	4.03E-03	66%	2.08E-03	3.81E-03	83%	2.25E+00	3.10E+00	38%
Dodecanal	-	7.33E-03	4.06E-02	454%	3.73E-02	7.66E-02	106%	7.77E-04	3.00E-03	286%	1.12E-03	1.86E-03	66%	9.60E-04	1.76E-03	83%	1.04E+00	1.43E+00	38%
Tridecanal	-	1.22E-02	6.77E-02	454%	6.21E-02	1.28E-01	106%	1.29E-03	5.00E-03	286%	1.86E-03	3.10E-03	66%	1.60E-03	2.93E-03	83%	1.73E+00	2.38E+00	38%
1,2,4-Trimethylbenzene	220	5.38E-03	2.98E-02	454%	2.73E-02	5.62E-02	106%	5.70E-04	2.20E-03	286%	8.20E-04	1.37E-03	66%	7.04E-04	1.29E-03	83%	7.61E-01	1.05E+00	38%
1,3,5-Trimethylbenzene	220	1.59E-03	8.81E-03	454%	8.07E-03	1.66E-02	106%	1.68E-04	6.50E-04	286%	2.42E-04	4.03E-04	66%	2.08E-04	3.81E-04	83%	2.25E-01	3.10E-01	38%
Benzene	29	1.92E-02	9.31E-02	384%	8.77E-02	1.76E-01	101%	1.88E-03	6.96E-03	270%	4.85E-03	6.70E-03	38%	4.57E-03	6.40E-03	40%	2.38E+00	3.26E+00	37%
Ethylbenzene	21,710	2.88E-03	1.59E-02	453%	1.46E-02	3.00E-02	105%	3.06E-04	1.18E-03	284%	4.41E-04	7.32E-04	66%	3.79E-04	6.92E-04	83%	4.07E-01	5.60E-01	38%
Propylbenzene	-	6.11E-04	3.39E-03	454%	3.11E-03	6.38E-03	106%	6.47E-05	2.50E-04	286%	9.32E-05	1.55E-04	66%	8.00E-05	1.47E-04	83%	8.65E-02	1.19E-01	38%
Indanone	-	4.25E-04	2.35E-03	454%	2.16E-03	4.44E-03	106%	4.50E-05	1.74E-04	286%	6.48E-05	1.08E-04	66%	5.56E-05	1.02E-04	83%	6.01E-02	8.28E-02	38%
Toluene	3,800	2.57E-02	1.35E-01	425%	1.25E-01	2.55E-01	103%	2.69E-03	1.01E-02	275%	4.47E-03	7.15E-03	60%	4.21E-03	6.86E-03	63%	3.45E+00	4.74E+00	38%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	-	1.28E-03	7.11E-03	454%	6.52E-03	1.34E-02	106%	1.36E-04	5.25E-04	286%	1.96E-04	3.26E-04	66%	1.68E-04	3.08E-04	83%	1.82E-01	2.50E-01	38%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	-	3.18E-03	1.76E-02	454%	1.61E-02	3.32E-02	106%	3.37E-04	1.30E-03	286%	4.85E-04	8.07E-04	66%	4.16E-04	7.62E-04	83%	4.50E-01	6.19E-01	38%
Acetone	11,880	1.34E-01	7.45E-01	454%	6.83E-01	1.40E+00	106%	1.42E-02	5.50E-02	286%	2.05E-02	3.41E-02	66%	1.76E-02	3.23E-02	83%	1.90E+01	2.62E+01	38%
Acetophenone	-	3.12E-02	1.73E-01	454%	1.58E-01	3.26E-01	106%	3.30E-03	1.27E-02	286%	4.75E-03	7.91E-03	66%	4.08E-03	7.48E-03	83%	4.41E+00	6.08E+00	38%
Methyl Ethyl Ketone	1,000	4.58E-02	2.54E-01	454%	2.33E-01	4.79E-01	106%	4.85E-03	1.87E-02	286%	6.99E-03	1.16E-02	66%	6.00E-03	1.10E-02	83%	6.49E+00	8.93E+00	38%
Xylene	730	1.49E-02	7.90E-02	431%	7.30E-02	1.49E-01	104%	1.54E-03	5.85E-03	280%	2.60E-03	4.17E-03	60%	2.46E-03	4.01E-03	63%	2.02E+00	2.78E+00	38%
o-Xylene	730	5.08E-03	2.81E-02	454%	2.58E-02	5.30E-02	105%	5.38E-04	2.08E-03	286%	7.76E-04	1.29E-03	66%	6.67E-04	1.22E-03	83%	7.18E-01	9.89E-01	38%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	-	5.23E-02	2.90E-01	454%	2.66E-01	5.46E-01	106%	5.54E-03	2.14E-02	286%	7.98E-03	1.33E-02	66%	6.85E-03	1.25E-02	83%	7.40E+00	1.02E+01	38%
1,1,1-Trichloroethane (Methyl chloroform)	115,000	2.65E-05	2.65E-05	0%	6.03E-05	6.03E-05	0%	3.79E-06	3.75E-06	-1%	6.70E-06	6.68E-06	0%	6.04E-06	6.02E-06	0%	8.07E-04	8.07E-04	0%
Butane	-	2.34E-02	1.30E-01	454%	1.19E-01	2.44E-01	106%	2.48E-03	9.57E-03	286%	3.57E-03	5.94E-03	66%	3.07E-03	5.61E-03	83%	3.31E+00	4.56E+00	38%
2,2-Dimethylbutane	-	1.89E-03	1.05E-02	454%	9.63E-03	1.98E-02	106%	2.01E-04	7.75E-04	286%	2.89E-04	4.81E-04	66%	2.48E-04	4.54E-04	83%	2.68E-01	3.69E-01	38%
2,3-Dimethylbutane	-	3.48E-03	1.93E-02	454%	1.77E-02	3.64E-02	106%	3.69E-04	1.42E-03	286%	5.31E-04	8.84E-04	66%	4.56E-04	8.36E-04	83%	4.93E-01	6.79E-01	38%
Isobutene	-	6.96E-03	3.86E-02	454%	3.54E-02	7.28E-02	106%	7.38E-04	2.85E-03	286%	1.06E-03	1.77E-03	66%	9.12E-04	1.67E-03	83%	9.86E-01	1.36E+00	38%
cis-2-Butene	-	1.59E-03	8.81E-03	454%	8.07E-03	1.66E-02	106%	1.68E-04	6.50E-04	286%	2.42E-04	4.03E-04	66%	2.08E-04	3.81E-04	83%	2.25E-01	3.10E-01	38%
trans-2-Butene	-	3.18E-03	1.76E-02	454%	1.61E-02	3.32E-02	106%	3.37E-04	1.30E-03	286%	4.85E-04	8.07E-04	66%	4.16E-04	7.62E-04	83%	4.50E-01	6.19E-01	38%
2-Methyl-1-butene	-	1.59E-03	8.81E-03	454%	8.07E-03	1.66E-02	106%	1.68E-04	6.50E-04	286%	2.42E-04	4.03E-04	66%	2.08E-04	3.81E-04	83%	2.25E-01	3.10E-01	38%
3-Methyl-1-butene	-	9.78E-04	5.42E-03	454%	4.97E-03	1.02E-02	106%	1.04E-04	4.00E-04	286%	1.49E-04	2.48E-04	66%	1.28E-04	2.35E-04	83%	1.38E-01	1.91E-01	38%
1,3-Butadiene	950	1.89E-03	1.05E-02	454%	9.63E-03	1.98E-02	106%	2.01E-04	7.75E-04	286%	2.89E-04	4.81E-04	66%	2.48E-04	4.54E-04	83%	2.68E-01	3.69E-01	38%
Cyclopentane	-	2.50E-03	1.39E-02	454%	1.27E-02	2.62E-02	106%	2.65E-04	1.02E-03	286%	3.82E-04	6.36E-04	66%	3.28E-04	6.01E-04	83%	3.55E-01	4.88E-01	38%
Methylcyclopentane	-	3.79E-03	2.10E-02	454%	1.93E-02	3.96E-02	106%	4.01E-04	1.55E-03	286%	5.78E-04	9.62E-04	66%	4.96E-04	9.09E-04	83%	5.36E-01	7.39E-01	38%
Pentane	-	1.14E-02	6.30E-02	454%	5.78E-02	1.19E-01	106%	1.20E-03	4.65E-03	286%	1.73E-03	2.89E-03	66%	1.49E-03	2.73E-03	83%	1.61E+00	2.22E+00	38%
Isopentane	-	1.67E-02	9.28E-02	454%	8.51E-02	1.75E-01	106%	1.77E-03	6.85E-03	286%	2.55E-03	4.25E-03	66%	2.19E-03	4.02E-03	83%	2.37E+00	3.26E+00	38%
2-Methylpentane	-	5.68E-03	3.15E-02	454%	2.89E-02	5.94E-02	106%	6.02E-04	2.32E-03	286%	8.67E-04	1.44E-03	66%	7.44E-04	1.36E-03	83%	8.04E-01	1.11E+00	38%
3-Methylpentane	-	4.09E-03	2.27E-02	454%	2.08E-02	4.28E-02	106%	4.34E-04	1.67E-03	286%	6.24E-04	1.04E-03	66%	5.36E-04	9.82E-04	83%	5.79E-01	7.98E-01	38%
2,3-Dimethylpentane	-	4.40E-03	2.44E-02	454%	2.24E-02	4.60E-02	106%	4.66E-04	1.80E-03	286%	6.71E-04	1.12E-03	66%	5.76E-04	1.06E-03	83%	6.23E-01	8.58E-01	38%
2,4-Dimethylpentane	-	2.50E-03	1.39E-02	454%	1.27E-02	2.62E-02	106%	2.65E-04	1.02E-03	286%	3.82E-04	6.36E-04	66%	3.28E-04	6.01E-04	83%	3.55E-01	4.88E-01	38%
2,2,4-Trimethylpentane	-	7.58E-03	4.20E-02	454%	3.85E-02	7.91E-02	106%	8.03E-04	3.10E-03	286%	1.16E-03	1.92E-03	66%	9.92E-04	1.82E-03	83%	1.07E+00	1.48E+00	38%
2,3,4-Trimethylpentane	-	1.89E-03	1.05E-02	454%	9.63E-03	1.98E-02	106%	2.01E-04	7.75E-04	286%	2.89E-04	4.81E-04	66%	2.48E-04	4.54E-04	83%	2.68E-01	3.69E-01	38%
2-Methyl-2-pentene	-	1.28E-03	7.11E-03	454%	6.52E-03	1.34E-02	106%	1.36E-04	5.25E-04	286%	1.96E-04	3.26E-04	66%	1.68E-04	3.08E-04	83%	1.82E-01	2.50E-01	38%
trans-2-Pentene	-	3.05E-04	1.69E-03	454%	1.55E-03	3.19E-03	106%	3.24E-05	1.25E-04	286%	4.66E-05	7.76E-05	66%	4.00E-05	7.33E-05	83%	4.32E-02	5.96E-02	38%
Cyclohexane	6,100	1.28E-03	7.11E-03	454%	6.52E-03	1.34E-02	106%	1.36E-04	5.25E-04	286%	1.96E-04	3.26E-04	66%	1.68E-04	3.08E-04	83%	1.82E-01	2.50E-01	38%
Methylcyclohexane	-	3.18E-03	1.76E-02	454%	1.61E-02	3.32E-02	106%	3.37E-04	1.30E-03	286%	4.85E-04	8.07E-04	66%	4.16E-04	7.62E-04	83%	4.50E-01	6.19E-01	38%
Pentylcyclohexane	-	5.13E-04	2.84E-03	454%	2.61E-03	5.36E-03	106%	5.43E-05	2.10E-04	286%	7.82E-05	1.30E-04	66%	6.72E-05	1.23E-04	83%	7.26E-02	9.99E-02	38%
Dodecylcyclohexane	-	1.03E-04	5.69E-04	454%	5.22E-04	1.07E-03	106%	1.09E-05	4.20E-05	286%	1.57E-05	2.61E-05	66%	1.34E-05	2.46E-05	83%	1.45E-02	2.00E-02	38%
Tridecylcyclohexane	-	1.01E-04	5.59E-04	454%	5.12E-04	1.05E-03	106%	1.07E-05	4.12E-05	286%	1.54E-05	2.56E-05	66%	1.32E-05	2.42E-05	83%	1.43E-02	1.97E-02	38%
Tetradecylcyclohexane	-	9.71E-05	5.38E-04	454%	4.94E-04	1.01E-03	106%	1.03E-05	3.97E-05	286%	1.48E-05	2.47E-05	66%	1.27E-05	2.33E-05	83%	1.38E-02	1.89E-02	38%
Pentadecylcyclohexane	-	7.82E-05	4.33E-04	454%	3.97E-04	8.17E-04	106%	8.28E-06	3.20E-05	286%	1.19E-05	1.99E-05	66%	1.02E-05	1.88E-05	83%	1.11E-02	1.52E-02	38%
2-Methylhexane	-	3.48E-03	1.93E-02	454%	1.77E-02	3.64E-02	106%	3.69E-04	1.42E-03	286%	5.31E-04	8.84E-04	66%	4.56E-04	8.36E-04	83%	4.93E-01	6.79E-01	38%
3-Methylhexane	-	1.89E-03	1.05E-02	454%	9.63E-03	1.98E-02	106%	2.01E-04	7.75E-04	286%	2.89E-04	4.81E-04	66%	2.48E-04	4.54E-04	83%	2.68E-01	3.69E-01	38%
3-Ethylhexane	-	1.28E-03	7.11E-03	454%	6.52E-03	1.34E-02	106%	1.36E-04	5.25E-04	286%	1.96E-04	3.26E-04	66%	1.68E-04	3.08E-04	83%	1.82E-01	2.50E-01	38%
2,3-Dimethylhexane	-	9.78E-04	5.42E-03	454%	4.97E-03	1.02E-02	106%	1.04E-04	4.00E-04	286%	1.49E-04	2.48E-04	66%	1.28E-04	2.35E-04	83%	1.38E-01	1.91E-01	38%
2,4-Dimethylhexane	-	3.05E-04	1.69E-03	454%	1.55E-03	3.19E-03	106%	3.24E-05	1.25E-04	286%	4.66E-05	7.76E-05	66%	4.00E-05	7.33E-05	83%	4.32E-02	5.96E-02	38%
2,5-Dimethylhexane	-	3.05E-04	1.69E-03	454%	1.55E-03	3.19E-03	106%	3.24E-05	1.25E-04	286%	4.66E-05	7.76E-05	66%	4.00E-05	7.33E-05	83%	4.32E-02	5.96E-02	38%
cis-2-Hexene	-	6.11E-04	3.39E-03	454%	3.11E-03	6.38E-03	106%	6.47E-05	2.50E-04	286%	9.32E-05	1.55E-04	66%	8.00E-05	1.47E-04	83%	8.65E-02	1.19E-01	38%

**Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B**

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	-	9.78E-04	5.42E-03	454%	4.97E-03	1.02E-02	106%	1.04E-04	4.00E-04	286%	1.49E-04	2.48E-04	66%	1.28E-04	2.35E-04	83%	1.38E-01	1.91E-01	38%
Heptane	11,000	2.87E-03	1.59E-02	454%	1.46E-02	3.00E-02	106%	3.04E-04	1.17E-03	286%	4.38E-04	7.29E-04	66%	3.76E-04	6.89E-04	83%	4.06E-01	5.60E-01	38%
2-Methylheptane	-	6.11E-04	3.39E-03	454%	3.11E-03	6.38E-03	106%	6.47E-05	2.50E-04	286%	9.32E-05	1.55E-04	66%	8.00E-05	1.47E-04	83%	8.65E-02	1.19E-01	38%
Octane	-	1.59E-03	8.81E-03	454%	8.07E-03	1.66E-02	106%	1.68E-04	6.50E-04	286%	2.42E-04	4.03E-04	66%	2.08E-04	3.81E-04	83%	2.25E-01	3.10E-01	38%
Nonane	-	9.78E-04	5.42E-03	454%	4.97E-03	1.02E-02	106%	1.04E-04	4.00E-04	286%	1.49E-04	2.48E-04	66%	1.28E-04	2.35E-04	83%	1.38E-01	1.91E-01	38%
Dodecane	-	3.07E-03	1.70E-02	454%	1.56E-02	3.21E-02	106%	3.26E-04	1.26E-03	286%	4.69E-04	7.80E-04	66%	4.03E-04	7.37E-04	83%	4.35E-01	5.99E-01	38%
Tridecane	-	2.91E-03	1.62E-02	454%	1.48E-02	3.04E-02	106%	3.09E-04	1.19E-03	286%	4.45E-04	7.40E-04	66%	3.82E-04	6.99E-04	83%	4.13E-01	5.68E-01	38%
Tetradecane	-	3.84E-03	2.13E-02	454%	1.95E-02	4.01E-02	106%	4.07E-04	1.57E-03	286%	5.86E-04	9.76E-04	66%	5.03E-04	9.22E-04	83%	5.44E-01	7.49E-01	38%
n-Pentadecane	-	2.43E-03	1.35E-02	454%	1.24E-02	2.54E-02	106%	2.58E-04	9.94E-04	286%	3.71E-04	6.17E-04	66%	3.19E-04	5.83E-04	83%	3.44E-01	4.74E-01	38%
Hexadecane	-	4.34E-03	2.41E-02	454%	2.21E-02	4.54E-02	106%	4.60E-04	1.78E-03	286%	6.63E-04	1.10E-03	66%	5.69E-04	1.04E-03	83%	6.15E-01	8.47E-01	38%
n-Heptadecane	-	3.75E-03	2.08E-02	454%	1.91E-02	3.92E-02	106%	3.97E-04	1.53E-03	286%	5.72E-04	9.53E-04	66%	4.91E-04	9.00E-04	83%	5.31E-01	7.31E-01	38%
n-Octadecane	-	3.67E-03	2.04E-02	454%	1.87E-02	3.84E-02	106%	3.89E-04	1.50E-03	286%	5.60E-04	9.32E-04	66%	4.81E-04	8.81E-04	83%	5.20E-01	7.16E-01	38%
n-Nonadecane	-	2.51E-03	1.39E-02	454%	1.28E-02	2.62E-02	106%	2.66E-04	1.03E-03	286%	3.83E-04	6.38E-04	66%	3.29E-04	6.03E-04	83%	3.55E-01	4.90E-01	38%
n-Eicosane	-	1.26E-03	6.98E-03	454%	6.40E-03	1.31E-02	106%	1.33E-04	5.15E-04	286%	1.92E-04	3.20E-04	66%	1.65E-04	3.02E-04	83%	1.78E-01	2.45E-01	38%
n-Heneicosane	-	4.02E-04	2.23E-03	454%	2.04E-03	4.20E-03	106%	4.26E-05	1.64E-04	286%	6.13E-05	1.02E-04	66%	5.27E-05	9.65E-05	83%	5.69E-02	7.84E-02	38%
Farnesane	-	2.65E-03	1.47E-02	454%	1.35E-02	2.77E-02	106%	2.81E-04	1.08E-03	286%	4.04E-04	6.73E-04	66%	3.47E-04	6.36E-04	83%	3.75E-01	5.17E-01	38%
Pristane	-	2.71E-03	1.50E-02	454%	1.38E-02	2.83E-02	106%	2.87E-04	1.11E-03	286%	4.13E-04	6.87E-04	66%	3.55E-04	6.49E-04	83%	3.83E-01	5.28E-01	38%
C ₂ -C ₆ aliphatic	6,100	1.88E-01	9.92E-01	429%	9.18E-01	1.87E+00	104%	1.93E-02	7.35E-02	281%	3.38E-02	5.35E-02	58%	3.19E-02	5.14E-02	61%	2.53E+01	3.49E+01	38%
>C ₆ -C ₈ aliphatic	11,000	3.29E-02	1.82E-01	454%	1.67E-01	3.43E-01	106%	3.48E-03	1.34E-02	286%	5.01E-03	8.35E-03	66%	4.31E-03	7.89E-03	83%	4.65E+00	6.41E+00	38%
>C ₈ -C ₁₀ aliphatic	-	9.78E-04	5.42E-03	454%	4.97E-03	1.02E-02	106%	1.04E-04	4.00E-04	286%	1.49E-04	2.48E-04	66%	1.28E-04	2.35E-04	83%	1.38E-01	1.91E-01	38%
>C ₁₀ -C ₁₂ aliphatic	-	3.68E-03	2.04E-02	454%	1.87E-02	3.84E-02	106%	3.89E-04	1.50E-03	286%	5.61E-04	9.34E-04	66%	4.82E-04	8.82E-04	83%	5.20E-01	7.17E-01	38%
>C ₁₂ -C ₁₆ aliphatic	-	2.11E-02	1.17E-01	454%	1.07E-01	2.21E-01	106%	2.24E-03	8.65E-03	286%	3.22E-03	5.37E-03	66%	2.77E-03	5.07E-03	83%	2.99E+00	4.12E+00	38%
>C ₁₆ -C ₂₁ aliphatic	-	2.10E-02	1.16E-01	454%	1.07E-01	2.19E-01	106%	2.22E-03	8.57E-03	286%	3.20E-03	5.32E-03	66%	2.75E-03	5.03E-03	83%	2.97E+00	4.09E+00	38%
C ₆ -C ₈ aromatic	29	4.78E-02	2.44E-01	410%	2.28E-01	4.61E-01	102%	4.88E-03	1.82E-02	273%	9.72E-03	1.46E-02	50%	9.17E-03	1.40E-02	52%	6.23E+00	8.57E+00	38%
>C ₈ -C ₁₀ aromatic	220	5.07E-03	2.81E-02	454%	2.58E-02	5.30E-02	106%	5.37E-04	2.07E-03	286%	7.73E-04	1.29E-03	66%	6.64E-04	1.22E-03	83%	7.18E-01	9.89E-01	38%
Dioxins and Furans^(a)																			
2378 - TCDD	-	9.56E-13	9.56E-13	0%	1.92E-12	1.92E-12	0%	1.72E-13	1.72E-13	0%	3.72E-13	3.72E-13	0%	3.99E-13	3.99E-13	0%	1.65E-10	1.65E-10	0%
12378 - PeCDD	-	1.55E-12	1.55E-12	0%	3.11E-12	3.11E-12	0%	2.79E-13	2.79E-13	0%	6.01E-13	6.01E-13	0%	6.46E-13	6.46E-13	0%	2.67E-10	2.67E-10	0%
123478 - HxCDD	-	3.37E-13	3.37E-13	0%	6.78E-13	6.78E-13	0%	6.09E-14	6.09E-14	0%	1.31E-13	1.31E-13	0%	1.41E-13	1.41E-13	0%	5.83E-11	5.83E-11	0%
123678 - HxCDD	-	9.00E-13	9.00E-13	0%	1.81E-12	1.81E-12	0%	1.62E-13	1.62E-13	0%	3.50E-13	3.50E-13	0%	3.76E-13	3.76E-13	0%	1.55E-10	1.55E-10	0%
123789 - HxCDD	-	1.38E-12	1.38E-12	0%	2.77E-12	2.77E-12	0%	2.49E-13	2.49E-13	0%	5.35E-13	5.35E-13	0%	5.76E-13	5.76E-13	0%	2.38E-10	2.38E-10	0%
1234678 - HpCDD	-	2.56E-12	2.56E-12	0%	5.14E-12	5.14E-12	0%	4.61E-13	4.61E-13	0%	9.93E-13	9.93E-13	0%	1.07E-12	1.07E-12	0%	4.41E-10	4.41E-10	0%
1,2,3,4,6,7,8,9-Octa CDD	-	2.60E-12	2.60E-12	0%	5.22E-12	5.22E-12	0%	4.69E-13	4.69E-13	0%	1.01E-12	1.01E-12	0%	1.09E-12	1.09E-12	0%	4.49E-10	4.49E-10	0%
2378 - TCDF	-	1.57E-11	1.57E-11	0%	3.15E-11	3.15E-11	0%	2.83E-12	2.83E-12	0%	6.09E-12	6.09E-12	0%	6.54E-12	6.54E-12	0%	2.71E-09	2.71E-09	0%
12378 - PeCDF	-	8.19E-12	8.19E-12	0%	1.65E-11	1.65E-11	0%	1.48E-12	1.48E-12	0%	3.18E-12	3.18E-12	0%	3.42E-12	3.42E-12	0%	1.41E-09	1.41E-09	0%
23478 - PeCDF	-	1.41E-11	1.41E-11	0%	2.83E-11	2.83E-11	0%	2.54E-12	2.54E-12	0%	5.48E-12	5.48E-12	0%	5.89E-12	5.89E-12	0%	2.44E-09	2.44E-09	0%
123478 - HxCDF	-	1.43E-11	1.43E-11	0%	2.88E-11	2.88E-11	0%	2.59E-12	2.59E-12	0%	5.57E-12	5.57E-12	0%	5.99E-12	5.99E-12	0%	2.48E-09	2.48E-09	0%

Table B-6 Screening of Predicted 24-Hour Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge			Maximum Offsite Location (MPOI)		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	-	7.70E-12	7.70E-12	0%	1.55E-11	1.55E-11	0%	1.39E-12	1.39E-12	0%	2.99E-12	2.99E-12	0%	3.22E-12	3.22E-12	0%	1.33E-09	1.33E-09	0%
234678 - HxCDF	-	2.98E-12	2.98E-12	0%	5.98E-12	5.98E-12	0%	5.37E-13	5.37E-13	0%	1.16E-12	1.16E-12	0%	1.24E-12	1.24E-12	0%	5.14E-10	5.14E-10	0%
123789 - HxCDF	-	3.09E-13	3.09E-13	0%	6.22E-13	6.22E-13	0%	5.58E-14	5.58E-14	0%	1.20E-13	1.20E-13	0%	1.29E-13	1.29E-13	0%	5.34E-11	5.34E-11	0%
1234678 - HpCDF	-	1.17E-11	1.17E-11	0%	2.35E-11	2.35E-11	0%	2.11E-12	2.11E-12	0%	4.54E-12	4.54E-12	0%	4.88E-12	4.88E-12	0%	2.02E-09	2.02E-09	0%
1234789 - HpCDF	-	1.32E-12	1.32E-12	0%	2.66E-12	2.66E-12	0%	2.38E-13	2.38E-13	0%	5.13E-13	5.13E-13	0%	5.52E-13	5.52E-13	0%	2.28E-10	2.28E-10	0%
1,2,3,4,6,7,8,9-Octa CDF	-	1.21E-12	1.21E-12	0%	2.44E-12	2.44E-12	0%	2.19E-13	2.19E-13	0%	4.71E-13	4.71E-13	0%	5.06E-13	5.06E-13	0%	2.09E-10	2.09E-10	0%
Total PCDDs (TEQ)	0.0000001	2.79E-12	2.79E-12	0%	5.61E-12	5.61E-12	0%	5.03E-13	5.03E-13	0%	1.08E-12	1.08E-12	0%	1.17E-12	1.17E-12	0%	4.82E-10	4.82E-10	0%
Total PCDFs (TEQ)	0.0000001	8.71E-12	8.71E-12	0%	1.75E-11	1.75E-11	0%	1.57E-12	1.57E-12	0%	3.38E-12	3.38E-12	0%	3.64E-12	3.64E-12	0%	1.50E-09	1.50E-09	0%
Total PCDDs + PCDFs	-	2.91E-10	2.91E-10	0%	5.84E-10	5.84E-10	0%	5.24E-11	5.24E-11	0%	1.13E-10	1.13E-10	0%	1.21E-10	1.21E-10	0%	5.02E-08	5.02E-08	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to 24-hour (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; MPOI = Maximum Point of Impingement; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

B2.2 Air Quality Assessment – Chronic Inhalation Thresholds

As part of the long-term human health inhalation risk assessment screening process, concentrations of substances expected to be emitted by the Project were compared to selected air quality screening levels or guidelines derived for the protection of chronic inhalation to human health. The chronic health-based thresholds were preferentially obtained from the following agencies:

- NWT Ambient Air Quality Guidelines
- CCME;
- ATSDR;
- US EPA Residential Air Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites;
- US EPA NAAQS; and,
- WHO.

The lowest health-based threshold with supporting information was generally selected for use in the screening process. Consideration was also given to relevant species (i.e., human data versus animal data), study endpoint, quality and date of the study.

Where a health-based screening threshold was not available from the agencies listed above, the lowest available health-based thresholds with supporting information, from the following agencies, were used:

- OMOE;
- Cal OEHHA; and,
- TCEQ.

The screening levels and guidelines available from the agencies listed above are provided in Table B-7. Risk levels for which the screening levels/guidelines were derived were standardized to risk levels considered acceptable by Health Canada (Health Canada 2010). For non-carcinogens, this involved adjusting to a HQ of 1.0, and for carcinogens, this involved adjusting to a risk level of 1 in 100,000 (i.e., 1×10^{-5}). Further information on the approach used to develop the screening levels/guidelines/objectives for each of the agencies is provided below.

Northwest Territories

The NWT Department of ENR has developed a 'Guideline for Ambient Air Quality Standards in the Northwest Territories', dated February 2014, which includes standards for the following substances: CO, PM_{2.5}, O₃, NO₂, SO₂, and TSP. The Guideline was established under the GNWT's Environmental Protection Act, and sets ambient air standards for the maximum concentrations of CO, PM_{2.5}, O₃, NO₂, SO₂, and TSP acceptable in the NWT. The standards are established at levels intended to protect human health and the environment; however, ENR indicates that due to the non-threshold nature of O₃ and PM_{2.5}, the standards for those contaminants are not to be considered as completely protective of human health (GNWT-ENR 2014). The standards are to be used to determine the acceptability of emissions from proposed and existing developments, and for reporting on the state of air quality in the NWT (GNWT-ENR 2014).

The SO₂, CO, NO₂, and TSP standards were adopted from the Canadian NAAQO (described below), while the O₃ and PM_{2.5} standards were adopted from the CAAQS.

Canadian Council of Ministers of the Environment

Air quality in Canada is regulated by standards set by the CCME, an inter-governmental body of federal, provincial, and territorial ministers responsible for the environment. In 2012, a Canada-wide AQMS, an approach for reducing air pollution in Canada, was implemented, and is the product of collaboration by the federal, provincial, and territorial governments and stakeholders. The CAAQS, which are established as objectives under the Canadian Environmental Protection Act (1999), have been developed for PM_{2.5} and O₃, and in May 2013, replaced the Canada-wide Standards for Particulate Matter and Ozone. Standards for NO₂ and SO₂ are currently under development.

The CCME has developed NAAQOs, which are health-based air quality objectives for pollutant concentrations in outdoor air. NAAQOs have been developed for CO, NO₂, and SO₂ (CCME 1999). Three levels of NAAQOs have been established: 1) maximum desirable levels (long-term goal for air quality and a basis for an anti-degradation policy for the unpolluted parts of the country and for the continuing development of control technology); 2) maximum acceptable levels (intended to provide adequate protection against adverse effects on soil, water, vegetation, materials, animals, visibility, personal comfort, and well-being); and, 3) maximum tolerable levels (air contaminant concentrations that require mitigation to avoid further deterioration to an air quality that endangers the prevailing Canadian lifestyle, or that pose a substantial risk to human health) (Health Canada 1994).

Agency for Toxic Substances and Disease Registry

The ATSDR derives MRLs (ATSDR 2013) for non-carcinogenic health effects based on data that identify the target organ(s) of effect and/or the most sensitive health effect(s) for a specific duration and route of exposure to the substance. The ATSDR generally uses the NOAEL/UF approach to derive MRLs. Physiologically based pharmacokinetic modelling and BMD modelling have also been used in deriving MRLs. The MRLs are set below levels that may cause adverse health effects in the sensitive subpopulations of people. The chronic MRLs are derived for exposure durations greater than or equal to 365 days.

The MRLs are generally based on the most sensitive substance-induced endpoint considered to be of relevance to humans. The ATSDR applies a protective approach (i.e., application of margins of safety) to address uncertainty, particularly related to people who might be most sensitive (e.g., infants, elderly and nutritionally or immunologically compromised). Supporting documentation was available for the MRLs used in this assessment.

United States Environmental Protection Agency Regional Screening Levels

The US EPA has developed residential air RSLs (US EPA 2014a) for the protection of human health. The RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with US EPA toxicity data. The RSLs are considered by the US EPA to be protective for human exposure (including sensitive groups) over a lifetime. Chemical concentrations above the RSL do not automatically constitute a health risk; however, exceeding a RSL suggests that further evaluation of the potential risks is appropriate. The US EPA RSLs for non-carcinogens are based on a HQ of 1.0, and for carcinogens are based on a risk level of 1 in 1,000,000. The carcinogenic RSLs were multiplied by a factor of 10 to adjust to a risk level of 1 in 100,000.

United States Environmental Protection Agency National Ambient Air Quality Standards

The US EPA has developed NAAQS for widespread pollutants that are considered harmful to human health as part of the Clean Air Act. The six criteria pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM_{2.5} and PM₁₀), and sulphur dioxide. A primary and/or secondary standard is set for each of the criteria pollutants. Primary standards are intended to protect sensitive populations, including children, the elderly, and those with pre-disposed respiratory illnesses (e.g., asthma). Secondary standards are intended to be protective of public welfare (e.g., damage to animals, crops, vegetation, and buildings).

World Health Organization

The WHO has developed air quality guidelines that provide a basis for protecting public health from adverse effects of air pollution. The guidelines are intended to provide background information and guidance to governments in making risk management decisions, particularly in setting standards. The guidelines may also be used in planning processes and various kinds of management decisions at a community or regional level. Supporting documentation was provided for all WHO guidelines. The air quality guidelines for non-carcinogens are based on a HQ of 1.0, and for carcinogens, are provided for a cancer risk level of 1 in 100,000.

The WHO air quality guidelines are provided in the following documents:

- WHO (2000) – Air quality guidelines for Europe, 2nd Edition. WHO Regional Publications, European Series, No. 91.
- WHO (2006) – Air Quality Guidelines. Global Update 2005. Particulate matter, ozone, nitrogen dioxide, and sulfur dioxide.

Ontario Ministry of the Environment

The OMOE has developed AAQC, which may be used in environmental assessments to assess air quality (OMOE 2012). An AAQC is a desirable concentration of a contaminant in air, based on protection against adverse effects on health or the environment. The AAQCs are set with different averaging times (e.g., annual, 24-hour, 1-hour and 10 minutes) appropriate for the effect that they are intended to protect against. The effects considered may be health, odour, vegetation, soiling, visibility, corrosion or other effects.

The OMOE has also developed air quality standards used to assess emissions from all non-mobile sources of air pollution in Ontario. The Ontario air quality standards are generally derived from the AAQC, and are set at levels protective of the natural environment and sensitive populations (e.g., children, the elderly). The OMOE considers available toxicological information and supporting environmental information to establish effects-based air standards based on the limiting or critical effect(s) (health or environmental considerations) of that chemical.

In general, the OMOE air standards for carcinogens are set at an incremental lifetime cancer risk (ILCR) of one (1) incidence in one million individuals; this level was multiplied by a factor of 10 to derive a screening value for a risk level of 1 in 100,000. Air standards for non-carcinogens are generally derived from reference concentrations (RfC) (chosen based on available peer-reviewed toxicological information and key studies with associated limiting or critical effect[s]). The air standards for non-carcinogens are generally set at a target HQ of 1.0.

California Office of Environmental Health Hazard Assessment

The Cal OEHHA RELs are concentrations of a chemical at or below which adverse non-carcinogenic health effects are not anticipated to occur for a specified exposure duration (Cal OEHHA 2014a).

The RELs are used in risk assessments to evaluate the potential for adverse non-carcinogenic public health effects from facility emissions or similar localized sources in the Air Toxics Hot Spots Program, and from widespread exposures in the Toxic Air Chemicals program. The REL is an exposure level at or below which adverse non-carcinogenic health effects are not expected to occur in a human population, including sensitive subgroups (e.g., infants and children), exposed to that concentration for a specified duration. Supporting documentation was available for most of the RELs. The chronic RELs for non-carcinogens are based on a HQ of 1.0.

The Cal OEHHA does not develop RELs or air quality guidelines or objectives for carcinogens. Rather, the Cal OEHHA has developed inhalation unit risks (IURs) for use in cancer risk assessments (Cal OEHHA 2014a). Cal OEHHA was contacted regarding the use of their unit risk factors for screening purposes.

Mr. Chris Halm of the California Environmental Protection Agency Air Resources Board indicated that the unit risks can be adjusted based on an applicable cancer risk level and used as screening values (Halm 2010, pers. comm.). The Cal OEHHA unit risks are based on a cancer risk level of 1 in 1,000,000; this level was divided by the unit risk and multiplied by a factor of 10 to derive a screening value for a risk level of 1 in 100,000.

Texas Commission on Environmental Quality

The TCEQ has developed chronic ESLs that are used in the air permitting process to evaluate air the effects predicted by dispersion modelling (TCEQ 2012a). The ESLs are used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in the air. The long-term ESLs are based on data concerning chronic health and vegetation effects. They are not ambient air standards. If predicted airborne levels of a constituent do not exceed the screening level, adverse health effects are not expected. If predicted ambient levels of constituents in air exceed the screening levels, it does not necessarily indicate a problem but rather triggers a more detailed review.

The TCEQ have developed a guidance document titled, TCEQ Guidelines to Develop Toxicity Factors (TCEQ 2012a), that outlines the approach and methods used to derived the acute and chronic ESLs. The TCEQ chronic ESLs for non-carcinogens are based on an HQ of 0.3, and for carcinogens, the ESLs are based on a risk level of 1 in 100,000. The non-carcinogenic ESLs were multiplied by a factor of $1.0/0.3$ (i.e., 3.333) to adjust to a HQ of 1.0.

Selected Screening Thresholds and COPC Screening Process

The available chronic health-based thresholds and the basis of these thresholds are presented in Table B-7. The thresholds selected for use in the screening process are bolded and shaded in the table.

COPCs were identified as those substances in the Application Case that both exceeded the chronic inhalation threshold and exhibited a 10% or greater increase above the baseline concentration at any location.

Comparison to regulatory threshold values was considered to represent a conservative evaluation of the potential for the predicted concentrations to elicit adverse effects. Comparison to 10% above baseline concentrations was considered to represent a conservative evaluation of whether a measureable project-related impact on environmental quality was likely to occur. Given temporal variability, variability in sampling and laboratory methods, and the uncertainty inherent in estimates from air quality models, any predicted increase of less than 10% above baseline concentrations was considered unlikely to reflect a meaningful project-related change in environmental quality.

The baseline and predicted annual air concentrations and results of the screening process are provided in Table B-8 (Annual Construction Case) and Table B-9 (Annual Application Case).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHHA RELS ^(m)	TCEQ ESLS ⁽ⁿ⁾	
Acid Gases and Particulate Matter													
Nitrogen dioxide (NO ₂)	NC	60	60	100	-	-	100 (53 ppb)	-	40	-	-	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
													CCME NAAQO: Supporting documentation not available.
													US NAAQS: Threshold based on a large body of evidence for respiratory effects from exposure to nitrogen oxides. The key clinical studies on human health effects are based on shorter exposure durations (0.5 to 3 hours). The health effects reported include increased airway responsiveness in asthmatics, small decreases in forced vital capacity (FVC) and forced expiratory volume in one second (FEV ₁) with mild exercise in patients with chronic obstructive pulmonary disease, increased airway responsiveness to bronchoconstrictors in healthy adults, and changes in lung function in healthy adults (US EPA 1993). The key epidemiological studies on human health effects indicated increased risk of lower respiratory symptoms/disease in children (5 to 12 years). Exposure to nitrogen dioxide in occupational settings was associated with bronchial pneumonia and bronchitis (25 to 100 ppm). In high occupational exposure cases (>200 ppm), effects ranged from hypoxemia/transient airway obstruction to death (US EPA 1993). The NAAQS is a primary and secondary value, which is protective of "sensitive" populations such as asthmatics, children, and the elderly. The NAAQS of 53 ppb was converted to µg/m ³ using a molecular weight of 46.01 g/mol.
													WHO: Threshold based on a health endpoint. Epidemiological studies show that reduced lung function growth in children is linked to elevated NO ₂ concentrations within communities already at current North American and European urban ambient air levels. Studies indicated that a 28.2 µg/m ³ increase in nitrogen dioxide is associated with a 20% increase in the odds of lower respiratory symptoms (International Programme on Chemical Safety 1997). WHO states that there is still no robust basis for setting a guideline value based on any direct toxic effect. The threshold was set based on a meta-analysis of indoor air studies; however, there is evidence to suggest that there are health effects at the current threshold. The WHO states that the extent to which observed health effects in studies are attributable to NO ₂ itself is still unknown.
Sulphur dioxide (SO ₂)	NC	30	30	60	-	-	-	-	-	55	-	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
													CCME: Supporting documentation not available.
													OMOE: Threshold based on health and vegetation endpoints (supporting document not available).
Total Suspended Particulates (TSP)	NC	60	60	70	-	-	-	-	-	60	-	-	NWT: The NWT standard is adopted from the Canadian NAAQO.
													CCME NAAQO: Supporting documentation not available.
													OMOE: Supporting documentation not available.

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
PM _{2.5}	NC	10	10			-	12	-	10	-	-	-	NWT: The NWT standard is adopted from the Canadian AAQS. CCME NAAQO: Canadian ambient air quality standard protective of human health and the environment. The threshold represents a balance between achieving the best health and environmental protection possible and the feasibility and costs of reducing pollutant emissions; a value of 10 µg/m³ is effective in 2015. The metric is the 3-year average of the annual average concentrations. WHO: Threshold represents the lowest level at which total, cardiopulmonary and lung cancer mortality have been shown to increase with more than 95% confidence in response to long term exposure. The above effects were reported at concentrations ranging from 11.0 to 29.6 µg/m³ and 9.0 to 33.5 µg/m³ in two key studies. WHO determined that health effects can be expected when annual average concentrations are in the range of 11 to 15 µg/m³. Therefore, a guideline value of 10 µg/m³ was selected, as it is considered to be below the mean for the most likely effects. US NAAQS: Threshold based on annual mean averaged over 3 years for the health protection of "sensitive" populations such as asthmatics, children, and the elderly.
PM ₁₀	NC	-	-	-	-	-	-	-	20	-	-	-	WHO: Threshold is based on PM_{2.5} as an indicator. The ratio of PM_{2.5}:PM₁₀ in developed countries ranges from 0.5 to 0.8. A ratio of 0.5 has been applied to the PM_{2.5} guideline.
Metals													
Aluminum	NC	-	-	-	-	-	-	5.2	-	-	-	17 (5)	US EPA: Threshold based on a provisional reference concentration (RfC) of 0.005 mg/m³ for neurotoxic effects (psychomotor and cognitive impairment) in occupationally exposed workers (US EPA 2006). Workers were exposed to a time-weighted average concentration of 4.6 to 11.5 mg/m³ for an average of 12 years. The LOAEL of 4.6 mg/m³ based on an 8-hour exposure was adjusted for continuous exposure and corrected for a human equivalent concentration [HEC]. The LOAEL_{HEC} is 1.64 mg/m³. An uncertainty factor of 300 (10 for intrahuman variability, 10 for using a LOAEL and 3 for an incomplete database) was applied. A residential scenario exposure factor was applied to the RfC to derive the screening level.
												6.7 (2)	TCEQ: Threshold based on a health endpoint (supporting documentation not available), as aluminum metals and soluble aluminum salts (5 µg/m³) in PM₁₀ and as alkyl aluminum and soluble salt compounds (2 µg/m³).
Antimony	NC	-	-	-	-	-	-	0.21	-	-	-	1.7 (0.5)	US EPA: Threshold based on a reference concentration (RfC) of 0.0002 mg/m³ for antimony trioxide, based on pulmonary toxicity and chronic interstitial inflammation in rats exposed to antimony trioxide for 6 hours/day, 5 days/week for 1 year. The NOAEL was 0.51 mg/m³ and NOAEL_{HEC} was 0.042 mg/m³. A BMC₁₀ (benchmark concentration) of 0.87 mg/m³ and BMC_{HEC} of 0.074 mg/m³ were calculated. An uncertainty factor of 300 (10 to protect sensitive human subpopulations, 3 for interspecies extrapolation, 3 for database inadequacies, and 3 to account for a less-than-lifetime exposure duration) was applied to the BMC_{HEC}. A residential scenario exposure factor was applied to the RfC to derive the screening level.
													TCEQ: Threshold based on a health endpoint (supporting documentation not available), as antimony in PM₁₀.
Arsenic	NC	-	-	-	-	-	-	0.016	-	-	0.015	-	US EPA: Threshold based on a Cal OEHHA reference concentration (RfC), and a residential scenario exposure factor was applied to the RfC to derive the screening level.
													Cal OEHHA: Threshold based on decrease in intellectual function and adverse effects on neurobehavioural development in humans. An inhalation dose was estimated from an oral dose (drinking water) to give a value of 0.46 µg/m³. An uncertainty factor of 30 (3 for estimating a LOAEL based on quantitative dose-response analysis and 10 for inter-individual variation) was used.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
	C	-	-	-	-	-	-	0.0065 (0.00065)	0.0066	-	0.003	0.067	US EPA: Threshold based on an inhalation unit risk (IUR) of 4.29 per µg/m³ based on lung cancer in occupationally exposed male human workers. The risk-based concentration for a cancer risk of 1 in 100,000 is 0.002 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level. WHO: Threshold based on an estimated ILCR of 1 in 100,000 at an air concentration of 0.0066 µg/m³ and an inhalation unit risk (IUR) of 0.0015 per µg/m³, derived from lung cancer incidences in exposed workers at metal smelters. Cal OEHHA: Threshold based on an inhalation unit risk (IUR) of 0.0033 per µg/m³ based on a human occupational exposure lung tumour incidence and an ILCR of 1 in 100,000. TCEQ: Threshold based on respiratory and lung cancer in occupational workers (supporting documentation available). The threshold is based on an inhalation unit risk (IUR) of 0.00015 per µg/m³ and an ILCR of 1 in 100,000.
Barium	NC	-	-	-	-	-	-	0.52	-	-	-	1.7 (0.5)	US EPA: Threshold based a reference concentration (RfC) of 0.5 µg/m³ based on a reproductive study in rats exposed for four months via inhalation (US EPA 1997). The NOAEL was 0.8 mg/m³, adjusted for continuous exposure, and an uncertainty factor of 1000 was applied (to yield an RfC of 0.5 µg/m³). A residential scenario exposure factor was applied to the RfC to derive the screening level. TCEQ: Threshold based on health endpoint (interim, supporting documentation not available), as barium and compounds in PM₁₀.
Beryllium	NC	-	-	-	-	-	-	0.021	-	-	0.007	0.0067 (0.002)	US EPA: Threshold based on beryllium sensitization and progressing to chronic beryllium disease in an occupational study for beryllium and compounds. The LOAEL_{HEC} was 0.2 µg/m³ and an uncertainty factor of 10 (3 for sensitive individuals in the population and 3 for database uncertainty) was applied. A residential scenario exposure factor was applied to the reference concentration (RfC) to derive the screening level. Cal OEHHA: Threshold based on beryllium-sensitized (chronic beryllium disease) workers in a ceramics plant. The LOAEL (median exposure of sensitized workers) was 0.55 µg/m³ and the average experimental exposure was 0.2 µg/m³. An uncertainty factor of 30 (10 for LOAEL uncertainty where there is a low incidence of disease but with serious, irreversible chronic effects and 3 for intraspecies differences) was applied to 0.2 µg/m³. TCEQ: Threshold based on health endpoint (interim, supporting documentation not available), as beryllium as a particulate.
	C	-	-	-	-	-	-	0.012 (0.0012)	-	-	0.0042	-	US EPA: Threshold based on an inhalation unit risk (IUR) of 0.0024 per µg/m³ based on lung cancer effects in an occupational study. The risk-based concentration for a cancer risk of 1 in 100,000 is 0.0041 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level. Cal OEHHA: Based on an inhalation unit risk (IUR) of 0.0024 per µg/m³, based on lung cancer in beryllium processing workers. The risk-based concentration for a cancer risk of 1 in 100,000 is 0.0042 µg/m³.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Cadmium	NC	-	-	-	-	0.01	-	0.01	0.005	0.005	0.02	0.033 (0.01)	ATSDR: Threshold based on a urinary cadmium level associated with 10% extra risk of low molecular weight proteinuria. A urinary cadmium dose corresponding to a 10% excess risk of low molecular proteinuria of 0.5 µg/m ³ creatinine was calculated from three occupational exposure studies and used as the point of departure (POD). It was estimated that an exposure of 0.1 µg/m ³ in air and 0.3 µg/kg/day in diet would result in urinary cadmium level of 0.5 µg/m ³ creatinine. The inhalation concentration was divided by an uncertainty factor of 9 (3 for human variability and 3 as a modifying factor).
													US EPA: Threshold derived from a Cal OEHHA reference concentration (RfC). A residential scenario exposure factor was applied to the RfC to derive the screening level.
													WHO: Threshold based on data collected in industrial workers with lung cancer and renal alterations effects. Cadmium exposure may result in various renal alterations, whether it is absorbed via inhalation or contaminated food. WHO (2000) estimated that the lowest estimate of the cumulative exposure to airborne cadmium in industrial workers leading to an increased risk of renal dysfunction (low-molecular-weight proteinuria) or lung cancer was 100 µg/m ³ -years for an 8-hour exposure, and this was extrapolated to a continuous lifetime exposure estimate of 0.3 µg/m ³ . WHO (2000) indicated that existing levels of cadmium in the air of most urban or industrial areas are around one-fiftieth of this value. The threshold was derived to prevent a further increase of cadmium in agricultural soils for future generations, which is likely to increase exposure through dietary intake.
													OMOE: Threshold based on health effects (supporting document not available).
													Cal OEHHA: Threshold based on kidney and respiratory system effects in humans (an occupational study with average exposure duration of 28 years). A LOAEL of 0.5 µg/m ³ was derived and an uncertainty factor of 30 (3 for use of a subchronic study and 10 for intraspecies uncertainty) was used.
													TCEQ: Threshold based on health effects (interim, supporting documentation not available), as cadmium and compounds in PM ₁₀ .
	C	-	-	-	-	-	-	0.016 (0.0016)	-	-	0.0024	-	US EPA: Threshold based on an inhalation unit risk (IUR) of 0.0018 per µg/m ³ for lung, trachea and bronchus cancer deaths in occupational exposure studies. An ILCR of 1 in 100,000 was used to convert the IUR to a risk-based concentration of 0.0056 µg/m ³ , and a residential scenario exposure factor was applied to the risk-based concentration to derive the screening level.
													Cal OEHHA: Threshold based on human occupational exposure lung cancer data; an inhalation unit risk (IUR) of 0.0042 per µg/m ³ was derived and an ILCR of 1 in 100,000 was used to convert the IUR to a screening value.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Chromium	NC	-	-	-	-	-	-	0.1	-	-	0.2	Cr(III) = 0.14 (0.041) Cr(VI) = 0.22 (0.066)	US EPA: Threshold based on a reference concentration (RfC) of 0.0001 mg/m³ for lower respiratory effects (lactate dehydrogenase in bronchoalveolar lavage fluid) in rats following inhalation of Cr(VI) particulates, and using a benchmark concentration (BMC) approach. The BMC was 0.016 mg/m³. The regional deposited dose ratio (RDDR) of 2.1576 was applied to account for differences in the deposition pattern of inhaled Cr(VI) dusts in the respiratory tract of humans and Wistar rat test animals. An uncertainty factor of 300 was applied (10 to account for variation in the human population, 10 to account for using a subchronic study rather than a chronic study, and 3 to account for pharmacodynamic differences not accounted for by the RDDR) [0.016 mg/m³ x 2.1576 / (300)]. A residential scenario exposure factor was applied to the reference concentration (RfC) to derive the screening level. Cal OEHH: Threshold applies to soluble hexavalent chromium compounds other than chromic trioxide. Sodium dichromate aerosol was inhaled by rats for 22 hours/day, 7 days/week for 90 days. The health effect observed was bronchoalveolar hyperplasia. The LOAEL identified in the study was 50 µg/m³ and a NOAEL was not observed. The BMC₀₅ (the concentration calculated to be associated with a 5% incidence of effect) was 12.50 µg/m³ and adjusted to a human equivalent concentration (HEC) of 24.47 µg/m³ and an uncertainty factor of 100 (3 for subchronic to chronic extrapolation, 3 for interspecies variability and 10 for intraspecies variability) was applied. TCEQ: Cr(III): Threshold based on a study where rats were exposed to 0, 17, 54, or 168 mg/m³ chromic sulphate particulate for 6 hours/day, 5 days/week for 13 weeks. The critical effects were increased total lung and trachea weight relative to body weight in male and female rats. The benchmark concentration lower confidence limit corresponding to a 10% increase in effect (BMCL₁₀) was 3.45 mg/m³. The BMCL₁₀ was adjusted for duration (6 hours/24 hours and 5 days/7 days) and an RDDR of 1.31, resulting in a point of departure [human equivalent concentration] (POD_{HEC}) of 0.81 mg/m³. An uncertainty factor of 1,000 for interspecies variability (3), intraspecies variability (10), subchronic duration (10), and database deficiencies (3) was applied. The threshold (0.81 µg/m³) was then adjusted to an HQ = 0.3, by dividing the value of 0.14 µg/m³ by 3.3, resulting in a value of 0.041 µg/m³. TCEQ: Cr(VI): Threshold based on NOAEL of 25 µg/m³ for no observed increase in relative lung weight in rats exposed to 25, 50, 100, or 200 µg Cr(VI)/m³, as sodium dichromate, for 22 hours/day, 7 days/week for 90 days. The NOAEL was not adjusted for duration because the exposure duration in the study closely resembled continuous exposure. An uncertainty factor of 270 (3 for interspecies variation, 10 for intraspecies variation, 3 for extrapolation from sub-chronic to chronic exposure, and 3 for database deficiencies) were applied to the point of departure [human equivalent concentration] (POD_{HEC}) of 60.25 µg Cr(VI)/m³. The resulting threshold of 0.22 µg/m³ was based on a HQ = 1.0. The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 0.22 µg/m³ by 3.3, resulting in a value of 0.066 µg/m³.

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Chromium (continued)	C	-	-	-	-	-	-	0.00012 (0.000012)	0.00025	0.00007	0.000067	0.0042	WHO: Threshold derived from exposed workers to Cr(VI) assuming a linear dose-response relationship between exposure and lung cancer. A unit risk of 0.04 is based on the geometric mean cancer risk estimates (epidemiological data sets range from 0.011 to 0.13 per µg/m³ for a lifetime exposure). OMOE: Threshold based on a health effect (supporting documentation not available), as Cr(VI) in PM₁₀. US EPA: Threshold based on an inhalation unit risk (IUR) of 1.2 x 10⁻² per µg/m³, which is based on lung cancer mortality in a cohort of chromate workers. The IUR is based on an assumed 1:6 ratio of Cr(VI):Cr(III). Cal OEHHH: Threshold based on an inhalation unit risk (IUR) of 0.15 per µg/m³ and an ILCR of 1 in 100,000. The health effects identified were lung cancer mortality in humans occupationally exposed to Cr(VI). TCEQ: Threshold based on a unit risk factor of 2.3 x 10⁻³ per µg Cr(VI)/m³ (for a risk level of 1 in 100,000) for lung cancer mortality in humans. The unit risk factor was derived by weighting the unit risk factors from two studies (Crump et al. (2003) and Gibb et al. (2000); as cited in TCEQ 2014c). A weight of 44.4% was given to the Crump et al. 2003 study, from which a unit risk factor of 1.94 x 10⁻³ was selected, and a weight of 55.6% was given to the Gibb et al. (2000; as cited in TCEQ 2014c) study, from which a unit risk factor of 2.56 x 10⁻³ was selected. The unit risk factor was adjusted to an inhalation concentration based on a cancer risk of 1 in 100,000, resulting in a threshold of 0.0042 µg/m³.
Cobalt	NC	-	-	-	-	0.1	-	0.0063	-	-	-	0.067 (0.02)	ATSDR: Threshold based on a decrease in pulmonary function (same study used in US EPA 2008). The NOAEL was 5.3 µg/m³ and adjusted for continuous exposure (1.3 µg/m³) and an uncertainty factor of 10 (for human variability) was applied (supporting documentation available). US EPA: Threshold based on a provisional reference concentration (RfC) of 0.006 mg/m³ based on decreased pulmonary function and respiratory tract irritation in occupationally exposed workers (US EPA 2008). A NOAEL of 5.3 µg/m³ was identified and adjusted for continuous exposure (1.9 µg/m³). An uncertainty factor of 300 (3 for extrapolating from a subchronic to chronic exposure duration, 10 for database insufficiencies and 10 for human variability) was applied to yield 0.006 µg/m³. A residential scenario exposure factor was applied to the RfC to derive the screening level. TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as cobalt and inorganic cobalt compounds in PM₁₀.
	C	-	-	-	-	-	-	0.0031 (0.00031)	-	-	-	-	US EPA: Threshold based on a 2 year rat study where adenoma and carcinoma of the lung was observed. An inhalation unit risk (IUR) of 9 per mg/m³ and an ILCR of 1 in 100,000 was applied to derive a risk-based concentration of 0.0011 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level.
Copper	NC	-	-	-	-	-	-	-	-	-	-	3.3 (1)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as copper dusts and mists in PM₁₀.
Iron	NC	-	-	-	-	-	-	-	-	-	-	17 (5)	TCEQ: Threshold of 16.7 (5) µg/m³ based on health effects (interim, supporting documentation not available), as iron oxide. Threshold of 3.3 (1) µg/m³ based on health effects (interim, supporting documentation not available), as iron soluble salts.
												3.3 (1)	

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Lead	NC	-	-	-	-	-	0.15 (3 months)	0.15 (3 months)	0.5	-	-	-	US NAAQS: Threshold is a rolling 3 month average based on neurological effects (decrease of less than 2 IQ points) in children, and the potential for cardiovascular and renal effects in adults. An air concentration of less than 0.15 µg/m³ of lead would correspond to a blood lead concentration of approximately 1 µg/dL which leads to less than 2 IQ points lost in US children based on an air-to-blood ratio of 1:7. US EPA: The US EPA adopted the US NAAQS as the regional screening level for lead and compounds. WHO: Threshold based on not having blood lead levels exceed 100 µg/L in order to protect 98% of the population including children. Various international expert groups have determined that the earliest signs of adverse effects of lead in young children begin at 100 to 150 µg/L in blood. It also appears that 1 µg/m³ of lead in air directly contributes approximately 19 µg/L of lead in blood in children and 16 µg/L in adults.
Manganese	NC	-	-	-	-	0.3	-	0.052	0.15	-	0.09	0.67 (0.2)	ATSDR: (For respirable manganese) Threshold based on abnormal performances in eye-hand coordination in an occupational study. The benchmark concentration lower confidence limit corresponding to a 10% incidence of effect (BMCL₁₀) of 142 µg/m³ was adjusted by an uncertainty factor of 100 (10 for human variability and 10 for database deficiencies) and for continuous exposure (multiplied by 5/7 days and 8/24 hour to account for intermittent exposure). US EPA: Threshold based on a reference concentration (RfC) of 0.05 µg/m³ based on impairment of neurobehavioural function (occupational study). The LOAEL was 150 µg/m³ and the LOAEL_{HEC} was 50 µg/m³. An uncertainty factor of 1,000 (10 to protect sensitive individuals, 10 for using a LOAEL, and 10 for database limitations) was applied. A residential scenario exposure factor was applied to the RfC to derive the screening level. WHO: Threshold based on neurotoxic effects observed in occupationally exposed workers and an estimated NOAEL of 30 µg/m³. The threshold was derived using a benchmark approach and by dividing by a factor of 4.2 for continuous exposure and an uncertainty factor of 50 (10 for interindividual variation and 5 for developmental effects in younger children). Cal OEHHA: Threshold based on impairment of neurobehavioral function in humans (occupational study) for manganese and compounds. A benchmark concentration lower confidence limit corresponding to a 5% response (BMCL₀₅) of 72 µg/m³ was obtained and a time-adjusted exposure of 26 µg/m³ was calculated. An uncertainty factor of 300 (3 for subchronic to chronic conversion, 100 for intraspecies differences [10 for adults to children, and 10 for the more sensitive developing brains of newborns and infant children]) was used. TCEQ: Threshold based on health effects (interim, supporting documentation not available), as manganese dust and inorganic compounds in PM₁₀.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Mercury	NC	-	-	-	-	0.2	-	0.31	1	-	0.03	0.083 (0.025)	ATSDR: Threshold based on neurological effects (hand tremors) in 26 male workers exposed to metallic mercury for an average of 15.3±2.6 years. A LOAEL of 0.026 mg/m³ associated with an increased frequency of hand tremors was determined and adjusted for continuous exposure (by multiplying 5/7 days and 8/24 hour = 0.0062 mg/m³). An uncertainty factor of 30 (3 for using a LOAEL and 10 for human variability) was applied. US EPA: Threshold based on a reference concentration (RfC) of 0.0003 mg/m³ for hand tremors, increases in memory disturbance, slight subjective and objective evidence of autonomic dysfunction in occupational studies. A LOAEL of 0.025 mg/m³ was calculated and adjusted to a LOAEL of 0.009 mg/m³. An uncertainty factor of 30 (10 to protect sensitive individuals and 3 for a lack of a database) was used. A residential scenario exposure factor was applied to the RfC to derive a screening level. WHO: Threshold based on the LOAELs for mercury vapour (15 to 30 µg/m³, tremors, renal tubular effects, and changes in plasma enzymes) and applying an uncertainty factor of 20 (10 for uncertainty in variable sensitivities in higher risk populations and 2 for extrapolating from LOAEL to NOAEL). Cal OEHHA: Threshold based on neurotoxicity as measured by tremor, memory and sleep disturbances, decreased performance on neurobehavioral tests, and decreased electroencephalography activity in occupational studies. Humans were exposed to mercury for 8 hours/day, 5 days/week for 13.7 to 15.6 years. A LOAEL of 0.025 mg/m³ (time adjusted value is 0.0009 mg/m³) was calculated and an uncertainty factor of 300 (10 for neurotoxicity being a moderate to severe effect, 3 to reflect interindividual variability and 10 for the higher susceptibility of the developing nervous system) was used. TCEQ: Threshold based on health effects (interim, supporting documentation not available) as mercury metal and inorganic mercury forms in PM₁₀.
Molybdenum	NC	-	-	-	-	-	-	-	-	-	-	10 (3)	TCEQ: Health endpoint, interim guideline (supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Nickel	NC	-	-	-	-	0.09		0.015, 0.094, 0.021-	-	0.02	0.014	0.23 (0.07)	ATSDR: Threshold based on chronic active inflammation and lung fibrosis in rats exposed to nickel sulfate hexahydrate (6 hours/day, 5 days/week for 2 years). The NOAEL was 0.03 mg/m³, adjusted for continuous exposure (5/7 days and 6/24 hours = 0.0054 mg/m³), adjusted for human equivalent concentration (HEC) (0.0027 mg/m³) and an uncertainty factor of 30 (3 for animal to human extrapolation and 10 for human variability) was applied. US EPA: For nickel refinery dust and nickel subsulphide (RSL of 0.015 µg/m³), the threshold is based on a Cal OEHHA reference exposure level of 0.014 µg/m³ (see below). A residential scenario exposure factor was applied by US EPA to derive a screening level. For nickel soluble salts (RSL of 0.094 µg/m³), the threshold is based on an ATSDR minimal risk level of 0.09 µg/m³ (see below). US EPA applied a residential scenario exposure factor to the ATSDR minimal risk level to derive a screening level. For nickel oxide (RSL of 0.021 µg/m³), the threshold is based on a Cal OEHHA reference exposure level derivation for nickel oxide. Health effects (active pulmonary inflammation and alveolar proetinosis) were observed in mice following exposure to nickel oxide for 6 hours/day, 5 days/week for 104 weeks. The LOAEL (20.9 µg/m³) was adjusted to a human equivalent concentration of 2.0 µg/m³ and an uncertainty to factor of 100 (~3 for interspecies variability and 30 for intraspecies variability) was applied to derive an inhalation reference exposure level of 0.02 µg/m³. A residential scenario exposure factor was applied by US EPA to derive a screening level. OMOE: Threshold for nickel in PM₁₀, that is protective of carcinogenic and non-carcinogenic effects (supporting document available). The critical criterion for carcinogenic effects was lung and nasal cancer while the critical non-cancer effect is respiratory effects. The OMOE threshold is based on the Scientific Committee for Toxicity, Ecotoxicity and Environment working group (part of the European Commission for Health and Consumer Protection) recommended value. Based on the European Commission's decision, the lower end of the annual mean total airborne nickel concentration range of 10 to 50 ng/m³ (lung fibrosis from a US National Toxicology program study with NiSO₄) was chosen, but because soluble nickel (a contributor to the non-cancer respiratory effects) does not appear to constitute more than 50% of the total airborne nickel concentration, a value of 20 ng/m³ was chosen. Cal OEHHA: Threshold based on pathological changes in lung, lymph nodes and nasal epithelium in rats exposed to nickel and nickel compounds (except nickel oxide) for 6 hours/day, 5 days/week for 104 weeks. The BMDL₀₅ was 30.5 µg/m³ and the BMDL_{HEC05} was 1.4 µg/m³. An uncertainty factor of 100 (~3 for interspecies differences and 30 for intraspecies differences) was applied (Cal OEHHA 2014b). TCEQ: Threshold based on chronic active lung inflammation and associated lesions in male and female F344 rats exposed to nickel sulfate hexahydrate for 6 hours/day, 5 days/week for 2 years. The NOAEL/POD was 0.03 mg nickel/m³, the adjusted POD was 5.357 µg nickel/m³ and the HEC was 7.034 µg/m³. An uncertainty factor of 30 (~3 for interspecies variability and 10 for intraspecies variability) was applied.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Nickel (continued)	C	-	-	-	-	-	-	0.12 (0.012); 0.11 (0.011); 0.058 (0.0058)	0.025	0.2 (0.02)	0.038	0.059	US EPA: Threshold for nickel refinery dust (RSL of 0.12 µg/m³) is based on an inhalation unit risk (IUR) of 0.00024 per µg/m³ which was derived from several epidemiological studies (excess lung cancer mortality in four (4) studies of nickel refinery workers). The risk-based concentration for a cancer risk of 1 in 100,000 is 0.042 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level. Threshold for nickel soluble salts (RSL of 0.11 µg/m³) is based on an IUR of 0.00026 per µg/m³ from Cal OEHHA (see below). A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level. Threshold for nickel subsulphide (RSL of 0.058 µg/m³) is based on an IUR of 0.00048 per µg/m³, which was based on excess lung cancer mortality observed in four (4) studies of workers exposed to nickel compounds. The inhalation unit risk was the incremental unit risk estimate of nickel refinery dust (2.4 x 10⁻⁴ per µg/m³) used with a multiplication factor of 2.0 to account for a nickel subsulfide composition of about 50% in the refinery dust. The risk-based concentration for a cancer risk of 1 in 100,000 is 0.021 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive the screening level. WHO: Threshold based on an inhalation unit risk (IUR) of 0.00038 µg/m³ for 1 µg/m³ of nickel in the air, based on lung cancer incidences in exposed human workers. The concentration corresponding to an incremental lifetime risk of 1 in 100,000 is about 0.025 µg/m³. OMOE: Threshold of 0.02 µg/m³ based on an ILCR of 1 in one million and on carcinogenic effects from inhaling NiO and Ni(OH)₂ (the two predominant nickel oxide species in Ontario) in PM₁₀. Cal OEHHA: Threshold based on an inhalation unit risk (IUR) of 0.00026 per µg/m³ and an ILCR of 1 in 100,000. The IUR is calculated from Ontario nickel refinery sinter plant worker lung cancer mortality data. TCEQ: Threshold based on lung cancer in workers exposed to various forms of nickel in air (Grimsrud et al. 2003; and Enterline and Marsh 1983; as cited in TCEQ 2011). The inhalation unit risk (IUR) was 0.00017 per µg/m³ and the ESL was based on an incremental lifetime risk of 1 in 100,000.
Selenium	NC	-	-	-	-	-	-	21	-	-	20	0.67 (0.2)	US EPA: Threshold based on a Cal OEHHA reference exposure level (see below). A residential scenario exposure factor was applied by US EPA to derive a screening level. Cal OEHHA: Threshold based on environmental exposure of selenium (in soil and food supplies) to people in China over a lifetime in their diets (as selenium subsulfide). Health effects were clinical selenosis (liver, blood, skin and CNS). The LOAEL was 0.023 mg/kg/day and the NOAEL was 0.015 mg/kg/day. The inhalation chronic REL is based on the oral chronic REL and an inhalation extrapolation factor of 3,500 µg/m³ per mg/kg/day. An uncertainty factor of 3 to account for intraspecies differences was applied. One of the assumptions of route-to-route extrapolation assumes that a chemical is equally absorbed by both oral and inhalation routes; Cal OEHHA indicated that the available data are not adequate to depart from the default assumption of equal absorption across the lungs and gastrointestinal tract. TCEQ: Threshold based on health effects (interim, supporting documentation not available), as selenium, selenium oxide and selenium compounds in PM₁₀.
Silver	NC	-	-	-	-	-	-	-	-	-	-	0.033 (0.01)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as PM ₁₀ .
Strontium	NC	-	-	-	-	-	-	-	-	-	-	6.7 (2)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as PM ₁₀ .
Tellurium	NC	-	-	-	-	-	-	-	-	-	-	0.33 (0.1)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available) based on tellurium and compounds, as PM ₁₀ .

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Thallium	NC	-	-	-	-	-	-	-	-	-	-	0.33 (0.1)	TCEQ: Threshold based on health endpoint (interim, supporting documentation not available), as PM ₁₀ .
Titanium	NC	-	-	-	-	0.1	-	0.1	-	-	-	16.7 (5)	ATSDR: Threshold based on increased incidence of inflammation of the trachea and mucous membrane of the nose in rats exposed to titanium tetrachloride for 6 hours/day, 5 days/week for 104 weeks. A LOAEL of 0.1 mg/m ³ was used converted to a human equivalent concentration (LOAEL _{HEC} :0.012 mg/m ³) and an uncertainty factor of 90 (3 for using a LOAEL, 3 for extrapolating from animals to humans and 10 for human variability) was applied.
													US EPA: Threshold based on the ATSDR minimal risk level (see above). A residential scenario exposure factor was applied to the ATSDR minimal risk level (selected as a reference concentration by US EPA) to derive the screening level.
													TCEQ: Threshold (16.7 µg/m ³) based on health effects (interim, supporting documentation not available), as titanium, titanium oxide and titanium dioxide compounds in PM ₁₀ .
Tungsten	NC	-	-	-	-	-	-	-	-	-	-	16.7; 3.3 (5; 1)	TCEQ: Thresholds based on health effects (interim, supporting documentation not available), as insoluble particulate tungsten compounds (5 µg/m ³) and soluble particulate tungsten compounds (1 µg/m ³).
Uranium	NC	-	-	-	-	0.04; 0.8	-	0.042	-	0.03	-	0.67; 0.17 (0.2; 0.05)	ATSDR: The threshold for soluble forms of uranium (0.04 µg/m ³) is based on renal tubular atrophy in dogs exposed to uranium tetrachloride for 33 hours/week for 1 year. The BMCL ₁₀ (benchmark concentration lower confidence limit corresponding to the lower 10% incidence of effect) was 0.019 mg/m ³ and adjusted for continuous exposure (multiplied by 33/168 hours = 0.0037 mg/m ³) and an uncertainty factor of 100 (10 for extrapolating from animals to humans and 10 for human variability) was applied to give 0.04 µg/m ³ as the threshold for soluble uranium.
													Threshold for insoluble uranium (0.8 µg/m ³) based on fibrosis in the lungs and tracheobronchial lymph nodes in monkeys exposed to insoluble forms of uranium for 5.4 hours/day, 5 days/week for 5 years. The LOAEL (5.1 mg/m ³) was adjusted for intermittent exposure (5.1 mg/m ³ x 5.4 hours/24 hour x 5 days/7 days) and an uncertainty factor of 1,000 (10 for using a LOAEL, 10 for extrapolating from animals to humans and 10 for human variability) was applied to give 0.8 µg/m ³ as the threshold for insoluble uranium.
													US EPA: Threshold based on ATSDR minimal risk level (see above). A residential scenario exposure factor was applied by US EPA to derive a screening level.
													OMOE: Threshold based on a health endpoint and will take effect after July 1, 2016 (as uranium in PM ₁₀ , supporting documentation not available).
													TCEQ: Threshold based on health effects (interim, supporting documentation not available) as insoluble uranium compounds in PM ₁₀ (0.67 µg/m ³) and as soluble uranium compounds in PM ₁₀ (0.167 µg/m ³).
Vanadium	NC	-	-	-	-	0.1	-	0.1	-	-	-	0.17 (0.05)	ATSDR: Threshold based on degeneration of respiratory epithelium of the epiglottis in mice exposed to vanadium pentoxide for 6 hours/day, 5 days/week for 104 weeks. The human equivalent BMCL ₁₀ (benchmark concentration lower confidence limit corresponding to the lower 10% incidence of effect) of 0.003 mg/m ³ was used and an uncertainty factor of 30 (3 for extrapolating from animals to humans and 10 for human variability) was applied to calculate 0.1 µg/m ³ as the threshold for vanadium pentoxide.
													US EPA: Threshold based on ATSDR (see above).
													TCEQ: Threshold based on health effects (interim, supporting documentation not available) as vanadium compounds and vanadium pentoxide in PM ₁₀ .
Zinc	NC	-	-	-	-	-	-	-	-	-	-	6.7 (2)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as zinc and compounds in PM ₁₀ .

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELs ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Polycyclic Aromatic Hydrocarbons													
1-Methylnaphthalene	NC	-	-	-	-	-	-	-	-	-	-	10 (3)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylnaphthalene	NC	-	-	-	-	-	-	-	-	-	-	10 (3)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
1-Methylphenanthrene Surrogate: phenanthrene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on phenanthrene as a surrogate.
2-Methylphenanthrene Surrogate: phenanthrene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on phenanthrene as a surrogate.
3-Methylphenanthrene Surrogate: phenanthrene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on phenanthrene as a surrogate.
4-Methylphenanthrene (surrogate: phenanthrene)	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on phenanthrene as a surrogate.
9-Methylphenanthrene (surrogate: phenanthrene)	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on phenanthrene as a surrogate.
1-Nitropyrene	C	-	-	-	-	-	-	-	-	-	0.091	0.17 (0.05)	Cal OEHHA: Threshold based on a potency equivalence factor (PEF) of 0.1 relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation available).
												TCEQ: Threshold based on health effects (interim, supporting documentation not available).	
2-Methylantracene Surrogate: anthracene	NC	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on anthracene as a surrogate.
2-Methylfluorene Surrogate: fluorene	NC	-	-	-	-	-	-	-	-	-	-	3.3 (1)	TCEQ: Threshold based on fluorene as a surrogate.
2-Methylpyrene Surrogate: pyrene	NC	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on pyrene as a surrogate.
3- Methyldibenzothiophene Surrogate: dibenzothiophene	NC	-	-	-	-	-	-	-	-	-	-	8.3 (2.5)	TCEQ: Threshold based on dibenzothiophene as a surrogate.
4- Methyldibenzothiophene Surrogate: dibenzothiophene	NC	-	-	-	-	-	-	-	-	-	-	8.3 (2.5)	TCEQ: Threshold based on dibenzothiophene as a surrogate.
Acenaphthene	NC	-	-	-	-	-	-	-	-	-	-	0.33 (0.1)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), in PM ₁₀ .
Acenaphthylene Surrogate: Acenaphthene	NC	-	-	-	-	-	-	-	-	-	-	0.33 (0.1)	TCEQ: Threshold based on acenaphthene as a surrogate.
Acephenanthrylene Surrogate: pyrene	NC	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on pyrene as a surrogate.
Anthracene	NC	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), in PM ₁₀ .

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Benz(a)anthracene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHH inhalation unit risk (IUR). Cal OEHH: Threshold based on a potency equivalence factor (PEF) of 0.1 relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation available). TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), in PM₁₀.
Benzo(a)fluorene Surrogate: chrysene	C	-	-	-	-	-	-	0.92 (0.092)	-	-	0.91	0.17 (0.05)	US EPA, Cal OEHH, and TCEQ: Threshold based on chrysene as a surrogate.
Benzo(a)pyrene	C	-	-	-	-	-	-	0.0092 (0.00092)	0.00012	0.0001 (0.00001)	0.0091	0.01 (0.003)	US EPA: Threshold based on the Cal OEHH inhalation unit risk (IUR). WHO: Based on epidemiological data from studies on coke-oven workers exposed to a mixture of PAHs, a unit risk for benzo(a)pyrene as an indicator in air constituent is estimated to be 8.7 × 10⁻⁵ per ng/m³. The corresponding concentrations of benzo(a)pyrene producing an incremental lifetime cancer risk of 1 in 100,000 is 0.12 ng/m³. OMOE: Threshold based on carcinogenic potential endpoint that is based on an evaluation of coke-oven worker epidemiological studies by the WHO that derived an inhalation unit risk (IUR) value of 8.7 × 10⁻⁵ per ng/m³ for benzo(a)pyrene as a surrogate for total PAHs, equivalent to 0.1 ng/m³ of benzo(a)pyrene at a risk level of 1 in 100,000. Cal OEHH: Threshold based on respiratory tract tumors in hamsters. A linearized multistage model was fit to the respiratory tract tumor data resulting from inhalation exposure of hamsters to benzo(a)pyrene. A human equivalent inhalation unit risk (IUR) of 0.0011 per µg/m³ was derived and an incremental lifetime cancer risk of 1 in 100,000 was used to convert the IUR to a screening value. TCEQ: Threshold based on a health effect (under review, supporting documentation not available), in PM₁₀.
Benzo(b)fluoranthene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHH inhalation unit risk (IUR). Cal OEHH: Threshold based on a potency equivalence factor (PEF) of 0.1 relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation for benzo(a)pyrene available). TCEQ: Threshold based on health effects (interim, supporting documentation not available) in PM₁₀.
Benzo(e)pyrene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), in PM₁₀.
Benzo(g,h,i)fluoranthene Surrogate: benzo(g,h,i)perylene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on benzo(g,h,i)perylene as a surrogate.
Benzo(g,h,i)perylene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), in PM₁₀.
Benzo(k)fluoranthene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHH inhalation unit risk (IUR). Cal OEHH: Threshold based on a potency equivalence factor (PEF) of 0.1 relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation for benzo(a)pyrene available). TCEQ: Threshold based on health effects (interim, supporting documentation not available) in PM₁₀.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Chrysene	C	-	-	-	-	-	-	0.92 (0.092)	-	-	0.91	0.17 (0.05)	US EPA: Threshold based on the Cal OEHHA inhalation unit risk (IUR). Cal OEHHA: Threshold based on a potency equivalence factor (PEF) of 0.01 relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation for benzo(a)pyrene available). TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Coronene Surrogate: benzo(g,h,i)perylene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on benzo(g,h,i)perylene as a surrogate.
Cyclopenta(cd)pyrene	C	-	-	-	-	-	-	0.092 (0.0092)	0.0012	0.001 (0.0001)	0.091	0.1 (0.03)	WHO, OMOE, US EPA, Cal OEHHA, and TCEQ: Threshold based on a PEF of 0.1 (Health Canada 2010) relative to benzo(a)pyrene (i.e., a PEF of 0.1 was applied to the thresholds available for benzo(a)pyrene) in the absence of an available threshold for cyclopenta(cd)pyrene.
Dibenzo(a,h)anthracene	C	-	-	-	-	-	-	0.0084 (0.00084)	-	-	0.0083	0.17 (0.05)	US EPA: Threshold based on the Cal OEHHA inhalation unit risk (IUR). Cal OEHHA: Threshold based on an oral slope factor of 4.1 per mg/kg/day derived using a linearized multistage model with dose-response data from a drinking water study which reported alveolar carcinomas of the lung in male mice due to dibenzo(a,h)anthracene. An inhalation unit risk (IUR) was derived from the oral slope factor with the assumption that dibenzo(a,h)anthracene was equally absorbed and equally potent by oral and inhalation routes and that a 70 kg person inhales 20 m³ of air per day. An ILCR of 1 in 100,000 was used to convert the IUR (0.0012 per µg/m³) to a screening value. TCEQ: Threshold based on health effects (interim, supporting documentation not available), in PM₁₀.
Dibenzothiophene	NC	-	-	-	-	-	-	-	-	-	-	8.3 (2.5)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Fluoranthene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as PM₁₀.
Fluorene	NC	-	-	-	-	-	-	-	-	-	-	3.3 (1)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as PM₁₀.
Indeno(1,2,3-cd)fluoranthene Surrogate: indeno(1,2,3-cd)pyrene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHHA inhalation unit risk (IUR) for indeno(1,2,3-cd)pyrene. Cal OEHHA: Threshold based on a potency equivalence factor (PEF) of 0.1 for indeno(1,2,3-cd)pyrene relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³). TCEQ: Threshold based on health effects using indeno(1,2,3-cd)pyrene as a surrogate (interim, supporting documentation not available).
Indeno(1,2,3-cd)pyrene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHHA inhalation unit risk (IUR). Cal OEHHA: Threshold based on a potency equivalent factor (PEF) of 0.1 for indeno(1,2,3-cd)pyrene relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³). TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Indeno(1,2,3-W)pyrene Surrogate: indeno(1,2,3-cd)pyrene	C	-	-	-	-	-	-	0.092 (0.0092)	-	-	0.091	0.17 (0.05)	US EPA: Threshold based on the Cal OEHHA inhalation unit risk (IUR) for indeno(1,2,3-cd)pyrene. Cal OEHHA: Threshold based on a potency equivalence factor (PEF) of 0.1 for indeno(1,2,3-cd)pyrene relative to benzo(a)pyrene (inhalation unit risk [IUR] = 0.00011 per µg/m³; supporting documentation available). TCEQ: Threshold based on health effects, as indeno(1,2,3-cd)pyrene (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Naphthalene	NC	-	-	-	-	4 (0.0007 p pm)	-	3.1	10	-	9	170 (50)	ATSDR: Threshold based on induced nasal lesions in rats exposed to naphthalene, from two chronic inhalation toxicity and carcinogenicity studies with mice. The LOAEL was 10 ppm (52.4 mg/m³), adjusted for continuous exposure (multiplied by 6 hours/24 hours x 5 days/7 days = 1.8 ppm or 9.4 mg/m³) and converted to a human equivalent concentration (HEC) (0.2 ppm or 1.05 mg/m³). The HEC derived by using a regional gas dose ratio (RGDR) for a rat to human conversion by multiplying 1.8 ppm x 0.132 (0.2 ppm or 1.05 mg/m³). An uncertainty factor of 300 (10 for use of a LOAEL, 3 for extrapolating from animals to humans with dosimetric adjustment and 10 for human variability) was used. A molecular weight of 128.17 g/mol was used to convert from ppm to mg/m³. US EPA: Non-carcinogenic threshold based on a reference concentration (RfC) of 0.003 mg/m³ for nasal effects (hyperplasia and metaplasia in respiratory and olfactory epithelium) in mice. The human equivalent (LOAEL_{HEC}) was 9.3 mg/m³ and an uncertainty factor of 3,000 (10 for sensitive individuals, 10 for interspecies extrapolation, 10 for use of LOAEL, 3 for database deficiencies) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level. WHO: Non-carcinogenic threshold based on respiratory tract lesions leading to inflammation and olfactory epithelial metaplasia in animal studies (rats) when chronically exposed to 53 mg/m³ of naphthalene for 6 hours/day, 5 days/week for 104 weeks. The LOAEL was 53 mg/m³ and adjusted for continuous exposure (6 hours/24 hours, 5 days/7days) to obtain a value of about 10 mg/m³. An uncertainty factor of 1,000 (10 for using a LOAEL rather than a NOAEL, 10 for interspecies variation, and 10 for inter-individual variation) was applied. Cal OEHHA: Threshold based on LOAEL of 10 ppm for nasal inflammation, olfactory epithelial metaplasia, and respiratory epithelial hyperplasia in mice exposed to 0, 10, or 30 ppm naphthalene vapour for 6 hours/day, 5 days/week for 104 weeks. The LOAEL was adjusted for continuous exposure (6 hours/24 hours, 5 days/7days). Uncertainty factors were applied for use of a LOAEL (10), interspecies variability (10), and intraspecies variability (10). TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Perylene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on health effects (interim, supporting documentation not available), in PM ₁₀ .
Phenanthrene	C	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on health effects (under review, supporting documentation not available).
Picene Surrogate: dibenzo(a,h)anthracene	C	-	-	-	-	-	-	0.0084 (0.00084)	-	-	0.0083	0.17 (0.05)	US EPA, Cal OEHHA, and TCEQ: Threshold based on dibenzo(a,h)anthracene as a surrogate.
Pyrene	NC	-	-	-	-	-	-	-	-	-	-	0.17 (0.05)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Biphenyl	NC	-	-	-	-	-	-	0.42	-	-	-	1	US EPA: Threshold is based on a provisional peer reviewed toxicity value (PPRTV) for 1,1-biphenyl (US EPA 2011a). A study conducted by Cannon Laboratories Inc. (1977, as cited in US EPA 2011a) was selected as the principal study for the derivation of a screening toxicity value. The principal study was not peer-reviewed and is an unpublished report. The study was considered inadequate for derivation of a chronic provisional reference concentration (RfC), but was considered suitable to derive screening toxicity values. Mice were exposed to atmospheric concentrations of biphenyl for 7 hours/day, 5 days/week for 13 weeks. Benchmark concentration modelling of the 13-week inhalation data for both respiratory effects (i.e., congestion and edema of the lungs) and extra-respiratory effects (i.e., congestion and edema in the livers and kidneys) was conducted. The lower human equivalent benchmark concentration (BMCL_{10HEC}) of 1.2 mg/m³ for extrarespiratory effects in mice was selected as the point of departure for deriving the screening RfC. An uncertainty factor of 3,000 (3 for animal-to-human extrapolation, 10 for no acceptable two-generation reproduction studies or developmental studies, 10 for intraspecies differences and 10 for using a data from a subchronic-duration study for evaluating response from chronic-duration exposure) was applied resulting in a screening chronic provisional RfC of 0.0004 mg/m³. A residential scenario exposure factor was applied to the screening chronic provisional RfC to derive a screening level. TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Volatile Organic Compounds													
Ethylene	NC	-	-	-	-	-	-	-	-	-	-	6,100 (1,800)	TCEQ: Threshold based on hepatic damage in rats exposed to ethylene via inhalation for 6 hours/day, 5 days/week for over 2 years. The NOAEL of 3,442 mg/m³ (3,000 ppm) was adjusted for continuous exposure, resulting in a value of 615 mg/m³ (535.71 ppm) and an uncertainty factor of 100 (3 for interspecies variation, 10 for intraspecies variation, 3 for database uncertainty) was applied. The molecular weight 28.05 g/mol was used to convert from ppm to mg/m³.
1,1,1-Trichloroethane (methyl chloroform)	NC	-	-	-	-	-	-	5200	-	-	1,000	5,100 (1,500)	US EPA: Threshold based on a NOAEL_{HEC} of 1,553 mg/m³ using two inhalation studies in rodents. Rodents were exposed for 6 hrs/d, 5 d/wk for 2 years (concentrations adjusted for continuous exposure (1,460 mg/m³)). The human equivalent concentration (HEC) was estimated from the rat NOAEL of 8,190 mg/m³, which was based on liver histopathology changes following repeated exposure to 1,1,1-trichloroethane. Physiologically based pharmacokinetic (PBPK) modelling was applied for interspecies extrapolation to obtain a NOAEL HEC of 1,553 mg/m³. A total uncertainty factor of 100 was applied (10 for intraspecies differences, and 3 each for database deficiencies and for pharmacodynamic uncertainty in extrapolating from animals to humans), resulting in a chronic RfC of 16 mg/m³. The chronic RfC was higher than the short-term RfC (5 mg/m³) derived for 1,1,1-trichloroethane by the US EPA. Therefore, the chronic RfC was set at 5 mg/m³, to not exceed the limiting reference value derived for short-term exposure. A residential scenario exposure factor was applied to the RfC to derive a screening level. Cal OEHH: Threshold is based on neurotoxic effects in gerbils exposed for 3 months. The NOAEL was 70 ppm (381.9 mg/m³) and an uncertainty factor of 300 (3 for subchronic to chronic extrapolation, 10 for interspecies variability, and 10 for intraspecies variability) was applied. A human equivalent concentration (HEC) was not derived because there were no species-specific data for allowing for the extrapolation from gerbils to humans. TCEQ: Threshold based on slight microscopic hepatic changes in rats and mice exposed for 6 hours/day, 5 days/week for 2 years. The LOAEL was 1,500 ppm (8,184 mg/m³) and adjusted for a human equivalent concentration (HEC) (283.1 ppm or 1,545 mg/m³). An uncertainty factor of 300 (3 for interspecies variability, 10 for intraspecies variability, and 10 for database uncertainty) was applied.
1,3,5-Trimethylbenzene Surrogate: 1,2,4-trimethylbenzene	NC	-	-	-	-	-	-	7.3	-	-	-	417 (125)	US EPA and TCEQ: Threshold based on 1,2,4-trimethylbenzene as a surrogate.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
1,2,4-Trimethylbenzene	NC	-	-	-	-	-	-	7.3	-	-	-	417 (125)	US EPA: Threshold based on a provisional reference concentration (RfC) of 0.007 mg/m³ based on decreased clotting time in rats exposed to 1,2,4-trimethylbenzene for 6 hours/day, 5 days/week for 3 months (US EPA 2007). A NOAEL of 123 mg/m³ was identified, adjusted for continuous exposure and a NOAEL_{HEC} of 21.8 mg/m³ was calculated. An uncertainty factor of 3,000 (3 for extrapolating from animals to humans, 10 for interindividual variability, 10 for extrapolating from subchronic to chronic exposure, and 10 for database deficiencies) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on health effects (under review, supporting documentation not available).
1,3-Butadiene	NC	-	-	-	-	-	-	2.1	-	2	2	33 (9.9)	US EPA: Threshold based on a reference concentration (RfC) of 0.002 mg/m³ based on ovarian atrophy in a 2-year mouse inhalation study. The benchmark concentration confidence limit corresponding to a 10% response and adjusted to a human equivalent concentration (BMCL_{HEC10}) was determined to be 1.9 mg/m³ (0.88 ppm). An uncertainty factor of 1,000 (3 for interspecies extrapolation, 10 for intraspecies variability, 3 for an incomplete database, and 10 for extrapolation to a level below the 10% effect level) was applied to derive an RfC of 0.002 mg/m³. A residential scenario exposure factor was applied to the RfC to derive a screening level. OMOE: Threshold based on a health endpoint (supporting documentation not available). Cal OEHHA: Threshold based on an increased incidence of ovarian atrophy in mice exposed for 6 hours/day, 5 days/week for 9 to 24 months. The benchmark concentration lower confidence limit corresponding to a 5% response (BMCL₀₅) was 1.01 ppm (2.23 mg/m³). After adjusting for continuous exposure (1.01 ppm x 6/24 hour x 5/7 days = 0.18 ppm or 0.4 mg/m³) and adjusting for a human equivalent concentration (HEC) (0.18 ppm x 1.68 dosimetric adjustment factor (DAF) = 0.302 ppm or 0.67 mg/m³), an uncertainty factor of 300 (10 for interspecies toxicodynamic differences, 10 for intraspecies toxicokinetic differences, and 3 for intraspecies toxicodynamic differences) was applied, resulting in a chronic REL of 0.002 mg/m³. The DAF is the ratio of physiologically based pharmacokinetic (PBPK) predicted human blood concentration over the PBPK predicted animal blood concentration. TCEQ: Threshold based on ovarian atrophy in female mice exposed for 6 hours/day, 5 days/week for 2 years. The benchmark concentration lower confidence limit corresponding to a 5% response (BMCL₀₅) was 0.462 ppm (1.02 mg/m³) and was not adjusted for a human equivalent concentration (HEC). An uncertainty factor of 30 (10 for intraspecies variability and 3 for database uncertainty) was applied.
	C	-	-	-	-	-	-	-	0.94 (0.094)	-	20 (2)	0.059	20

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
2,2,4-Trimethylpentane Surrogate: 2,3,4- trimethylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2,3,4-Trimethylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2,2-Dimethylbutane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (supporting documentation not available).
2,3-Dimethylbutane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (supporting documentation not available).
2,3-Dimethylhexane Surrogate: dimethylhexane, all isomers	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).
2,4-Dimethylhexane Surrogate: dimethylhexane, all isomers	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).
2,5-Dimethylhexane Surrogate: dimethylhexane, all isomers	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint, as dimethyl hexane, all isomers (interim, supporting documentation not available).
2,3-Dimethylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2,4-Dimethylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2-Methyl-1-butene Surrogate: 1-butene	NC	-	-	-	-	-	-	-	-	-	-	5,300 (1,600)	TCEQ: Threshold based on 1-butene as a surrogate. Threshold based on no observed effects level in rats exposed to 1-butene for 6 hours/day, 7 days/week for approximately 42 days. A free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 18,981 mg/m ³ (8,271 ppm) was adjusted for continuous exposure (4,746 mg/m ³ or 2,068 ppm) and an uncertainty factor of 900 (3 for interspecies variability, 10 for intraspecies variability, 3 for subchronic to chronic extrapolation, and 10 for an incomplete database) was applied. A molecular weight of 56.11 g/mol was used to convert ppm to mg/m ³ .
3-Methyl-1-butene Surrogate: 1-butene	NC	-	-	-	-	-	-	-	-	-	-	5,300 (1,600)	TCEQ: Threshold based on 1-butene as a surrogate. Supporting information provided above for 2-Methyl-1-butene.
2-Methyl-2-pentene	NC	-	-	-	-	-	-	-	-	-	-	600 (180)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
2-Methylheptane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2-Methylhexane	NC	-	-	-	-	-	-	-	-	-	-	1,020 (307)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
3-Methylhexane	NC	-	-	-	-	-	-	-	-	-	-	1,020 (307)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
2-Methylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (under review, supporting documentation not available).
3-Methylpentane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
3-Ethylhexane Surrogate: ethylhexane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint, as ethyl hexane (interim, supporting documentation not available).
Benzene	NC	-	-	-	-	9.6 (0.003 pp m)	-	31	-	-	3	280 (84)	ATSDR: Threshold based on a decrease in B cell count in a cross-sectional study performed on 250 workers exposed to benzene for an average of 6.1±2.9 years. The benchmark concentration lower confidence limit corresponding to a 0.25 standard deviation (BMCL_{0.25SD}) was 0.10 ppm (0.32 mg/m³) and adjusted for continuous exposure (multiplied by 8/24 hours x 6/7 days = 0.03 ppm or 0.096 mg/m³). An uncertainty factor of 10 (for human variability) was applied. A molecular weight of 78.11 g/mol was used to convert from ppm to mg/m³. US EPA: Non-carcinogenic threshold based on decreased lymphocyte count in 44 occupationally exposed workers. The reference concentration (RfC) of 0.03 mg/m³ was derived from a benchmark concentration (BMC) of 13.7 ppm and a BMCL (the 95% lower bound on the BMC) of 7.2 ppm. Converting the units and adjusting for continuous exposure resulted in an adjusted benchmark concentration (BMCL_{ADJ}) of 8.2 mg/m³. An uncertainty factor of 300 was applied (3 for extrapolation from a benchmark dose, 10 for human variability, 3 for subchronic to chronic extrapolation, and 3 for database deficiencies). Cal OEHHA: Non-carcinogenic threshold based on decreased peripheral blood cell counts in 250 occupationally exposed workers exposed for 8 hours/day, 6 days/week for an average of 6.1 years. The benchmark concentration lower confidence limit corresponding to a 0.5 standard deviation (BMCL_{0.5SD}) of 1.52 mg/m³ (0.476 ppm) was adjusted for average continuous exposure to 0.665 mg/m³ (0.204 ppm). An uncertainty factor of 200 (60 for intraspecies differences, 10^{1/2} for subchronic uncertainty) was applied. TCEQ: Threshold based on decreased absolute lymphocyte count in 44 benzene-exposed workers exposed for 5 days/week for a mean of 6.3 years. The benchmark concentration lower confidence limit (BMCL) was 7.2 ppm (23 mg/m³) and extrapolated to continuous exposure (2.6 ppm or 8.3 mg/m³). An uncertainty factor of 30 (10 for intraspecies variability and 3 for an incomplete database) was applied.

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Benzene (continued)	C	-	-	-	-	-	-	3.6 (0.36)	1.7	4.5 (0.45)	0.34	4.5	US EPA: Carcinogenic threshold based on an inhalation unit risk (IUR) of 7.8×10^{-6} per $\mu\text{g}/\text{m}^3$ for an increased incidence of leukemia in occupationally exposed workers. The risk-based concentration for an incremental lifetime cancer risk of 1 in 100,000 is $1.3 \mu\text{g}/\text{m}^3$. A residential scenario exposure factor was applied to the risk-based concentration to derive a screening level. WHO: Threshold based on an increase of mortality from leukemia in workers who were occupationally exposed. Threshold based on the geometric mean of the range of estimates of the incremental lifetime cancer risk (inhalation unit risk [IUR] = 6×10^{-6} per $\mu\text{g}/\text{m}^3$) of leukemia from the Pliofilm cohort study (see OMOE derivation below). The guideline is based on an ILCR of 1 in 100,000. OMOE: Threshold based on 1,717 occupationally exposed male workers. An inhalation unit risk (IUR) of 2.2×10^{-6} per $\mu\text{g}/\text{m}^3$ was determined. Threshold based on the incidence of cancer death in a cohort of 1,717 male occupational exposed workers assumed to be exposed for 8 hours/day, 250 days/year in a Pliofilm plant. The US EPA proposed a range of IURs from 2.2×10^{-6} to 7.8×10^{-6} per $\mu\text{g}/\text{m}^3$. The lower end of this range was based on the Paustenbach et al. (1992; as cited in OMOE 2011) exposure estimates and the higher end was based on the Crump and Allen (1994; as cited in OMOE 2011) exposure estimates. Both approaches are based on the Pliofilm study, but OMOE preferred the Paustenbach exposure matrix because it includes additional observations. Hence, the lower unit risk of 2.2×10^{-6} per $\mu\text{g}/\text{m}^3$ was selected which corresponds to concentration range of $0.45 \mu\text{g}/\text{m}^3$. The threshold was multiplied by 10 to account for a cancer risk of 1 in 100,000. Cal OEHHA: Based on an inhalation unit risk (IUR) of 2.9×10^{-5} per $\mu\text{g}/\text{m}^3$ for a risk level of 1 in 1,000,000, which corresponds to the upper 95% confidence bound derived by US EPA for human leukemia incidence data from two occupational studies. TCEQ: Threshold based on acute myelogenous and acute monocytic leukemia in occupationally exposed workers. The inhalation unit risk (IUR) is 2.2×10^{-5} per $\mu\text{g}/\text{m}^3$; the ESL is based on an ILCR of 1 in 100,000.
Butane	NC	-	-	-	-	-	-	-	-	-	-	24,000 (7,200)	TCEQ: Threshold based on the chronic health ESL of pentane because no chronic toxicological data on n-butane was available. Since there is a direct relationship between aliphatic carbon length and the potency effect of alkanes, use of pentane (which is longer and therefore more toxic than butane) as a surrogate was considered conservative (supporting documentation available).
cis-2-Butene Surrogate: 2-butene	NC	-	-	-	-	-	-	-	-	-	-	1,600 (480)	TCEQ: Threshold based on 2-butene as a surrogate. Decreased body weight was observed in female rats exposed to 2-butene for 6 hours/day, 7 days/week for 39 to 46 days. (2,476 ppm) was adjusted for continuous exposure ($1,421 \text{ mg}/\text{m}^3$ [619 ppm]). An uncertainty factor of 900 (3 for interspecies variability, 10 for intraspecies variability, 3 for subchronic to chronic extrapolation, and 10 for an incomplete database) was applied. A molecular weight of 56.11 g/mol was used to convert from ppm to mg/m^3 .
trans-2-Butene Surrogate: 2-butene	NC	-	-	-	-	-	-	-	-	-	-	1,600 (480)	TCEQ: Threshold based on 2-butene as a surrogate. Supporting information provided above for cis-2-Butene.
Cyclohexane	NC	-	-	-	-	-	-	6,300	-	-	-	1,130 (340)	US EPA: Threshold based on a reference concentration (RfC) of $6.0 \text{ mg}/\text{m}^3$ for a significant reduction in body weights of rats (parental and F_1 generation) exposed to cyclohexane vapours. The NOAEL for developmental effects was $6,886 \text{ mg}/\text{m}^3$ and adjusted for continuous exposure ($1,722 \text{ mg}/\text{m}^3$). The benchmark concentration lower confidence limit adjusted to a human equivalent concentration (BMCL_{HEC}) was $1,822 \text{ mg}/\text{m}^3$ and an uncertainty factor of 300 (3 for interspecies differences, 10 for intraspecies variation in humans, and 10 for database deficiencies) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on health effects (interim, supporting documentation not available).
Cyclopentane	NC	-	-	-	-	-	-	-	-	-	-	1,130 (340)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
n-Dodecane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Dodecylcyclohexane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on health effects (interim, supporting documentation not available).
n-Eicosane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Ethylbenzene	NC	-	-	-	-	260 (0.06 pp m)	-	1,000	-	-	2,000	1,900 (570)	ATSDR: Threshold based on increased severity of chronic progressive nephropathy in female rats exposed to 75 ppm (325.7 mg/m³) for 6 hours/day, 5 days/week for 104 weeks. The LOAEL was converted to a human equivalent concentration (HEC) (17.45 ppm or 75.8 mg/m³) and an uncertainty factor of 300 (10 for the use of a LOAEL, 3 for extrapolation from animals to humans with dosimetric adjustments, and 10 for human variability) was used to calculate a chronic-duration inhalation minimal risk level of 0.06 ppm (260 µg/m³). A molecular weight of 106.17 g/mol was used to convert from ppm to mg/m³. US EPA: Threshold based on a reference concentration (RfC) of 1.0 mg/m³ based on developmental toxicity in rat and rabbit studies. The NOAEL was 434 mg/m³ and the NOAEL_{HEC} was also 434 mg/m³. An uncertainty factor of 300 (3 for interspecies conversion and 10 for the absence of multigenerational reproductive and chronic studies) was used. A residential scenario exposure factor was applied to the reference concentration (RfC) to derive the screening level. Cal OEHHA: Threshold based on nephrotoxicity and body weight reduction in rats and hyperplasia of the pituitary gland, liver cellular alterations and necrosis in mice in a 103 week study. The experimental NOAEL_{HEC} was 56 mg/m³ (13 ppm). An uncertainty factor of 30 (3 for interspecies differences and 10 for intraspecies differences) was applied. TCEQ: Threshold based on increased severity of nephropathy in rats exposed for 6 hours/day, 5 days/week for 104 weeks. The NOAEL was 75 ppm (326 mg/m³) and adjusted for continuous exposure and a human equivalent concentration (HEC) (13 ppm or 57 mg/m³). An uncertainty factor of 30 (3 for interspecies variability and 10 for intraspecies variability) was applied.
m-Ethyltoluene	NC	-	-	-	-	-	-	-	-	-	-	417 (125)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
p-Ethyltoluene Surrogate: m-ethyltoluene	NC	-	-	-	-	-	-	-	-	-	-	417 (125)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Farnesane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Heneicosane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Heptadecane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Heptane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Hexadecane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
cis-2-Hexene Surrogate: 1-hexene	NC	-	-	-	-	-	-	-	-	-	-	570 (170)	TCEQ: Threshold based on a health endpoint, as 1-hexene (interim, supporting documentation not available).
trans-2-Hexene Surrogate: 1-hexene	NC	-	-	-	-	-	-	-	-	-	-	570 (170)	TCEQ: Threshold based on a health endpoint, as 1-hexene (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Indanone Surrogate: indane	NC	-	-	-	-	-	-	-	-	-	-	160 (48)	TCEQ: Threshold based on a health endpoint, as indane (interim, supporting documentation not available).
Isobutene	NC	-	-	-	-	-	-	-	-	-	-	110,000 (32,000)	TCEQ: Threshold based on degeneration in the respiratory and olfactory epithelium (lesions; accumulation of protein globules) in rats and mice exposed to isobutene for 6 hours/day, 5 days/week for 105 weeks. A free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 18,300 mg/m ³ (7,960 ppm) was extrapolated for continuous exposure (x 6/24 hours x 5/7 days) to a point of departure (POD _{ADJ}) of 3,300 mg/m ³ (1,421 ppm) and an uncertainty factor of 30 (3 for interspecies variation and 10 for intraspecies variation) was applied to derive a value of 110 mg/m ³ (47 ppm). A molecular weight of 56.11 g/mol was used to convert from ppm to mg/m ³ .
Isopentane	NC	-	-	-	-	-	-	-	-	-	-	24,000 (7100)	TCEQ: Threshold based on a free-standing NOAEL (i.e., no LOAEL provided) for neurotoxicity where rats were exposed for 9 hours/day, 5 days/week for 30 weeks. The NOAEL of 3,000 ppm (8,853 mg/m ³) was adjusted for continuous exposure (804 ppm or 2,371 mg/m ³) and an uncertainty factor of 100 (3 for interspecies variability, 10 for intraspecies variability and 3 for an incomplete database) was applied.
Methylcyclohexane	NC	-	-	-	-	-	-	-	-	-	-	5,370 (1,610)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Methylcyclopentane	NC	-	-	-	-	-	-	-	-	-	-	880 (260)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Nonadecane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Nonane	NC	-	-	-	-	-	-	21	-	-	-	3,500 (1,050)	US EPA: Threshold based on a provisional reference concentration (RfC) of 0.02 mg/m ³ for nonane (US EPA 2009a) Increased salivation and lacrimation, as well as marginally depressed body weight was observed in rats exposed to 8,292 mg/m ³ (LOAEL) for 6 hours/day, 5 days/week for 13 weeks. The NOAEL identified in this study was 3,095 mg/m ³ and was adjusted for continuous exposure (NOAEL _{ADJ} ; 553 mg/m ³). The human equivalent concentration (HEC; 66.4 mg/m ³) was determined by multiplying the NOAEL _{ADJ} by the ratio of the blood:gas (air) partition coefficient of n-nonane for the laboratory animal species to the human value (ratio of 0.12). An uncertainty factor of 3,000 (3 for interspecies extrapolation, 10 for using a subchronic study, 10 for intraspecies differences and 10 for database limitations) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level.
													TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Octadecane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Octane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
n-Pentadecane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHH RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
n-Pentane	NC	-	-	-	-	-	-	1,000	-	-	-	24,000 (7,100)	US EPA: Threshold based on a provisional reference concentration (RfC) (1 mg/m³). The RfC is based on a free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 20,483 mg/m³ in a subchronic study of rats exposed to n-pentane for 6 hours/day, 5 days/week for 13 weeks (US EPA 2009b). n-Pentane has not been shown to induce neurotoxic effect in rats exposed to concentrations up to 9,089 mg/m³ (subchronic) nor has it been shown to induce developmental effects in rat fetuses from dams exposed to n-pentane vapour during gestation up to 29,509 mg/m³ (highest concentration). The NOAEL was adjusted for continuous exposure and to a NOAEL_{HEC} of 3,658 mg/m³. An uncertainty factor of 3,000 (3 for interspecies extrapolation, 10 for intraspecies differences, 10 for database insufficiencies and 10 for exposure duration) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on a free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) in rats exposed for 9 hours/day, 5 days/week for 30 weeks. The NOAEL was 3,000 ppm (8,853 mg/m³) and was adjusted for continuous exposure (803.57 ppm or 2,371 mg/m³) and multiplied by the ratio of the animal blood gas partition coefficient to the human blood gas partition coefficient (default of 1), resulting in a human equivalent concentration of 803.57 ppm (2,371 mg/m³). An uncertainty factor of 100 (3 for interspecies variability, 10 for intraspecies variability and 3 for database uncertainty) was applied.
n-Propylbenzene	NC	-	-	-	-	-	-	1,000	-	-	-	830 (250)	US EPA: Threshold based on developmental toxicity effects from ethylbenzene exposure as a surrogate for propylbenzene. Rats and white rabbits were exposed 6 to 7 hours/day, 7 days/week during days 1 to 19 and 1 to 24 of gestation, respectively. A NOAEL of 434 mg/m³ (100 ppm) was adjusted using an uncertainty factor of 300 (10 for intraspecies variability, 3 for interspecies variability, and 10 for database deficiencies) to give a reference concentration (RfC) of 1 mg/m³. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on health effects (under review, supporting documentation not available).
Pentadecylcyclohexane Surrogate: aliphatics >C16-C21	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on health effects (interim, supporting documentation not available), using alkanes greater than C ₁₇ as a surrogate.
trans-2-Pentene	NC	-	-	-	-	-	-	-	-	-	-	2,000 (600)	TCEQ: Threshold based on data for 2-butene (see above for derivation). The threshold of 210 ppb (based on a HQ of 0.3) for 2-butene was used to derive the threshold for trans-2-pentene by converting 210 ppb to µg/m ³ using a molecular weight of 70.13 g/mol.
Pentylcyclohexane Surrogate: cyclohexane	NC	-	-	-	-	-	-	6,300	-	-	-	1,130 (340)	US EPA: Threshold based on a reference concentration (RfC) of 6.0 mg/m³ for a significant reduction in body weights of rats (parental and F₁ generation) exposed to cyclohexane vapours. The NOAEL for developmental effects was 6886 mg/m³ and adjusted for continuous exposure (1,722 mg/m³). The benchmark concentration lower confidence limit adjusted to a human equivalent concentration (BMCL_{HEC}) was 1,822 mg/m³ and an uncertainty factor of 300 (3 for interspecies differences, 10 for intraspecies variation in humans, and 10 for database deficiencies) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on cyclohexane as a surrogate.
Pristane	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Tetradecylcyclohexane Surrogate: aliphatics >C16-C21	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .
n-Tetradecane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Toluene	NC	-	-	-	-	300 (0.08 pp m)	-	5200	260	-	300	4,100 (1,200)	ATSDR: Threshold based on a study where colour vision impairment was the critical effect in toluene exposed shoe-makers. A LOAEL of 35 ppm (132 mg/m³) was derived. The LOAEL was adjusted for continuous exposure, 35 ppm x 5 days/7 days x 8 hours/24 hours (= 8.3 ppm or 31.3 mg/m³) and an uncertainty factor of 100 (10 for use of a LOAEL and 10 for human variability) was applied. A molecular weight of 92.14 g/mol was used to convert from ppm to mg/m³. US EPA: Threshold based on a reference concentration (RfC) of 5 mg/m³. The RfC is based on neurological effects in occupationally exposed workers and an average NOAEL of 34 ppm (128 mg/m³) from multiple human studies. The NOAEL was adjusted for continuous exposure (34 ppm x 10 m³/20 m³ x 5/7 days = 12.1 ppm or 46 mg/m³). An uncertainty factor of 10 was applied to account for potentially susceptible human subpopulations. The resulting RfC was 5 mg/m³. A residential scenario exposure factor was applied to the RfC to derive a screening level. WHO: Threshold based on LOAEL of 332 mg/m³ for CNS effects in occupationally exposed workers. The LOAEL was adjusted for continuous exposure using a factor of 4.2. Uncertainties for use of a LOAEL (10), human variation (10), and potential effects on developing CNS (3) were applied. The WHO guideline is to be applied as a weekly average. Cal OEHHA: Threshold based on decreased brain (subcortical limbic area) weight and altered dopamine receptor binding in rats in a 4-week study. The NOAEL was 154 mg/m³ (40 ppm) and the human equivalent concentration (HEC) was 27 mg/m³ (7 ppm). An uncertainty factor of 100 (10 for subchronic to chronic extrapolation and 10 for intraspecies differences) was used. TCEQ: Threshold based on a NOAEL of 32 ppm and a LOAEL of 50 ppm for colour vision impairment in occupationally exposed workers exposed to 0, 32, or 132 ppm toluene for 8 hours/day, 5 days/week for 10 years or more. The NOAEL was adjusted for duration (5 days/7 days) and inhalation rate (10 m³/20 m³). An uncertainty factor for intraspecies variation (10) was applied. The resulting threshold of 4,100 µg/m³ (1,110 ppb) was based on a HQ = 1.0. The screening level was derived by adjusting to an HQ = 0.3, by dividing the value of 4100 µg/m³ by 3.3, resulting in a value of 1,200 µg/m³ (330 ppb).
n-Tridecane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Tridecylcyclohexane Surrogate: Aliphatics >C16-C21	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on health (interim, supporting documentation not available), as alkanes greater than C ₁₇ .
o-Xylene Surrogate: Xylenes (total)	NC	-	-	-	-	200 (0.05 pp m)	-	100	-	-	700	610 (180)	ATSDR, US EPA, Cal OEHHA, and TCEQ: Threshold based on xylenes as a surrogate.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Xylenes (total)	NC	-	-	-	-	200 (0.05 pp m)	-	100	-	-	700	610 (180)	ATSDR: Threshold based on subjective effects (such as increased prevalence of anxiety, forgetfulness, inability to concentrate, eye and nasal irritation, dizziness, and sore throats) in 175 workers exposed to mixtures of xylenes for an average of 7 years. A LOAEL of 14 ppm (60.8 mg/m³) was used. An uncertainty factor of 300 (10 for the use of a LOAEL, 10 for human variability and 3 to account for the lack of supporting studies evaluating the chronic neurotoxicity of xylene) was applied. A molecular weight of 106.17 g/mol was used to convert from ppm to mg/m³. US EPA: Threshold based on a reference concentration (RfC) of 0.1 mg/m³ based on impaired motor coordination in rats exposed for 6 hours/day, 5 days/week for 6 months to 0 or 100 ppm or for 3 months to 1000 ppm. An experimental NOAEL of 217 mg/m³ (50 ppm) was calculated and converted to a human equivalent concentration (NOAEL_{HEC}) of 39 mg/m³. An uncertainty factor of 300 (3 for interspecies differences, 10 for intraspecies differences, 3 for extrapolation from subchronic to chronic, and 3 for uncertainties in the database) was applied. A residential scenario exposure factor was applied to the reference concentration (RfC) to derive the screening level. Cal OEHHA: Threshold based on eye irritation, sore throat, floating sensation, and poor appetite in an occupational study where workers were exposed for 8 hours/day, 5 days/week for an average of 7 years. The LOAEL of 14.2 ppm was adjusted for continuous exposure (5 days/7 days) and inhalation rate (10 m³/20 m³). An uncertainty factor of 30 (3 for LOAEL uncertainty and 10 for intraspecies differences) was applied. TCEQ: Threshold based on mild respiratory and subjective neurological effects in a study of 175 occupationally exposed factory workers exposed to mixed isomers of xylene exposed for an average of more than 7 years. The LOAEL was 14 ppm (60.8 mg/m³). An uncertainty factor of 100 (10 for intraspecies variability, 3 for using a LOAEL and 3 for database uncertainty) was applied.
Aliphatics C2-C6 Surrogate: cyclohexane	NC	-	-	-	-	-	-	6,300	-	-	-	1,130 (340)	US EPA: Threshold based cyclohexane as a surrogate. TCEQ: Threshold based on cyclohexane as a surrogate.
Aliphatics >C6-C8 Surrogate: heptane	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on heptane as a surrogate.
Aliphatics >C8-C10 Surrogate: C4-C16 alkanes	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as C ₄ -C ₁₆ alkanes.
Aliphatics >C10-C12 Surrogate: C4-C16 alkanes	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as C ₄ -C ₁₆ alkanes.
Aliphatics >C12-C16 Surrogate: C4-C16 alkanes	NC	-	-	-	-	-	-	-	-	-	-	1,170 (350)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available), as C ₄ -C ₁₆ alkanes.
Aliphatics >C16-C21 Surrogate: alkanes, C17 or higher)	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on health endpoint (interim, supporting documentation not available), as alkanes greater than C ₁₇ .

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Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Aromatics C6-C8 Surrogate: benzene	NC	-	-	-	-	9.6 (0.003 pp m)	-	31	-	-	3	280 (84)	ATSDR, US EPA, Cal OEHHA, and TCEQ: Threshold based on benzene as a surrogate.
	C	-	-	-	-	-	-	3.6 (0.36)	1.7	4.5 (0.45)	0.34	4.5	US EPA, WHO, OMOE, Cal OEHHA and TCEQ: Threshold based on benzene as a surrogate.
Aromatics >C8-C10 Surrogate: trimethylbenzene	NC	-	-	-	-	-	-	7.3	-	-	-	417 (125)	US EPA: Threshold based on 1,2,4-trimethylbenzene as a surrogate.
													TCEQ: Threshold based on 1,2,4-trimethylbenzene as a surrogate.
Aldehydes													
Acetaldehyde	NC							9.4			140	150 (45)	US EPA: Non-carcinogenic threshold based on a reference concentration (RfC) of 9 µg/m ³ based on degeneration of olfactory epithelium in rats. The NOAEL was 273 mg/m ³ and the human equivalent concentration (NOAEL _{HEC}) was 8.7 mg/m ³ . An uncertainty factor of 1,000 (10 for sensitive human populations, 10 for interspecies extrapolation and an incomplete database, and 10 for subchronic to chronic extrapolation) was applied to give an RfC of 9 µg/m ³ . A residential scenario exposure factor was applied to the RfC to derive a screening level.
													Cal OEHHA: Non-carcinogenic threshold based on incidence of degeneration of nasal olfactory epithelium effects in rats (a sub-chronic study for 4 weeks, exposed for 6 hours/day, 5 days/week). The LOAEL of 720 mg/m ³ was adjusted for continuous exposure (43.2 mg/m ³) and was used to calculate a chronic threshold. An uncertainty factor of 300 (3 for subchronic to chronic, 3 for interspecies differences, 3 for intra-individual differences, and 10 to account for sensitive individuals) was applied.
													TCEQ: Threshold based on health effects (interim, supporting documentation not available).
	C							13 (1.3)			3.7		US EPA: Carcinogenic threshold based on an inhalation unit risk (IUR) of 2.2 x 10 ⁻⁶ per µg/m ³ for nasal squamous cell carcinoma or adenocarcinoma in rats. The risk-based concentration for an incremental life cancer risk of 1 in 100,000 is 4.5 µg/m ³ . A residential scenario exposure factor was applied to risk based concentration to derive a screening level.
													Cal OEHHA: Carcinogenic threshold based on an inhalation unit risk (IUR) of 2.7 x 10 ⁻⁶ per µg/m ³ based on rat nasal tumor incidence data using a linearized, time-dependent multistage procedure. The risk-based concentration for an incremental lifetime cancer risk of 1 in 100,000 is 3.7 µg/m ³ .
Acrolein	NC	-	-	-	-	-	-	0.021	-	-	0.35	2.7 (0.82)	US EPA: Threshold based on a reference concentration (RfC) of 0.00002 mg/m ³ for nasal lesions in rats which were exposed to acrolein for 13 weeks. The LOAEL was 0.9 mg/m ³ and the LOAEL _{HEC} was 0.02 mg/m ³ . An uncertainty factor of 1,000 (3 for interspecies extrapolation, 10 for intraspecies uncertainty, 10 for extrapolating from subchronic to chronic, and 3 for the use of a LOAEL instead of a NOAEL) was applied. A residential scenario exposure factor was applied to the RfC to derive a screening level.
													Cal OEHHA: Threshold based on rat studies where a NOAEL of 459 mg/m ³ (0.2 ppm) was identified for respiratory lesions. The human equivalent concentration (HEC) was 69 mg/m ³ (30 ppm). An uncertainty factor of 200 (3 for subchronic to chronic extrapolation, 2 for using dosimetric adjustment factor (DAF) from an analogue chemical, 3 for interspecies differences, and 10 for potential asthma exacerbation in children) was applied.
													TCEQ: Threshold based on mild hyperplasia and a lack of recovery of the respiratory epithelium in rats exposed for 6 hours/day, 5 days/week for up to 13 weeks (65 days, discontinuous exposure). The LOAEL was 0.6 ppm (1.38 mg/m ³) and the NOAEL was 0.2 ppm (0.46 mg/m ³). The NOAEL was adjusted for continuous exposure (0.0357 ppm or 0.082 mg/m ³) and to a human equivalent concentration (HEC) (0.03571 ppm or 0.082 mg/m ³). An uncertainty factor of 30 (3 for interspecies variability and 10 for intraspecies variability) was applied.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Benzaldehyde	NC	-	-	-	-	-	-	-	-	-	-	30 (9)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Butyraldehyde (Butanal)	NC	-	-	-	-	-	-	-	-	-	-	100 (30)	TCEQ: Threshold based on hyperplasia, inflammation, and squamous metaplasia of the nasal tissues (nasal irritation) in rats and male beagle dogs. The LOAEL was 345 mg/m ³ (117 ppm) in rats and dogs (study I) and the NOAEL was 151.3 mg/m ³ (51.3 ppm) in rats (study II). The point of departure (POD) selected was 151.3 mg/m ³ (NOAEL from study II; 51.3 ppm), and was adjusted for continuous exposure (6 hours/day, 5 days/week). The POD _{adj} was 27 mg/m ³ (9.16 ppm) and an uncertainty factor of 270 (3 for interspecies differences, 10 for intraspecies differences, 3 for extrapolating from a sub-chronic to a chronic threshold, and 3 for an incomplete database) was applied, resulting in a value of 34 ppb (100 µg/m ³ ; HQ = 1.0).
Crotonaldehyde	NC	-	-	-	-	-	-	-	-	-	-	10 (3.1)	TCEQ: Since there is limited toxicity data for crotonaldehyde, TCEQ has calculated a threshold based on crotonaldehyde's relative potency to acrolein (see above for derivation). This was done by multiplying the acrolein ESL by a relative potency ratio. A geometric mean of 2.96 was calculated as the mean relative potency of crotonaldehyde to acrolein based on four studies. Two studies were based on a 50% reduction in respiratory rate in rats and mice (Babiuk et al. 1985; Steinhagen and Barrow 1984; as cited in TCEQ 2014d). The third study was based on an inhibitory concentration at 50% response level for viability in mouse lymphocytes (<i>in vitro</i> ; Poirer et al. 2002; as cited in TCEQ 2014d) and the final study was based on cell viability in normal human lung fibroblasts and small airway epithelial cells (<i>in vitro</i> ; Moretto et al. 2009; as cited in TCEQ 2014d). The mean relative potency factor was applied to the acrolein ESL of 0.36 ppb to derive a threshold of 3.1 µg/m ³ (1.1 ppb) for crotonaldehyde (HQ of 0.3).
Decanal	NC	-	-	-	-	-	-	-	-	-	-	13 (4)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
2,5-Dimethylbenzaldehyde Surrogate: benzaldehyde	NC	-	-	-	-	-	-	-	-	-	-	30 (9)	TCEQ: Threshold based on benzaldehyde as a surrogate.
Dodecanal Surrogate: decanal	NC	-	-	-	-	-	-	-	-	-	-	13 (4)	TCEQ: Threshold based on decanal as a surrogate.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Formaldehyde	NC	-	-	-	-	10 (0.008 pp m)	-	10	-	-	9	11 (3.3)	ATSDR: Threshold based on mild eye and upper respiratory tract irritation and mild damage to epithelium in occupationally exposed workers. Study subjects included 70 workers in a formaldehyde-producing chemical plant and 100 furniture factory workers where the mean exposure duration was 10.4 years and 9 years, respectively. A LOAEL of 0.24 ppm (0.29 mg/m³) was determined and an uncertainty factor of 30 (3 for use of a LOAEL and 10 for human variability) was applied. A molecular weight of 30.03 g/mol was used to convert from ppm to mg/m³. US EPA: Non-carcinogenic guideline derived from the ATSDR minimal risk level. A residential scenario exposure factor was applied to the minimal risk level to derive a screening level. Cal OEHHA: Non-carcinogenic threshold based on respiratory effects (nasal obstruction/discomfort, lower airway discomfort, eye irritation) in an occupational study of 66 workers. A NOAEL adjusted for continuous exposure of 0.09 mg/m³ and an uncertainty factor of 10 (for potential asthma exacerbation in children) were used to derive the chronic screening level. TCEQ: Non-carcinogenic threshold based on elevated rates of symptoms such as eye, nasal and lower airway discomfort in workers (66 exposed subjects, 36 controls) exposed for 5 days/week for a mean of 10 years. The NOAEL was 0.09 mg/m³ and adjusted for continuous exposure (0.032 mg/m³). An uncertainty factor of 3 (for intraspecies variability) was applied.
	C	-	-	-	-	-	-	2.2 (0.22)	-	-	1.7	18 (5.5)	US EPA: Carcinogenic threshold based on an inhalation unit risk (IUR) of 1.3 x 10⁻⁵ per µg/m³, identified from an inhalation study in rats which were exposed to 0, 2, 5.6 or 14.3 ppm formaldehyde, 6 hours/day, 5 days/week for 24 months. Rats were sacrificed at various increments throughout the study (6,12,18 months) to assess tumour growth and mortality was recorded throughout the study. The lifetime cancer risk of 1 in 100,000 is 0.77 µg/m³. A residential scenario exposure factor was applied to the risk-based concentration to derive a screening level. Cal OEHHA: Carcinogenic threshold based on an inhalation unit risk (IUR) of 6.0 x 10⁻⁶ per µg/m³ based on rat nasal squamous carcinoma incidence data using a linearized multistage procedure and a pharmacokinetic interpolation of molecular dosimetry and tumor incidence data. The risk-based concentration for an incremental lifetime cancer risk of 1 in 100,000 is 1.7 µg/m³. TCEQ: Carcinogenic threshold based on cell proliferation (as a key precursor event to tumorigenesis) in rats exposed for 2 years. Exposure concentrations range from 0.7 to 15 ppm (0.86 to 18.4 mg/m³) and the benchmark concentration lower confidence limit corresponding to a 1% incidence of effect (BMCL₀₁) was 0.44 ppm (0.54 mg/m³, adjusted for continuous exposure). An uncertainty factor of 30 (3 for interspecies variability and 10 for intraspecies variability) was applied.
Heptanal	NC	-	-	-	-	-	-	-	-	-	-	133 (40)	TCEQ: Threshold based on a health endpoint (under review, supporting documentation not available).
Hexanal	NC	-	-	-	-	-	-	-	-	-	-	2,730 (818)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Methacrolein	NC	-	-	-	-	-	-	-	-	-	-	8.1 (2.4)	TCEQ: Threshold based on effects to the extrathoracic region of the respiratory tract in rats exposed to methacrolein for 6 hours/day, 5 days/week for 13 weeks. The NOAEL was 14 mg/m ³ (4.9 ppm) and it was adjusted for continuous exposure and a point of departure [human equivalent concentration] (POD _{HEC}) of 2.5 mg/m ³ (0.875 ppm). An uncertainty factor of 300 (3 for interspecies differences, 10 for intraspecies differences, 3 for extrapolating from a subchronic study to a chronic value, and 3 for database quality) was applied resulting in a threshold of 0.0081 mg/m ³ (HQ = 1.0).
Nonanal	NC	-	-	-	-	-	-	-	-	-	-	500 (150)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Octanal	NC	-	-	-	-	-	-	-	-	-	-	500 (150)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Propanal	NC	-	-	-	-	-	-	8.3	-	-	-	150 (46)	US EPA: Threshold based on a reference concentration (RfC) of 0.008 mg/m³ derived from a study of young adult rats exposed to 0, 357, 1,785, and 3,570 mg/m³ propionaldehyde for 6 hours/day, 7 days/week via inhalation. The endpoint chosen from this study was the incidence of atrophy of the olfactory epithelium in male rats. A LOAEL of 150 ppm (357 mg/m³) was adjusted to a benchmark concentration lower confidence limit corresponding to a 10% incidence of effect and adjusted to a human equivalent concentration (BMCL_{10HEC}) of 8 mg/m³. An uncertainty factor of 1,000 was applied: 3 to account for extrapolation from animal to human, 10 for intraspecies uncertainty, 10 to account for adjustment from subchronic to chronic duration, and 3 to account for database deficiencies. A residential scenario exposure factor was applied to the RfC to derive a screening level. TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available, under review).
Tridecanal Surrogate: decanal	NC	-	-	-	-	-	-	-	-	-	-	13 (4)	TCEQ: Threshold based on decanal as a surrogate.
Undecanal	NC	-	-	-	-	-	-	-	-	-	-	33 (10)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Ketones													
Acetone	NC	-	-	-	-	31,000 (13 ppm)	-	32,000	-	-	-	16,000 (4,800)	ATSDR: Threshold based on neurological effects (increased visual evoked response) where humans were exposed for 1 to 7.5 hours/day, 2 to 5 days/week for 6 weeks. A LOAEL of 2970 mg/m ³ (1250 ppm) was used and an uncertainty factor of 100 (10 for using a LOAEL and 10 for human variability) was applied. The minimal risk level of 13 ppm was converted to µg/m ³ using a molecular weight of 58.08 g/mol.
													US EPA: Threshold based on an ATSDR minimal risk level. A residential scenario exposure factor was applied to the minimal risk level to derive a screening level.
													TCEQ: Threshold based on neurotoxicity (faintness and nausea) from 110 male workers exposed to 891 mg/m ³ (375 ppm) acetone for a mean of 14.9 years. The LOAEL was adjusted for continuous exposure (318 mg/m ³ or 133.9 ppm) and an uncertainty factor of 20 (10 for intraspecies differences and 2 for using a LOAEL) was applied.
Acetophenone	NC	-	-	-	-	-	-	-	-	-	-	160 (49)	TCEQ: Threshold based on a health endpoint (interim, supporting documentation not available).
Methyl ethyl ketone	NC	-	-	-	-	-	-	5,200	-	-	-	8,800 (2,600)	US EPA: Threshold based on 10% extra risk of misaligned strenebrae (the segments of the sternum in early life, which later fuse to form the body of the sternum) in mice exposed for 7 hours/day on days 6 to 15 of gestation. A lowest effect concentration of 5,202 mg/m ³ was adjusted to a human equivalent concentration(LEC _{HEC}) of 1,517 mg/m ³ and an uncertainty factor of 300 (3 for interspecies, 10 for susceptible individuals, and 10 for incomplete database) was applied. A residential scenario exposure factor was applied to the reference concentration (RFC) to derive a screening level.
													TCEQ: Threshold based on exposure of rats for 6 hours/day, 5 days/week 90 days. The subchronic free-standing NOAEL (i.e., a NOAEL without a corresponding LOAEL) of 14,865 mg/m ³ (5,041 ppm) was adjusted for continuous exposure 2,655 mg/m ³ (900.2 ppm) and an uncertainty factor of 300 (3 for interspecies, 10 for intraspecies, 3 for subchronic to chronic, and 3 for incomplete database) was applied.
Dioxins													
2,3,7,8- Tetrachlorodibenzo- <i>p</i> - dioxin	NC	-	-	-	-	-	-	4.2 x 10 ⁻⁵	-	-	4.0 x 10 ⁻⁵	1 x 10 ⁻⁷ (3 x 10 ⁻⁸)	US EPA: Threshold based on the Cal OEHHA reference exposure level. A residential scenario exposure factor was applied to derive a screening level.
													Cal OEHHA: A NOAEL of 1 ng/kg body weight/day was used to derive the reference exposure level, and was based on a study where several adverse health effects (including increased mortality, decreased weight gain, biochemical changes, and morphological changes) were observed in rats exposed to 2,3,7,8-tetrachlorodibenzodioxin (TCDD) in their diet for two years. An uncertainty factor of 100 (10 for interspecies variation and 10 for intraspecies variation) was applied to the NOAEL to derive an oral reference exposure level of 10 pg/kg/day, which was extrapolated to an inhalation reference exposure level (0.00004 µg/m ³), using route to route extrapolation, assuming 3,500 µg/m ³ per mg/kg/day.
													TCEQ: Threshold based on health effects for 2,3,7,8-TCDD (interim, supporting documentation not available).
1,2,3,7,8- Pentachlorodibenzo- <i>p</i> - dioxin	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁵	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 1.0 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,7,8-PCDD.
1,2,3,4,7,8- Hexachlorodibenzo- <i>p</i> - dioxin	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,7,8-HxCDD.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,6,7,8-HxCDD.
1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,7,8,9-HxCDD.
1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻³	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.01 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,6,7,8-HpCDD.
1,2,3,4,6,7,8,9-Octachlorodibenzo- <i>p</i> -dioxin	NC	-	-	-	-	-	-	-	-	-	1.3 x 10 ⁻¹	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.0003 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,6,7,8,9-OCDD.
Polychlorinated dibenzo- <i>p</i> -dioxins (PCDDs)	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁵	1 x 10 ⁻⁷ (3 x 10 ⁻⁸) TEQ	Cal OEHHA: Threshold for dioxins and furans (treated as 2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin); see above for derivation of reference exposure level for 2,3,7,8-TCDD. The Cal OEHHA reference exposure level was selected as the screening threshold because supporting rationale was available. TCEQ: Threshold based on health effects for all congeners of polychlorinated dibenzodioxins (interim, supporting documentation not available), expressed as a total toxicity equivalent.
Furans													
2,3,7,8-Tetrachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 2,3,7,8-TCDF.
1,2,3,7,8-Pentachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	1.3 x 10 ⁻³	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.03 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,7,8-PCDF.
2,3,4,7,8-Pentachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	1.3 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.3 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 2,3,4,7,8-PCDF.
1,2,3,4,7,8-Hexachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,7,8-HxCDF.
1,2,3,6,7,8-Hexachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,6,7,8-HxCDF.
2,3,4,6,7,8-Hexachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,6,7,8-HxCDF.
1,2,3,7,8,9-Hexachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁴	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.1 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,7,8,9-HxCDF.
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻³	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.01 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,6,7,8-HpCDF.
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻³	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.01 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for 1,2,3,4,7,8,9-HpCDF.
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	NC	-	-	-	-	-	-	-	-	-	1.3 x 10 ⁻¹	-	Cal OEHHA: Threshold based on 2,3,7,8-TCDD and a TEF of 0.0003 relative to 2,3,7,8-TCDD was applied to the threshold to derive the reference exposure level for OCDF.

Table B-7 Chronic Inhalation Assessment – Chronic Air Screening Levels and Guidelines Used in the Chemical Screening Process

Parameter	Carcinogenic/ Non- Carcinogenic	NWT Standards ^(a)	CCME NAAQO ^{(b),(c)}			ATSDR MRLs ^(d)	US NAAQS ^(e)	US EPA ^{(f),(g),(h),(i)}	WHO Guidelines ^{(j),(k)}	Others			Toxicological Endpoints and Derivations
			Desirable	Acceptable	Tolerable					OMOE AAQOs ^(l)	Cal OEHHA RELS ^(m)	TCEQ ESLs ⁽ⁿ⁾	
Polychlorinated dibenzofurans (PCDFs)	NC	-	-	-	-	-	-	-	-	-	4.0 x 10 ⁻⁵	1 x 10 ⁻⁷ (3 x 10 ⁻⁸) TEQ	Cal OEHHA: Threshold for dioxins and furans (treated as 2,3,7,8-tetrachlorodibenzo-p-dioxin); see above for derivation of reference exposure level for 2,3,7,8-TCDD. The Cal OEHHA reference exposure level was selected as the screening threshold because supporting rationale was available. TCEQ: Threshold based on health effects for all congeners of polychlorinated dibenzofurans (interim, supporting documentation not available), expressed as a total toxicity equivalent.

Note:
All values are in µg/m³, unless otherwise noted.
Concentrations in ppm were converted to mg/m³ by applying the formula: molecular weight (g/mol) x ppm / 24.45.
a) GNWT-ENR, 2014
b) CCME, 1999.
c) CCME, 2012.
d) ATSDR, 2013.
e) US EPA, 2011b.
f) US EPA, 2014a. Carcinogens have been adjusted from an ILCR of 1 in 1,000,000 (10⁻⁶) to an ILCR of 1 in 100,000 (10⁻⁵) to be consistent with WHO Guidelines. The original value from US EPA is given in parenthesis next to the adjusted value.
g) US EPA, 2014b.
h) US EPA, 2014c.
i) US EPA, 1997.
j) WHO, 2006.
k) WHO, 2000.
l) OMOE, 2012.
m) Cal OEHHA, 2014a.
n) TCEQ, 2014e. The screening levels derived by TCEQ are based on an HQ = 0.3 for non-carcinogens, and an ILCR of 1 in 100,000 (10⁻⁵) cancer risk for carcinogens. Guidelines for non-carcinogens have been adjusted to a HQ = 1.0. Values for carcinogens remain unchanged. The original value from TCEQ is given in parenthesis next to the adjusted value.

~ = approximately; >= greater than; µg/dL = microgram per deciliter; µg/kg/day = microgram per kilogram per day; µg/L = microgram per litre; µg/m³ = microgram per cubic metre; “-” = no value;% = percent; ± = plus/minus; ADJ = adjusted; ATSDR = Agency for Toxic Substances and Disease Registry; BMC = benchmark concentration; BMCL = benchmark concentration lower confidence limit; BMDL = benchmark dose level; C = carcinogenic; Cal OEHHA = California Office of Environmental Health Hazard Assessment; CCME = Canadian Council of Ministers of the Environment; CNS = central nervous system; Cr(III) = trivalent chromium; Cr(VI) = hexavalent chromium; DAF = dosimetric adjustment factor; ESL = Effects Screening Level; F1 = filial generation 1 (offspring); FEV₁ = forced expiratory volume in 1 second; FVC = forced vital capacity; g/mol = gram per mol; HEC = human equivalent concentration; HpCDD = heptachlorodibenzo-p-dioxin; HpCDF = hexachlorodibenzofuran; HQ = hazard quotient; HxCDD = hexachlorodibenzo-p-dioxin; HxCDF = hexachlorodibenzofuran; i.e. = *id est* (that is); ILCR = incremental lifetime cancer risk; IQ = intelligence quotient; IUR = inhalation unit risk; kg = kilogram; LOAEL = Lowest Observable Adverse Effect Level; m³ = cubic metre; mg/kg/day = milligram per kilogram per day; mg/m³ = milligram per cubic metre; MRL = Minimal Risk Level; NAAQO = National Ambient Air Quality Objective; NAAQS = National Ambient Air Quality Standard; NC = non-carcinogenic; ng/kg = nanogram per kilogram; ng/m³ = nanogram per cubic metre; Ni(OH)₂ = nickel (II) hydroxide; NiO = nickel oxide; NiSO₄ = nickel sulphate; NO₂ = nitrogen dioxide; NOAEL = No Observable Adverse Effect Level; NWT = Northwest Territories; OCDD = octachlorodibenzodioxin; OMOE = Ontario Ministry of Environment; PBPK = physiologically based pharmacokinetic; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofuran; PEF = potency equivalence factor; pg/kg/day = picogram per kilogram per day; PM_{2.5} = particulate matter with a mean aerodynamic diameter of 2.5 microns (µm) or smaller; PM₁₀ = particulate matter with a mean aerodynamic diameter of 10 microns (µm) or smaller; POD = point of departure; ppb = parts per billion; ppm = parts per million; PPRTV = Provisional Peer Reviewed Toxicity Value; RDDR = regional deposited dose ratio; REL = Reference Exposure Level; RfC = reference concentration; RGDR = regional gas dose ratio; RSL = Regional Screening Level; TCDD = tetrachlorodibenzo-p-dioxin; TCDF = tetrachlorodibenzofuran; TCEQ = Texas Commission on Environmental Quality; TEF = toxicity equivalency factor; TSP = total suspended particulate; US = United States; US EPA = United States Environmental Protection Agency; WHO = World Health Organization.

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																
Nitrogen dioxide	40	2.66E-01	2.98E-01	12%	2.29E+01	2.31E+01	1%	7.74E+00	8.25E+00	7%	7.34E+00	9.39E+00	28%	3.71E+00	4.15E+00	12%
Sulphur dioxide	30	3.18E-04	3.34E-04	5%	1.44E-01	1.45E-01	0%	2.45E-02	2.52E-02	3%	2.22E-02	2.24E-02	1%	7.95E-03	8.21E-03	3%
Total Suspended Particulates (TSP)	60	3.11E+00	3.12E+00	0%	1.25E+01	1.27E+01	2%	3.97E+00	4.42E+00	11%	1.46E+01	1.47E+01	1%	3.39E+00	3.53E+00	4%
PM _{2.5}	10	1.92E+00	1.92E+00	0%	5.55E+00	5.60E+00	1%	2.59E+00	2.69E+00	4%	3.10E+00	3.13E+00	1%	2.19E+00	2.23E+00	2%
PM ₁₀	20	2.72E+00	2.73E+00	0%	7.93E+00	8.15E+00	3%	3.61E+00	4.05E+00	12%	8.00E+00	8.09E+00	1%	3.02E+00	3.18E+00	5%
Metals																
Aluminum	5.2	5.63E-04	9.68E-04	72%	3.20E-01	3.32E-01	4%	4.22E-02	7.05E-02	67%	5.81E-01	5.86E-01	1%	1.21E-02	2.09E-02	72%
Antimony	0.21	1.57E-08	2.69E-08	72%	9.31E-06	9.66E-06	4%	1.18E-06	1.97E-06	66%	1.67E-05	1.69E-05	1%	3.41E-07	5.84E-07	71%
Arsenic	0.0065	2.63E-07	3.10E-07	18%	1.25E-04	1.26E-04	1%	1.59E-05	1.92E-05	21%	9.87E-05	9.92E-05	1%	7.13E-06	8.15E-06	14%
Barium	0.52	5.48E-06	8.79E-06	60%	5.15E-03	5.26E-03	2%	4.33E-04	6.65E-04	54%	8.03E-03	8.07E-03	0%	1.40E-04	2.11E-04	51%
Beryllium	0.012	1.58E-07	1.69E-07	7%	6.42E-05	6.46E-05	1%	9.08E-06	9.88E-06	9%	2.72E-05	2.74E-05	1%	4.41E-06	4.66E-06	6%
Cadmium	0.005	3.73E-06	4.00E-06	7%	1.06E-03	1.07E-03	0%	1.52E-04	1.62E-04	6%	2.45E-04	2.47E-04	1%	6.48E-05	6.89E-05	6%
Chromium (VI) ^(b)	0.00012	2.90E-06	3.98E-06	37%	3.05E-03	3.08E-03	1%	2.10E-04	2.84E-04	35%	4.12E-03	4.13E-03	0%	7.79E-05	1.01E-04	30%
Chromium (III) ^(b)	0.14	2.90E-06	3.98E-06	37%	3.05E-03	3.08E-03	1%	2.10E-04	2.84E-04	35%	4.12E-03	4.13E-03	0%	7.79E-05	1.01E-04	30%
Cobalt	0.0031	6.96E-07	7.80E-07	12%	3.34E-04	3.36E-04	1%	3.27E-05	3.70E-05	13%	2.70E-04	2.70E-04	0%	1.34E-05	1.49E-05	11%
Copper	3.3	1.05E-06	1.20E-06	14%	4.28E-04	4.32E-04	1%	5.31E-05	6.21E-05	17%	2.99E-04	3.01E-04	1%	2.25E-05	2.54E-05	13%
Iron	3.3	1.65E-04	2.61E-04	59%	1.57E-01	1.60E-01	2%	1.29E-02	1.97E-02	52%	2.42E-01	2.43E-01	0%	4.22E-03	6.30E-03	49%
Lead	0.15	1.16E-06	1.31E-06	12%	4.28E-04	4.31E-04	1%	5.84E-05	6.68E-05	14%	2.34E-04	2.36E-04	1%	2.55E-05	2.83E-05	11%
Manganese	0.052	3.52E-06	5.03E-06	43%	3.15E-03	3.20E-03	2%	2.52E-04	3.57E-04	41%	4.38E-03	4.40E-03	0%	8.97E-05	1.22E-04	36%
Mercury	0.2	2.13E-07	2.35E-07	10%	9.92E-05	9.99E-05	1%	1.15E-05	1.30E-05	13%	6.57E-05	6.60E-05	0%	5.81E-06	6.28E-06	8%
Molybdenum	10	1.32E-08	2.15E-08	63%	1.14E-05	1.17E-05	2%	1.03E-06	1.61E-06	56%	1.82E-05	1.83E-05	1%	3.26E-07	5.06E-07	55%
Nickel	0.015	1.28E-06	1.43E-06	11%	2.74E-03	2.75E-03	0%	1.13E-04	1.23E-04	9%	3.52E-03	3.52E-03	0%	5.07E-05	5.38E-05	6%
Selenium	21	7.13E-07	7.15E-07	0%	2.77E-04	2.77E-04	0%	3.96E-05	3.98E-05	0%	5.61E-05	5.62E-05	0%	2.04E-05	2.05E-05	0%
Silver	0.033	5.97E-07	6.43E-07	8%	1.68E-04	1.69E-04	0%	2.40E-05	2.57E-05	7%	4.03E-05	4.07E-05	1%	1.01E-05	1.08E-05	7%
Strontium	6.7	3.42E-06	5.56E-06	62%	3.00E-03	3.07E-03	2%	2.68E-04	4.18E-04	56%	4.77E-03	4.80E-03	1%	8.50E-05	1.31E-04	55%
Tellurium	0.33	8.84E-10	1.48E-09	67%	6.43E-07	6.62E-07	3%	6.79E-08	1.10E-07	61%	1.08E-06	1.09E-06	1%	2.05E-08	3.34E-08	63%
Thallium	0.33	1.07E-08	1.84E-08	73%	5.81E-06	6.06E-06	4%	7.99E-07	1.34E-06	68%	1.08E-05	1.09E-05	1%	2.27E-07	3.95E-07	74%
Titanium	0.1	1.29E-05	2.17E-05	68%	8.98E-03	9.26E-03	3%	9.86E-04	1.60E-03	62%	1.53E-02	1.54E-02	1%	2.95E-04	4.86E-04	65%
Tungsten	3.3	3.64E-08	6.26E-08	72%	2.11E-05	2.19E-05	4%	2.74E-06	4.57E-06	67%	3.82E-05	3.85E-05	1%	7.87E-07	1.35E-06	72%
Uranium	0.04	4.61E-08	7.83E-08	70%	2.98E-05	3.09E-05	3%	3.50E-06	5.75E-06	64%	5.20E-05	5.24E-05	1%	1.03E-06	1.73E-06	68%
Vanadium	0.1	3.29E-07	5.30E-07	61%	3.00E-04	3.06E-04	2%	2.59E-05	4.00E-05	55%	4.71E-04	4.74E-04	1%	8.28E-06	1.27E-05	53%
Zinc	6.7	4.79E-06	5.41E-06	13%	1.56E-03	1.58E-03	1%	2.12E-04	2.44E-04	15%	8.21E-04	8.27E-04	1%	8.61E-05	9.72E-05	13%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	10	1.02E-06	1.64E-06	61%	2.58E-04	2.69E-04	4%	6.79E-05	8.84E-05	30%	1.29E-04	1.33E-04	4%	1.99E-05	2.86E-05	44%
1-Methylphenanthrene	0.17	4.59E-08	7.39E-08	61%	1.16E-05	1.21E-05	4%	3.05E-06	3.98E-06	30%	5.78E-06	6.00E-06	4%	8.94E-07	1.29E-06	44%
2-Methylantracene	0.17	2.81E-08	4.52E-08	61%	7.10E-06	7.41E-06	4%	1.87E-06	2.43E-06	30%	3.54E-06	3.67E-06	4%	5.47E-07	7.87E-07	44%
2-Methylfluorene	3.3	9.47E-10	1.52E-09	61%	2.40E-07	2.50E-07	4%	6.30E-08	8.21E-08	30%	1.19E-07	1.24E-07	4%	1.85E-08	2.65E-08	44%
2-methylnaphthalene	10	1.65E-06	2.66E-06	61%	4.17E-04	4.35E-04	4%	1.10E-04	1.43E-04	30%	2.08E-04	2.16E-04	4%	3.21E-05	4.62E-05	44%
2-Methylphenanthrene	0.17	1.13E-07	1.83E-07	61%	2.87E-05	2.99E-05	4%	7.55E-06	9.83E-06	30%	1.43E-05	1.48E-05	4%	2.21E-06	3.18E-06	44%
2-Methylpyrene	0.17	8.40E-09	1.35E-08	61%	2.13E-06	2.22E-06	4%	5.59E-07	7.28E-07	30%	1.06E-06	1.10E-06	4%	1.64E-07	2.35E-07	44%
3-Methyldibenzothiophene	8.3	1.74E-09	2.80E-09	61%	4.39E-07	4.58E-07	4%	1.16E-07	1.50E-07	30%	2.19E-07	2.27E-07	4%	3.38E-08	4.86E-08	44%
3-Methylphenanthrene	0.17	8.18E-08	1.32E-07	61%	2.07E-05	2.16E-05	4%	5.44E-06	7.09E-06	30%	1.03E-05	1.07E-05	4%	1.59E-06	2.29E-06	44%
4-+9-Methylphenanthrene	0.17	6.18E-08	9.96E-08	61%	1.56E-05	1.63E-05	4%	4.11E-06	5.36E-06	30%	7.79E-06	8.08E-06	4%	1.20E-06	1.73E-06	44%
4-Methyldibenzothiophene	8.3	1.11E-09	1.78E-09	61%	2.80E-07	2.92E-07	4%	7.35E-08	9.58E-08	30%	1.39E-07	1.44E-07	4%	2.15E-08	3.10E-08	44%
9-Methylphenanthrene	-	4.99E-10	4.99E-10	0%	1.46E-07	1.46E-07	0%	9.74E-09	9.74E-09	0%	3.78E-08	3.78E-08	0%	1.10E-08	1.10E-08	0%
Acenaphthene	0.33	3.83E-07	4.15E-07	8%	4.89E-05	4.95E-05	1%	7.75E-06	8.79E-06	14%	1.21E-05	1.24E-05	2%	4.70E-06	5.14E-06	9%
Acenaphthylene	0.33	8.25E-07	9.40E-07	14%	1.14E-04	1.16E-04	2%	2.02E-05	2.40E-05	19%	3.25E-05	3.33E-05	3%	1.06E-05	1.22E-05	15%
Acphenanthrylene	0.17	3.24E-08	5.22E-08	61%	8.20E-06	8.55E-06	4%	2.16E-06	2.81E-06	30%	4.08E-06	4.23E-06	4%	6.31E-07	9.08E-07	44%
Anthracene	0.17	1.19E-07	1.40E-07	17%	1.75E-05	1.79E-05	2%	3.29E-06	3.96E-06	21%	5.47E-06	5.62E-06	3%	1.58E-06	1.87E-06	18%
Benz(a)anthracene	0.092	5.27E-08	5.76E-08	9%	6.95E-06	7.04E-06	1%	1.13E-06	1.29E-06	14%	1.83E-06	1.87E-06	2%	6.60E-07	7.29E-07	10%
Benzo(a)fluorene	0.92	1.02E-08	1.64E-08	61%	2.58E-06	2.69E-06	4%	6.78E-07	8.83E-07	30%	1.28E-06	1.33E-06	4%	1.99E-07	2.85E-07	44%
Benzo(a)pyrene	0.00012	2.21E-08	2.49E-08	12%	2.97E-06	3.02E-06	2%	5.09E-07	5.99E-07	18%	8.01E-07	8.22E-07	3%	2.78E-07	3.16E-07	14%
Benzo(b)fluoranthene	0.092	1.15E-07	1.38E-07	20%	1.79E-05	1.83E-05	2%	3.45E-06	4.21E-06	22%	5.90E-06	6.08E-06	3%	1.59E-06	1.91E-06	20%
Benzo(e)pyrene	0.17	9.39E-10	1.32E-09	41%	2.50E-07	2.57E-07	3%	4.80E-08	6.07E-08	26%	1.03E-07	1.06E-07	3%	1.91E-08	2.45E-08	28%
Benzo(g,h,i)fluoranthene	0.17	1.57E-08	2.53E-08	61%	3.97E-06	4.15E-06	4%	1.05E-06	1.36E-06	30%	1.98E-06	2.05E-06	4%	3.06E-07	4.40E-07	44%
Benzo(g,h,i)perylene	0.17	5.02E-08	5.64E-08	12%	7.01E-06	7.13E-06	2%	1.20E-06	1.40E-06	17%	1.99E-06	2.03E-06	2%	6.50E-07	7.37E-07	13%
Benzo(k)fluoranthene	0.092	1.93E-08	2.18E-08	13%	2.64E-06	2.69E-06	2%	4.63E-07	5.49E-07	18%	7.39E-07	7.59E-07	3%	2.45E-07	2.81E-07	15%
Biphenyl	0.42	2.10E-09	2.10E-09	0%	6.16E-07	6.16E-07	0%	4.11E-08	4.11E-08	0%	1.59E-07	1.59E-07	0%	4.65E-08	4.65E-08	0%
Chrysene	0.92	1.16E-07	1.21E-07	5%	1.37E-05	1.38E-05	1%	1.92E-06	2.10E-06	9%	2.74E-06	2.78E-06	2%	1.35E-06	1.43E-06	6%
Coronene	0.17	7.89E-11	1.27E-10	61%	2.00E-08	2.08E-08	4%	5.25E-09	6.84E-09	30%	9.94E-09	1.03E-08	4%	1.54E-09	2.21E-09	44%
Cyclopenta(c,d)pyrene	0.0012	5.56E-09	8.96E-09	61%	1.41E-06	1.47E-06	4%	3.70E-07	4.82E-07	30%	7.01E-07	7.27E-07	4%	1.08E-07	1.56E-07	44%
Dibenzo(a,h)anthracene	0.0084	3.62E-08	4.33E-08	20%	5.61E-06	5.74E-06	2%	1.10E-06	1.33E-06	21%	1.89E-06	1.94E-06	3%	5.01E-07	6.01E-07	20%
Dibenzothiophene	8.3	6.72E-10	1.08E-09	61%	1.70E-07	1.77E-07	4%	4.47E-08	5.82E-08	30%	8.46E-08	8.78E-08	4%	1.31E-08	1.88E-08	44%
Fluoranthene	0.17	4.27E-07	5.14E-07	20%	6.70E-05	6.85E-05	2%	1.30E-05	1.59E-05	22%	2.24E-05	2.31E-05	3%	5.94E-06	7.16E-06	21%
Fluorene	3.3	1.15E-06	1.32E-06	14%	1.60E-04	1.63E-04	2%	2.86E-05	3.40E-05	19%	4.61E-05	4.74E-05	3%	1.48E-05	1.71E-05	16%
Indeno(1,2,3-cd)fluoranthene	0.092	3.95E-10	6.35E-10	61%	9.98E-08	1.04E-07	4%	2.62E-08	3.42E-08	30%	4.97E-08	5.15E-08	4%	7.69E-09	1.11E-08	44%
Indeno(1,2,3-cd)pyrene	0.092	2.94E-08	2.94E-08	0%	3.19E-06	3.19E-06	0%	3.84E-07	3.84E-07	0%	5.06E-07	5.06E-07	0%	3.28E-07	3.28E-07	0%
Indeno(1,2,3-W)pyrene	0.092	7.09E-09	1.14E-08	61%	1.79E-06	1.87E-06	4%	4.72E-07	6.14E-07	30%	8.93E-07	9.26E-07	4%	1.38E-07	1.99E-07	44%
Naphthalene	3.1	1.35E-05	1.59E-05	18%	2.07E-03	2.12E-03	2%	3.98E-04	4.80E-04	20%	6.94E-04	7.13E-04	3%	1.86E-04	2.21E-04	19%

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		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	0.091	6.31E-09	1.02E-08	61%	1.60E-06	1.66E-06	4%	4.20E-07	5.47E-07	30%	7.94E-07	8.24E-07	4%	1.23E-07	1.77E-07	44%
Perylene	0.17	7.89E-11	1.27E-10	61%	2.00E-08	2.08E-08	4%	5.25E-09	6.84E-09	30%	9.94E-09	1.03E-08	4%	1.54E-09	2.21E-09	44%
Phenanthrene	0.17	3.07E-06	3.22E-06	5%	3.59E-04	3.62E-04	1%	5.07E-05	5.58E-05	10%	7.06E-05	7.18E-05	2%	3.55E-05	3.76E-05	6%
Picene	0.0084	7.89E-11	1.27E-10	61%	2.00E-08	2.08E-08	4%	5.25E-09	6.84E-09	30%	9.94E-09	1.03E-08	4%	1.54E-09	2.21E-09	44%
Pyrene	0.17	4.56E-07	5.75E-07	26%	7.76E-05	7.97E-05	3%	1.62E-05	2.01E-05	24%	2.85E-05	2.94E-05	3%	6.69E-06	8.35E-06	25%
Volatile Organic Compounds																
Methacrolein	8.1	1.13E-04	1.29E-04	14%	6.06E-02	6.09E-02	0%	8.09E-03	8.60E-03	6%	9.63E-03	9.75E-03	1%	2.69E-03	2.91E-03	8%
Acrolein	0.021	9.69E-05	1.10E-04	14%	5.16E-02	5.18E-02	0%	6.89E-03	7.32E-03	6%	8.20E-03	8.30E-03	1%	2.30E-03	2.48E-03	8%
Benzaldehyde	30	1.08E-04	1.23E-04	14%	5.75E-02	5.78E-02	0%	7.69E-03	8.17E-03	6%	9.15E-03	9.27E-03	1%	2.56E-03	2.77E-03	8%
2,5-dimethylbenzaldehyde	30	1.16E-04	1.32E-04	14%	6.21E-02	6.24E-02	0%	8.29E-03	8.82E-03	6%	9.87E-03	1.00E-02	1%	2.76E-03	2.99E-03	8%
Butanal (Butyraldehyde)	100	3.68E-05	4.19E-05	14%	1.97E-02	1.98E-02	0%	2.63E-03	2.80E-03	6%	3.13E-03	3.17E-03	1%	8.75E-04	9.47E-04	8%
Formaldehyde	2.2	6.59E-04	7.47E-04	13%	3.42E-01	3.44E-01	0%	4.63E-02	4.91E-02	6%	5.57E-02	5.63E-02	1%	1.56E-02	1.68E-02	8%
Acetaldehyde	9.4	1.19E-03	1.35E-03	14%	6.33E-01	6.36E-01	0%	8.46E-02	8.99E-02	6%	1.01E-01	1.02E-01	1%	2.82E-02	3.05E-02	8%
Propanal	8.3	3.97E-04	4.52E-04	14%	2.12E-01	2.13E-01	0%	2.83E-02	3.01E-02	6%	3.37E-02	3.41E-02	1%	9.43E-03	1.02E-02	8%
Crotonaldehyde	10	3.80E-04	4.32E-04	14%	2.03E-01	2.04E-01	0%	2.71E-02	2.88E-02	6%	3.23E-02	3.27E-02	1%	9.02E-03	9.76E-03	8%
Hexanal	2,730	6.23E-05	7.10E-05	14%	3.33E-02	3.35E-02	0%	4.45E-03	4.73E-03	6%	5.30E-03	5.36E-03	1%	1.48E-03	1.60E-03	8%
Heptanal	133	9.06E-05	1.03E-04	14%	4.85E-02	4.87E-02	0%	6.47E-03	6.88E-03	6%	7.71E-03	7.80E-03	1%	2.15E-03	2.33E-03	8%
Octanal	500	8.78E-05	1.00E-04	14%	4.69E-02	4.72E-02	0%	6.27E-03	6.67E-03	6%	7.47E-03	7.56E-03	1%	2.09E-03	2.26E-03	8%
Nonanal	500	1.25E-04	1.42E-04	14%	6.66E-02	6.69E-02	0%	8.90E-03	9.46E-03	6%	1.06E-02	1.07E-02	1%	2.96E-03	3.21E-03	8%
Decanal	13	7.93E-05	9.03E-05	14%	4.24E-02	4.26E-02	0%	5.66E-03	6.02E-03	6%	6.74E-03	6.83E-03	1%	1.89E-03	2.04E-03	8%
Undecanal	33	7.36E-05	8.39E-05	14%	3.94E-02	3.96E-02	0%	5.26E-03	5.59E-03	6%	6.26E-03	6.34E-03	1%	1.75E-03	1.89E-03	8%
Dodecanal	13	3.40E-05	3.87E-05	14%	1.82E-02	1.83E-02	0%	2.43E-03	2.58E-03	6%	2.89E-03	2.93E-03	1%	8.08E-04	8.74E-04	8%
Tridecanal	13	5.66E-05	6.45E-05	14%	3.03E-02	3.04E-02	0%	4.05E-03	4.30E-03	6%	4.82E-03	4.88E-03	1%	1.35E-03	1.46E-03	8%
1,2,4-Trimethylbenzene	7.3	2.49E-05	2.84E-05	14%	1.33E-02	1.34E-02	0%	1.78E-03	1.89E-03	6%	2.12E-03	2.15E-03	1%	5.93E-04	6.41E-04	8%
1,3,5-Trimethylbenzene	7.3	7.36E-06	8.39E-06	14%	3.94E-03	3.96E-03	0%	5.26E-04	5.59E-04	6%	6.26E-04	6.34E-04	1%	1.75E-04	1.89E-04	8%
Benzene	1.7	1.36E-04	1.47E-04	8%	4.79E-02	4.81E-02	0%	6.60E-03	6.95E-03	5%	7.40E-03	7.48E-03	1%	2.53E-03	2.68E-03	6%
Ethylbenzene	260	1.34E-05	1.53E-05	14%	7.14E-03	7.17E-03	0%	9.54E-04	1.01E-03	6%	1.14E-03	1.16E-03	1%	3.19E-04	3.44E-04	8%
Propylbenzene	1,000	2.83E-06	3.23E-06	14%	1.51E-03	1.52E-03	0%	2.02E-04	2.15E-04	6%	2.41E-04	2.44E-04	1%	6.73E-05	7.29E-05	8%
Indanone	160	1.97E-06	2.24E-06	14%	1.05E-03	1.06E-03	0%	1.41E-04	1.49E-04	6%	1.67E-04	1.69E-04	1%	4.68E-05	5.06E-05	8%
Toluene	260	1.39E-04	1.54E-04	11%	6.35E-02	6.38E-02	0%	8.64E-03	9.15E-03	6%	1.03E-02	1.04E-02	1%	3.03E-03	3.25E-03	7%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	417	5.95E-06	6.77E-06	14%	3.18E-03	3.19E-03	0%	4.25E-04	4.52E-04	6%	5.06E-04	5.12E-04	1%	1.41E-04	1.53E-04	8%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	417	1.47E-05	1.68E-05	14%	7.87E-03	7.91E-03	0%	1.05E-03	1.12E-03	6%	1.25E-03	1.27E-03	1%	3.50E-04	3.79E-04	8%
Acetone	31,000	6.23E-04	7.10E-04	14%	3.33E-01	3.35E-01	0%	4.45E-02	4.73E-02	6%	5.30E-02	5.36E-02	1%	1.48E-02	1.60E-02	8%
Acetophenone	160	1.44E-04	1.65E-04	14%	7.72E-02	7.76E-02	0%	1.03E-02	1.10E-02	6%	1.23E-02	1.24E-02	1%	3.43E-03	3.72E-03	8%
Methyl Ethyl Ketone	5,200	2.12E-04	2.42E-04	14%	1.14E-01	1.14E-01	0%	1.52E-02	1.61E-02	6%	1.81E-02	1.83E-02	1%	5.05E-03	5.46E-03	8%
Xylene	100	8.06E-05	8.98E-05	11%	3.69E-02	3.71E-02	0%	4.98E-03	5.27E-03	6%	5.82E-03	5.89E-03	1%	1.74E-03	1.87E-03	7%
o-Xylene	100	2.36E-05	2.68E-05	14%	1.26E-02	1.26E-02	0%	1.68E-03	1.79E-03	6%	2.00E-03	2.03E-03	1%	5.61E-04	6.06E-04	8%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	6,100	2.42E-04	2.76E-04	14%	1.30E-01	1.30E-01	0%	1.73E-02	1.84E-02	6%	2.06E-02	2.09E-02	1%	5.76E-03	6.24E-03	8%
1,1,1-Trichloroethane (Methyl chloroform)	5,200	1.55E-07	1.55E-07	0%	2.89E-05	2.89E-05	0%	7.56E-06	7.56E-06	0%	1.35E-05	1.35E-05	0%	3.65E-06	3.65E-06	0%
Butane	24,000	1.08E-04	1.24E-04	14%	5.80E-02	5.83E-02	0%	7.75E-03	8.24E-03	6%	9.22E-03	9.34E-03	1%	2.58E-03	2.79E-03	8%
2,2-Dimethylbutane	1,170	8.78E-06	1.00E-05	14%	4.69E-03	4.72E-03	0%	6.27E-04	6.67E-04	6%	7.47E-04	7.56E-04	1%	2.09E-04	2.26E-04	8%
2,3-Dimethylbutane	1,170	1.61E-05	1.84E-05	14%	8.63E-03	8.67E-03	0%	1.15E-03	1.23E-03	6%	1.37E-03	1.39E-03	1%	3.84E-04	4.15E-04	8%
Isobutene	110,000	3.23E-05	3.68E-05	14%	1.73E-02	1.73E-02	0%	2.31E-03	2.45E-03	6%	2.75E-03	2.78E-03	1%	7.68E-04	8.31E-04	8%
cis-2-Butene	1,600	7.36E-06	8.39E-06	14%	3.94E-03	3.96E-03	0%	5.26E-04	5.59E-04	6%	6.26E-04	6.34E-04	1%	1.75E-04	1.89E-04	8%
trans-2-Butene	1,600	1.47E-05	1.68E-05	14%	7.87E-03	7.91E-03	0%	1.05E-03	1.12E-03	6%	1.25E-03	1.27E-03	1%	3.50E-04	3.79E-04	8%
2-Methyl-1-butene	5,300	7.36E-06	8.39E-06	14%	3.94E-03	3.96E-03	0%	5.26E-04	5.59E-04	6%	6.26E-04	6.34E-04	1%	1.75E-04	1.89E-04	8%
3-Methyl-1-butene	5,300	4.53E-06	5.16E-06	14%	2.42E-03	2.43E-03	0%	3.24E-04	3.44E-04	6%	3.85E-04	3.90E-04	1%	1.08E-04	1.17E-04	8%
1,3-Butadiene	0.94	8.78E-06	1.00E-05	14%	4.69E-03	4.72E-03	0%	6.27E-04	6.67E-04	6%	7.47E-04	7.56E-04	1%	2.09E-04	2.26E-04	8%
Cyclopentane	1,130	1.16E-05	1.32E-05	14%	6.21E-03	6.24E-03	0%	8.29E-04	8.82E-04	6%	9.87E-04	1.00E-03	1%	2.76E-04	2.99E-04	8%
Methylcyclopentane	880	1.76E-05	2.00E-05	14%	9.39E-03	9.43E-03	0%	1.25E-03	1.33E-03	6%	1.49E-03	1.51E-03	1%	4.18E-04	4.52E-04	8%
Pentane	1,000	5.27E-05	6.00E-05	14%	2.82E-02	2.83E-02	0%	3.76E-03	4.00E-03	6%	4.48E-03	4.54E-03	1%	1.25E-03	1.36E-03	8%
Isopentane	24,000	7.76E-05	8.84E-05	14%	4.15E-02	4.17E-02	0%	5.54E-03	5.89E-03	6%	6.60E-03	6.68E-03	1%	1.85E-03	2.00E-03	8%
2-Methylpentane	1,170	2.63E-05	3.00E-05	14%	1.41E-02	1.41E-02	0%	1.88E-03	2.00E-03	6%	2.24E-03	2.27E-03	1%	6.26E-04	6.78E-04	8%
3-Methylpentane	1,170	1.90E-05	2.16E-05	14%	1.01E-02	1.02E-02	0%	1.36E-03	1.44E-03	6%	1.61E-03	1.63E-03	1%	4.51E-04	4.88E-04	8%
2,3-Dimethylpentane	1,170	2.04E-05	2.32E-05	14%	1.09E-02	1.10E-02	0%	1.46E-03	1.55E-03	6%	1.73E-03	1.76E-03	1%	4.85E-04	5.25E-04	8%
2,4-Dimethylpentane	1,170	1.16E-05	1.32E-05	14%	6.21E-03	6.24E-03	0%	8.29E-04	8.82E-04	6%	9.87E-04	1.00E-03	1%	2.76E-04	2.99E-04	8%
2,2,4-Trimethylpentane	1,170	3.51E-05	4.00E-05	14%	1.88E-02	1.89E-02	0%	2.51E-03	2.67E-03	6%	2.99E-03	3.02E-03	1%	8.35E-04	9.03E-04	8%
2,3,4-Trimethylpentane	1,170	8.78E-06	1.00E-05	14%	4.69E-03	4.72E-03	0%	6.27E-04	6.67E-04	6%	7.47E-04	7.56E-04	1%	2.09E-04	2.26E-04	8%
2-Methyl-2-pentene	600	5.95E-06	6.77E-06	14%	3.18E-03	3.19E-03	0%	4.25E-04	4.52E-04	6%	5.06E-04	5.12E-04	1%	1.41E-04	1.53E-04	8%
trans-2-Pentene	2,000	1.42E-06	1.61E-06	14%	7.57E-04	7.61E-04	0%	1.01E-04	1.08E-04	6%	1.20E-04	1.22E-04	1%	3.37E-05	3.64E-05	8%
Cyclohexane	6,300	5.95E-06	6.77E-06	14%	3.18E-03	3.19E-03	0%	4.25E-04	4.52E-04	6%	5.06E-04	5.12E-04	1%	1.41E-04	1.53E-04	8%
Methylcyclohexane	5,370	1.47E-05	1.68E-05	14%	7.87E-03	7.91E-03	0%	1.05E-03	1.12E-03	6%	1.25E-03	1.27E-03	1%	3.50E-04	3.79E-04	8%
Pentylcyclohexane	6,300	2.38E-06	2.71E-06	14%	1.27E-03	1.28E-03	0%	1.70E-04	1.80E-04	6%	2.02E-04	2.05E-04	1%	5.65E-05	6.11E-05	8%
Dodecylcyclohexane	33	4.76E-07	5.42E-07	14%	2.54E-04	2.56E-04	0%	3.40E-05	3.61E-05	6%	4.05E-05	4.10E-05	1%	1.13E-05	1.22E-05	8%
Tridecylcyclohexane	33	4.67E-07	5.32E-07	14%	2.50E-04	2.51E-04	0%	3.34E-05	3.55E-05	6%	3.97E-05	4.02E-05	1%	1.11E-05	1.20E-05	8%
Tetradecylcyclohexane	33	4.50E-07	5.13E-07	14%	2.41E-04	2.42E-04	0%	3.22E-05	3.42E-05	6%	3.83E-05	3.88E-05	1%	1.07E-05	1.16E-05	8%
Pentadecylcyclohexane	33	3.63E-07	4.13E-07	14%	1.94E-04	1.95E-04	0%	2.59E-05	2.75E-05	6%	3.08E-05	3.12E-05	1%	8.62E-06	9.32E-06	8%
2-Methylhexane	1,020	1.61E-05	1.84E-05	14%	8.63E-03	8.67E-03	0%	1.15E-03	1.23E-03	6%	1.37E-03	1.39E-03	1%	3.84E-04	4.15E-04	8%
3-Methylhexane	1,020	8.78E-06	1.00E-05	14%	4.69E-03	4.72E-03	0%	6.27E-04	6.67E-04	6%	7.47E-04	7.56E-04	1%	2.09E-04	2.26E-04	8%
3-Ethylhexane	1,170	5.95E-06	6.77E-06	14%	3.18E-03	3.19E-03	0%	4.25E-04	4.52E-04	6%	5.06E-04	5.12E-04	1%	1.41E-04	1.53E-04	8%
2,3-Dimethylhexane	1,170	4.53E-06	5.16E-06	14%	2.42E-03	2.43E-03	0%	3.24E-04	3.44E-04	6%	3.85E-04	3.90E-04	1%	1.08E-04	1.17E-04	8%
2,4-Dimethylhexane	1,170	1.42E-06	1.61E-06	14%	7.57E-04	7.61E-04	0%	1.01E-04	1.08E-04	6%	1.20E-04	1.22E-04	1%	3.37E-05	3.64E-05	8%
2,5-Dimethylhexane	1,170	1.42E-06	1.61E-06	14%	7.57E-04	7.61E-04	0%	1.01E-04	1.08E-04	6%	1.20E-04	1.22E-04	1%	3.37E-05	3.64E-05	8%
cis-2-Hexene	570	2.83E-06	3.23E-06	14%	1.51E-03	1.52E-03	0%	2.02E-04	2.15E-04	6%	2.41E-04	2.44E-04	1%	6.73E-05	7.29E-05	8%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	570	4.53E-06	5.16E-06	14%	2.42E-03	2.43E-03	0%	3.24E-04	3.44E-04	6%	3.85E-04	3.90E-04	1%	1.08E-04	1.17E-04	8%
Heptane	1,170	1.33E-05	1.52E-05	14%	7.12E-03	7.15E-03	0%	9.51E-04	1.01E-03	6%	1.13E-03	1.15E-03	1%	3.16E-04	3.42E-04	8%
2-Methylheptane	1,170	2.83E-06	3.23E-06	14%	1.51E-03	1.52E-03	0%	2.02E-04	2.15E-04	6%	2.41E-04	2.44E-04	1%	6.73E-05	7.29E-05	8%
Octane	1,170	7.36E-06	8.39E-06	14%	3.94E-03	3.96E-03	0%	5.26E-04	5.59E-04	6%	6.26E-04	6.34E-04	1%	1.75E-04	1.89E-04	8%
Nonane	21	4.53E-06	5.16E-06	14%	2.42E-03	2.43E-03	0%	3.24E-04	3.44E-04	6%	3.85E-04	3.90E-04	1%	1.08E-04	1.17E-04	8%
Dodecane	1,170	1.42E-05	1.62E-05	14%	7.62E-03	7.65E-03	0%	1.02E-03	1.08E-03	6%	1.21E-03	1.23E-03	1%	3.39E-04	3.66E-04	8%
Tridecane	1,170	1.35E-05	1.54E-05	14%	7.22E-03	7.26E-03	0%	9.65E-04	1.03E-03	6%	1.15E-03	1.16E-03	1%	3.21E-04	3.48E-04	8%
Tetradecane	1,170	1.78E-05	2.03E-05	14%	9.52E-03	9.57E-03	0%	1.27E-03	1.35E-03	6%	1.51E-03	1.53E-03	1%	4.24E-04	4.58E-04	8%
n-Pentadecane	33	1.13E-05	1.28E-05	14%	6.03E-03	6.05E-03	0%	8.05E-04	8.56E-04	6%	9.58E-04	9.71E-04	1%	2.68E-04	2.90E-04	8%
Hexadecane	1,170	2.01E-05	2.29E-05	14%	1.08E-02	1.08E-02	0%	1.44E-03	1.53E-03	6%	1.71E-03	1.73E-03	1%	4.79E-04	5.18E-04	8%
n-Heptadecane	33	1.74E-05	1.98E-05	14%	9.30E-03	9.34E-03	0%	1.24E-03	1.32E-03	6%	1.48E-03	1.50E-03	1%	4.13E-04	4.47E-04	8%
n-Octadecane	33	1.70E-05	1.94E-05	14%	9.10E-03	9.14E-03	0%	1.22E-03	1.29E-03	6%	1.45E-03	1.47E-03	1%	4.05E-04	4.38E-04	8%
n-Nonadecane	33	1.16E-05	1.33E-05	14%	6.22E-03	6.25E-03	0%	8.31E-04	8.84E-04	6%	9.90E-04	1.00E-03	1%	2.77E-04	2.99E-04	8%
n-Eicosane	33	5.83E-06	6.64E-06	14%	3.12E-03	3.13E-03	0%	4.17E-04	4.43E-04	6%	4.96E-04	5.02E-04	1%	1.39E-04	1.50E-04	8%
n-Heneicosane	33	1.86E-06	2.12E-06	14%	9.96E-04	1.00E-03	0%	1.33E-04	1.42E-04	6%	1.58E-04	1.60E-04	1%	4.43E-05	4.79E-05	8%
Farnesane	1,170	1.23E-05	1.40E-05	14%	6.57E-03	6.60E-03	0%	8.78E-04	9.33E-04	6%	1.05E-03	1.06E-03	1%	2.92E-04	3.16E-04	8%
Pristane	33	1.25E-05	1.43E-05	14%	6.71E-03	6.74E-03	0%	8.96E-04	9.53E-04	6%	1.07E-03	1.08E-03	1%	2.98E-04	3.23E-04	8%
C ₂ -C ₆ aliphatic	6,300	1.04E-03	1.15E-03	11%	4.66E-01	4.68E-01	0%	6.29E-02	6.67E-02	6%	7.31E-02	7.40E-02	1%	2.21E-02	2.37E-02	7%
>C ₆ -C ₈ aliphatic	1,170	1.52E-04	1.74E-04	14%	8.15E-02	8.18E-02	0%	1.09E-02	1.16E-02	6%	1.30E-02	1.31E-02	1%	3.62E-03	3.92E-03	8%
>C ₈ -C ₁₀ aliphatic	1,170	4.53E-06	5.16E-06	14%	2.42E-03	2.43E-03	0%	3.24E-04	3.44E-04	6%	3.85E-04	3.90E-04	1%	1.08E-04	1.17E-04	8%
>C ₁₀ -C ₁₂ aliphatic	1,170	1.70E-05	1.94E-05	14%	9.11E-03	9.15E-03	0%	1.22E-03	1.29E-03	6%	1.45E-03	1.47E-03	1%	4.05E-04	4.38E-04	8%
>C ₁₂ -C ₁₆ aliphatic	1,170	9.80E-05	1.12E-04	14%	5.24E-02	5.26E-02	0%	7.00E-03	7.44E-03	6%	8.33E-03	8.44E-03	1%	2.33E-03	2.52E-03	8%
>C ₁₆ -C ₂₁ aliphatic	33	9.72E-05	1.11E-04	14%	5.20E-02	5.22E-02	0%	6.94E-03	7.38E-03	6%	8.26E-03	8.37E-03	1%	2.31E-03	2.50E-03	8%
C ₆ -C ₈ aromatic	1.7	2.88E-04	3.16E-04	10%	1.18E-01	1.19E-01	0%	1.62E-02	1.71E-02	6%	1.88E-02	1.91E-02	1%	5.88E-03	6.28E-03	7%
>C ₈ -C ₁₀ aromatic	7.3	2.35E-05	2.68E-05	14%	1.26E-02	1.26E-02	0%	1.68E-03	1.79E-03	6%	2.00E-03	2.02E-03	1%	5.59E-04	6.05E-04	8%
Dioxins and Furans^(a)																
2378 - TCDD	0.000042	9.67E-15	9.67E-15	0%	2.04E-12	2.04E-12	0%	1.57E-13	1.57E-13	0%	2.00E-12	2.00E-12	0%	1.62E-13	1.62E-13	0%
12378 - PeCDD	0.00004	1.56E-14	1.56E-14	0%	3.30E-12	3.30E-12	0%	2.55E-13	2.55E-13	0%	3.23E-12	3.23E-12	0%	2.62E-13	2.62E-13	0%
123478 - HxCDD	0.0004	3.41E-15	3.41E-15	0%	7.21E-13	7.21E-13	0%	5.56E-14	5.56E-14	0%	7.05E-13	7.05E-13	0%	5.71E-14	5.71E-14	0%
123678 - HxCDD	0.0004	9.09E-15	9.09E-15	0%	1.92E-12	1.92E-12	0%	1.48E-13	1.48E-13	0%	1.88E-12	1.88E-12	0%	1.52E-13	1.52E-13	0%
123789 - HxCDD	0.0004	1.39E-14	1.39E-14	0%	2.94E-12	2.94E-12	0%	2.27E-13	2.27E-13	0%	2.88E-12	2.88E-12	0%	2.33E-13	2.33E-13	0%
1234678 - HpCDD	0.004	2.58E-14	2.58E-14	0%	5.46E-12	5.46E-12	0%	4.21E-13	4.21E-13	0%	5.34E-12	5.34E-12	0%	4.33E-13	4.33E-13	0%
1,2,3,4,6,7,8,9-Octa CDD	0.13	2.63E-14	2.63E-14	0%	5.55E-12	5.55E-12	0%	4.28E-13	4.28E-13	0%	5.43E-12	5.43E-12	0%	4.40E-13	4.40E-13	0%
2378 - TCDF	0.00042	1.58E-13	1.58E-13	0%	3.35E-11	3.35E-11	0%	2.58E-12	2.58E-12	0%	3.27E-11	3.27E-11	0%	2.65E-12	2.65E-12	0%
12378 - PeCDF	0.0013	8.28E-14	8.28E-14	0%	1.75E-11	1.75E-11	0%	1.35E-12	1.35E-12	0%	1.71E-11	1.71E-11	0%	1.39E-12	1.39E-12	0%
23478 - PeCDF	0.00013	1.43E-13	1.43E-13	0%	3.01E-11	3.01E-11	0%	2.32E-12	2.32E-12	0%	2.95E-11	2.95E-11	0%	2.39E-12	2.39E-12	0%
123478 - HxCDF	0.0004	1.45E-13	1.45E-13	0%	3.06E-11	3.06E-11	0%	2.36E-12	2.36E-12	0%	3.00E-11	3.00E-11	0%	2.43E-12	2.43E-12	0%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	0.0004	7.79E-14	7.79E-14	0%	1.65E-11	1.65E-11	0%	1.27E-12	1.27E-12	0%	1.61E-11	1.61E-11	0%	1.30E-12	1.30E-12	0%
234678 - HxCDF	0.0004	3.01E-14	3.01E-14	0%	6.36E-12	6.36E-12	0%	4.90E-13	4.90E-13	0%	6.22E-12	6.22E-12	0%	5.04E-13	5.04E-13	0%
123789 - HxCDF	0.0004	3.13E-15	3.13E-15	0%	6.61E-13	6.61E-13	0%	5.09E-14	5.09E-14	0%	6.46E-13	6.46E-13	0%	5.24E-14	5.24E-14	0%
1234678 - HpCDF	0.004	1.18E-13	1.18E-13	0%	2.50E-11	2.50E-11	0%	1.93E-12	1.93E-12	0%	2.44E-11	2.44E-11	0%	1.98E-12	1.98E-12	0%
1234789 - HpCDF	0.004	1.34E-14	1.34E-14	0%	2.82E-12	2.82E-12	0%	2.18E-13	2.18E-13	0%	2.76E-12	2.76E-12	0%	2.24E-13	2.24E-13	0%
1,2,3,4,6,7,8,9-Octa CDF	0.13	1.23E-14	1.23E-14	0%	2.59E-12	2.59E-12	0%	2.00E-13	2.00E-13	0%	2.53E-12	2.53E-12	0%	2.05E-13	2.05E-13	0%
Total PCDDs (TEQ)	0.00004	2.82E-14	2.82E-14	0%	5.96E-12	5.96E-12	0%	4.59E-13	4.59E-13	0%	5.83E-12	5.83E-12	0%	4.73E-13	4.73E-13	0%
Total PCDFs (TEQ)	0.00004	8.80E-14	8.80E-14	0%	1.86E-11	1.86E-11	0%	1.43E-12	1.43E-12	0%	1.82E-11	1.82E-11	0%	1.47E-12	1.47E-12	0%
Total PCDDs + PCDFs	-	2.94E-12	2.94E-12	0%	6.21E-10	6.21E-10	0%	4.78E-11	4.78E-11	0%	6.07E-10	6.07E-10	0%	4.92E-11	4.92E-11	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to Chronic (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Critical Air Contaminants																
Nitrogen dioxide	40	2.39E+00	3.95E+00	65%	6.93E+00	8.51E+00	23%	2.92E-01	3.69E-01	26%	3.58E-01	3.92E-01	9%	3.63E-01	3.95E-01	9%
Sulphur dioxide	30	4.59E-03	5.52E-03	20%	1.62E-02	2.08E-02	28%	3.71E-04	4.10E-04	10%	4.33E-04	4.51E-04	4%	4.28E-04	4.46E-04	4%
Total Suspended Particulates (TSP)	60	3.47E+00	3.92E+00	13%	1.68E+01	2.51E+01	49%	3.12E+00	3.13E+00	0%	3.11E+00	3.12E+00	0%	3.11E+00	3.12E+00	0%
PM _{2.5}	10	2.16E+00	2.29E+00	6%	3.64E+00	4.56E+00	25%	1.93E+00	1.94E+00	0%	1.93E+00	1.93E+00	0%	1.93E+00	1.93E+00	0%
PM ₁₀	20	3.17E+00	3.64E+00	15%	1.15E+01	1.64E+01	43%	2.73E+00	2.75E+00	1%	2.72E+00	2.74E+00	0%	2.72E+00	2.74E+00	0%
Metals																
Aluminum	5.2	2.14E-02	4.97E-02	132%	8.60E-01	1.39E+00	61%	1.03E-03	1.71E-03	67%	5.94E-04	9.58E-04	61%	5.72E-04	9.10E-04	59%
Antimony	0.21	5.96E-07	1.38E-06	132%	2.39E-05	3.85E-05	61%	2.86E-08	4.76E-08	67%	1.65E-08	2.66E-08	61%	1.59E-08	2.53E-08	59%
Arsenic	0.0065	4.89E-06	8.18E-06	67%	1.09E-04	1.70E-04	56%	3.19E-07	3.99E-07	25%	3.40E-07	3.82E-07	12%	3.32E-07	3.72E-07	12%
Barium	0.52	1.93E-04	4.25E-04	120%	7.06E-03	1.14E-02	61%	9.66E-06	1.53E-05	58%	5.91E-06	8.90E-06	50%	5.70E-06	8.46E-06	48%
Beryllium	0.012	2.31E-06	3.11E-06	34%	3.07E-05	4.55E-05	48%	1.70E-07	1.89E-07	11%	2.12E-07	2.22E-07	5%	2.08E-07	2.17E-07	5%
Cadmium	0.005	3.58E-05	4.93E-05	37%	1.51E-04	2.04E-04	35%	4.20E-06	4.80E-06	14%	4.94E-06	5.24E-06	6%	4.97E-06	5.26E-06	6%
Chromium (VI) ^(b)	0.00012	7.66E-05	1.51E-04	97%	2.25E-03	3.62E-03	61%	4.49E-06	6.34E-06	41%	3.38E-06	4.37E-06	29%	3.30E-06	4.21E-06	28%
Chromium (III) ^(b)	0.14	7.66E-05	1.51E-04	97%	2.25E-03	3.62E-03	61%	4.49E-06	6.34E-06	41%	3.38E-06	4.37E-06	29%	3.30E-06	4.21E-06	28%
Cobalt	0.0031	8.66E-06	1.36E-05	57%	1.06E-04	1.65E-04	55%	8.40E-07	1.00E-06	20%	9.02E-07	9.87E-07	9%	9.03E-07	9.84E-07	9%
Copper	3.3	1.52E-05	2.48E-05	64%	2.63E-04	4.11E-04	56%	1.26E-06	1.54E-06	22%	1.36E-06	1.51E-06	11%	1.35E-06	1.49E-06	10%
Iron	3.3	5.68E-03	1.24E-02	119%	2.05E-01	3.31E-01	61%	2.87E-04	4.51E-04	57%	1.79E-04	2.65E-04	49%	1.72E-04	2.53E-04	47%
Lead	0.15	1.61E-05	2.51E-05	56%	2.51E-04	3.87E-04	54%	1.35E-06	1.62E-06	20%	1.52E-06	1.66E-06	9%	1.51E-06	1.64E-06	9%
Manganese	0.052	9.89E-05	2.04E-04	106%	3.17E-03	5.10E-03	61%	5.54E-06	8.13E-06	47%	4.05E-06	5.43E-06	34%	3.95E-06	5.22E-06	32%
Mercury	0.2	3.31E-06	4.85E-06	46%	5.40E-05	8.27E-05	53%	2.52E-07	2.90E-07	15%	2.82E-07	3.02E-07	7%	2.75E-07	2.93E-07	7%
Molybdenum	10	4.73E-07	1.05E-06	123%	1.77E-05	2.85E-05	61%	2.34E-08	3.75E-08	60%	1.42E-08	2.16E-08	53%	1.37E-08	2.06E-08	51%
Nickel	0.015	2.79E-05	3.79E-05	36%	3.31E-04	5.24E-04	58%	1.87E-06	2.11E-06	13%	1.56E-06	1.69E-06	8%	1.51E-06	1.63E-06	8%
Selenium	21	8.65E-06	8.78E-06	1%	3.61E-05	3.85E-05	7%	7.09E-07	7.13E-07	0%	9.80E-07	9.81E-07	0%	9.62E-07	9.64E-07	0%
Silver	0.033	5.72E-06	8.02E-06	40%	2.62E-05	3.64E-05	39%	6.76E-07	7.78E-07	15%	7.89E-07	8.40E-07	7%	7.94E-07	8.44E-07	6%
Strontium	6.7	1.22E-04	2.72E-04	122%	4.56E-03	7.36E-03	61%	6.08E-06	9.70E-06	60%	3.68E-06	5.61E-06	52%	3.55E-06	5.33E-06	50%
Tellurium	0.33	3.27E-08	7.43E-08	127%	1.27E-06	2.04E-06	61%	1.59E-09	2.60E-09	63%	9.41E-10	1.48E-09	57%	9.06E-10	1.40E-09	55%
Thallium	0.33	4.09E-07	9.54E-07	133%	1.66E-05	2.67E-05	61%	1.95E-08	3.27E-08	68%	1.12E-08	1.82E-08	63%	1.08E-08	1.73E-08	60%
Titanium	0.1	4.79E-04	1.09E-03	128%	1.87E-02	3.02E-02	61%	2.33E-05	3.82E-05	64%	1.37E-05	2.16E-05	58%	1.32E-05	2.05E-05	56%
Tungsten	3.3	1.39E-06	3.22E-06	132%	5.58E-05	9.00E-05	61%	6.64E-08	1.11E-07	67%	3.83E-08	6.19E-08	62%	3.69E-08	5.88E-08	59%
Uranium	0.04	1.73E-06	3.98E-06	130%	6.85E-05	1.11E-04	61%	8.35E-08	1.38E-07	65%	4.88E-08	7.77E-08	59%	4.70E-08	7.38E-08	57%
Vanadium	0.1	1.17E-05	2.58E-05	121%	4.30E-04	6.93E-04	61%	5.81E-07	9.23E-07	59%	3.54E-07	5.36E-07	51%	3.41E-07	5.09E-07	49%
Zinc	6.7	5.81E-05	9.44E-05	62%	8.05E-04	1.25E-03	56%	5.69E-06	6.89E-06	21%	6.24E-06	6.86E-06	10%	6.25E-06	6.85E-06	9%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	10	2.12E-05	5.07E-05	139%	1.39E-04	2.61E-04	88%	1.48E-06	3.01E-06	103%	1.32E-06	2.04E-06	54%	1.27E-06	1.96E-06	55%
1-Methylphenanthrene	0.17	9.53E-07	2.28E-06	139%	6.24E-06	1.17E-05	88%	6.66E-08	1.35E-07	103%	5.95E-08	9.16E-08	54%	5.70E-08	8.81E-08	55%
2-Methylantracene	0.17	5.83E-07	1.40E-06	139%	3.82E-06	7.17E-06	88%	4.08E-08	8.29E-08	103%	3.64E-08	5.60E-08	54%	3.49E-08	5.39E-08	55%
2-Methylfluorene	3.3	1.97E-08	4.71E-08	139%	1.29E-07	2.42E-07	88%	1.37E-09	2.80E-09	103%	1.23E-09	1.89E-09	54%	1.18E-09	1.82E-09	55%
2-methylnaphthalene	10	3.42E-05	8.20E-05	139%	2.24E-04	4.21E-04	88%	2.39E-06	4.87E-06	103%	2.14E-06	3.29E-06	54%	2.05E-06	3.17E-06	55%
2-Methylphenanthrene	0.17	2.35E-06	5.64E-06	139%	1.54E-05	2.90E-05	88%	1.65E-07	3.35E-07	103%	1.47E-07	2.26E-07	54%	1.41E-07	2.18E-07	55%
2-Methylpyrene	0.17	1.74E-07	4.18E-07	139%	1.14E-06	2.15E-06	88%	1.22E-08	2.48E-08	103%	1.09E-08	1.68E-08	54%	1.04E-08	1.61E-08	55%
3-Methyldibenzothiophene	8.3	3.60E-08	8.63E-08	139%	2.36E-07	4.43E-07	88%	2.52E-09	5.12E-09	103%	2.25E-09	3.46E-09	54%	2.15E-09	3.33E-09	55%
3-Methylphenanthrene	0.17	1.70E-06	4.07E-06	139%	1.11E-05	2.09E-05	88%	1.19E-07	2.41E-07	103%	1.06E-07	1.63E-07	54%	1.02E-07	1.57E-07	55%
4-+9-Methylphenanthrene	0.17	1.28E-06	3.07E-06	139%	8.41E-06	1.58E-05	88%	8.97E-08	1.83E-07	103%	8.01E-08	1.23E-07	54%	7.67E-08	1.19E-07	55%
4-Methyldibenzothiophene	8.3	2.29E-08	5.49E-08	139%	1.50E-07	2.82E-07	88%	1.60E-09	3.26E-09	103%	1.43E-09	2.21E-09	54%	1.37E-09	2.12E-09	55%
9-Methylphenanthrene	-	4.39E-09	4.39E-09	0%	7.49E-09	7.49E-09	0%	6.45E-10	6.45E-10	0%	6.91E-10	6.91E-10	0%	6.55E-10	6.55E-10	0%
Acenaphthene	0.33	2.63E-06	4.14E-06	57%	1.02E-05	1.65E-05	61%	4.37E-07	5.15E-07	18%	5.18E-07	5.55E-07	7%	5.25E-07	5.60E-07	7%
Acenaphthylene	0.33	6.77E-06	1.23E-05	81%	3.09E-05	5.35E-05	73%	9.67E-07	1.25E-06	29%	1.11E-06	1.24E-06	12%	1.12E-06	1.25E-06	11%
Acephenanthrylene	0.17	6.73E-07	1.61E-06	139%	4.41E-06	8.27E-06	88%	4.70E-08	9.56E-08	103%	4.20E-08	6.46E-08	54%	4.02E-08	6.22E-08	55%
Anthracene	0.17	1.09E-06	2.06E-06	90%	5.31E-06	9.34E-06	76%	1.42E-07	1.92E-07	36%	1.60E-07	1.83E-07	15%	1.60E-07	1.83E-07	14%
Benz(a)anthracene	0.092	3.79E-07	6.12E-07	61%	1.55E-06	2.51E-06	62%	6.05E-08	7.26E-08	20%	7.13E-08	7.69E-08	8%	7.20E-08	7.75E-08	8%
Benzo(a)fluorene	0.92	2.12E-07	5.07E-07	139%	1.39E-06	2.60E-06	88%	1.48E-08	3.01E-08	103%	1.32E-08	2.03E-08	54%	1.26E-08	1.96E-08	55%
Benzo(a)pyrene	0.00012	1.72E-07	3.01E-07	75%	7.50E-07	1.28E-06	71%	2.57E-08	3.24E-08	26%	2.98E-08	3.29E-08	10%	3.01E-08	3.31E-08	10%
Benzo(b)fluoranthene	0.092	1.13E-06	2.22E-06	95%	5.76E-06	1.02E-05	78%	1.40E-07	1.96E-07	40%	1.55E-07	1.81E-07	17%	1.55E-07	1.80E-07	16%
Benzo(e)pyrene	0.17	1.58E-08	3.41E-08	116%	9.04E-08	1.66E-07	83%	1.31E-09	2.26E-09	72%	1.24E-09	1.69E-09	35%	1.19E-09	1.62E-09	36%
Benzo(g,h,i)fluoranthene	0.17	3.26E-07	7.81E-07	139%	2.14E-06	4.01E-06	88%	2.28E-08	4.64E-08	103%	2.04E-08	3.14E-08	54%	1.95E-08	3.02E-08	55%
Benzo(g,h,i)perylene	0.17	4.01E-07	6.96E-07	74%	1.77E-06	2.99E-06	69%	5.86E-08	7.39E-08	26%	6.76E-08	7.48E-08	11%	6.82E-08	7.51E-08	10%
Benzo(k)fluoranthene	0.092	1.55E-07	2.79E-07	79%	7.01E-07	1.21E-06	72%	2.25E-08	2.89E-08	28%	2.59E-08	2.89E-08	11%	2.61E-08	2.90E-08	11%
Biphenyl	0.42	1.85E-08	1.85E-08	0%	3.16E-08	3.16E-08	0%	2.72E-09	2.72E-09	0%	2.91E-09	2.91E-09	0%	2.76E-09	2.76E-09	0%
Chrysene	0.92	6.75E-07	9.37E-07	39%	2.16E-06	3.24E-06	50%	1.30E-07	1.43E-07	10%	1.57E-07	1.63E-07	4%	1.60E-07	1.66E-07	4%
Coronene	0.17	1.64E-09	3.92E-09	139%	1.07E-08	2.01E-08	88%	1.15E-10	2.33E-10	103%	1.02E-10	1.57E-10	54%	9.79E-11	1.51E-10	55%
Cyclopenta(c,d)pyrene	0.0012	1.15E-07	2.77E-07	139%	7.56E-07	1.42E-06	88%	8.07E-09	1.64E-08	103%	7.21E-09	1.11E-08	54%	6.90E-09	1.07E-08	55%
Dibenzo(a,h)anthracene	0.0084	3.57E-07	6.96E-07	95%	1.83E-06	3.22E-06	76%	4.37E-08	6.13E-08	40%	4.85E-08	5.67E-08	17%	4.86E-08	5.65E-08	16%
Dibenzothiophene	8.3	1.39E-08	3.34E-08	139%	9.13E-08	1.72E-07	88%	9.75E-10	1.98E-09	103%	8.71E-10	1.34E-09	54%	8.34E-10	1.29E-09	55%
Fluoranthene	0.17	4.28E-06	8.42E-06	97%	2.19E-05	3.90E-05	78%	5.18E-07	7.33E-07	41%	5.72E-07	6.72E-07	17%	5.72E-07	6.69E-07	17%
Fluorene	3.3	9.56E-06	1.74E-05	82%	4.39E-05	7.61E-05	73%	1.35E-06	1.76E-06	30%	1.55E-06	1.74E-06	12%	1.56E-06	1.74E-06	12%
Indeno(1,2,3-cd)fluoranthene	0.092	8.19E-09	1.96E-08	139%	5.36E-08	1.01E-07	88%	5.73E-10	1.16E-09	103%	5.11E-10	7.87E-10	54%	4.90E-10	7.57E-10	55%
Indeno(1,2,3-cd)pyrene	0.092	1.38E-07	1.38E-07	0%	2.86E-07	2.86E-07	0%	3.21E-08	3.21E-08	0%	4.00E-08	4.00E-08	0%	4.09E-08	4.09E-08	0%
Indeno(1,2,3-W)pyrene	0.092	1.47E-07	3.52E-07	139%	9.64E-07	1.81E-06	88%	1.03E-08	2.09E-08	103%	9.18E-09	1.41E-08	54%	8.80E-09	1.36E-08	55%
Naphthalene	3.1	1.29E-04	2.46E-04	90%	6.51E-04	1.13E-03	74%	1.62E-05	2.22E-05	37%	1.81E-05	2.09E-05	16%	1.81E-05	2.09E-05	15%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Nitro-pyrene	0.091	1.31E-07	3.14E-07	139%	8.58E-07	1.61E-06	88%	9.15E-09	1.86E-08	103%	8.17E-09	1.26E-08	54%	7.83E-09	1.21E-08	55%
Perylene	0.17	1.64E-09	3.92E-09	139%	1.07E-08	2.01E-08	88%	1.15E-10	2.33E-10	103%	1.02E-10	1.57E-10	54%	9.79E-11	1.51E-10	55%
Phenanthrene	0.17	1.79E-05	2.52E-05	41%	5.74E-05	8.74E-05	52%	3.44E-06	3.81E-06	11%	4.16E-06	4.33E-06	4%	4.23E-06	4.40E-06	4%
Picene	0.0084	1.64E-09	3.92E-09	139%	1.07E-08	2.01E-08	88%	1.15E-10	2.33E-10	103%	1.02E-10	1.57E-10	54%	9.79E-11	1.51E-10	55%
Pyrene	0.17	5.24E-06	1.09E-05	107%	2.87E-05	5.18E-05	81%	5.68E-07	8.60E-07	51%	6.08E-07	7.44E-07	22%	6.05E-07	7.37E-07	22%
Volatile Organic Compounds																
Methacrolein	8.1	2.23E-03	2.98E-03	34%	1.14E-02	1.40E-02	23%	1.47E-04	1.86E-04	27%	1.48E-04	1.66E-04	12%	1.42E-04	1.60E-04	12%
Acrolein	0.021	1.90E-03	2.53E-03	34%	9.69E-03	1.19E-02	23%	1.25E-04	1.58E-04	27%	1.26E-04	1.42E-04	12%	1.22E-04	1.37E-04	12%
Benzaldehyde	30	2.12E-03	2.83E-03	34%	1.08E-02	1.33E-02	23%	1.39E-04	1.76E-04	27%	1.40E-04	1.58E-04	12%	1.35E-04	1.52E-04	12%
2,5-dimethylbenzaldehyde	30	2.28E-03	3.05E-03	34%	1.17E-02	1.43E-02	23%	1.50E-04	1.90E-04	27%	1.52E-04	1.70E-04	12%	1.46E-04	1.64E-04	12%
Butanal (Butyraldehyde)	100	7.24E-04	9.67E-04	34%	3.70E-03	4.55E-03	23%	4.76E-05	6.03E-05	27%	4.81E-05	5.39E-05	12%	4.63E-05	5.20E-05	12%
Formaldehyde	2.2	1.27E-02	1.69E-02	33%	6.46E-02	7.91E-02	22%	8.48E-04	1.07E-03	26%	8.63E-04	9.64E-04	12%	8.32E-04	9.29E-04	12%
Acetaldehyde	9.4	2.33E-02	3.11E-02	34%	1.19E-01	1.46E-01	23%	1.53E-03	1.94E-03	27%	1.55E-03	1.74E-03	12%	1.49E-03	1.67E-03	12%
Propanal	8.3	7.79E-03	1.04E-02	34%	3.99E-02	4.90E-02	23%	5.13E-04	6.50E-04	27%	5.17E-04	5.81E-04	12%	4.98E-04	5.60E-04	12%
Crotonaldehyde	10	7.46E-03	9.97E-03	34%	3.82E-02	4.69E-02	23%	4.91E-04	6.22E-04	27%	4.95E-04	5.56E-04	12%	4.77E-04	5.36E-04	12%
Hexanal	2,730	1.22E-03	1.64E-03	34%	6.27E-03	7.70E-03	23%	8.06E-05	1.02E-04	27%	8.13E-05	9.12E-05	12%	7.83E-05	8.79E-05	12%
Heptanal	133	1.78E-03	2.38E-03	34%	9.11E-03	1.12E-02	23%	1.17E-04	1.49E-04	27%	1.18E-04	1.33E-04	12%	1.14E-04	1.28E-04	12%
Octanal	500	1.73E-03	2.31E-03	34%	8.83E-03	1.08E-02	23%	1.14E-04	1.44E-04	27%	1.15E-04	1.29E-04	12%	1.10E-04	1.24E-04	12%
Nonanal	500	2.45E-03	3.27E-03	34%	1.25E-02	1.54E-02	23%	1.61E-04	2.04E-04	27%	1.63E-04	1.82E-04	12%	1.57E-04	1.76E-04	12%
Decanal	13	1.56E-03	2.08E-03	34%	7.97E-03	9.80E-03	23%	1.03E-04	1.30E-04	27%	1.03E-04	1.16E-04	12%	9.97E-05	1.12E-04	12%
Undecanal	33	1.45E-03	1.93E-03	34%	7.41E-03	9.10E-03	23%	9.52E-05	1.21E-04	27%	9.61E-05	1.08E-04	12%	9.25E-05	1.04E-04	12%
Dodecanal	13	6.68E-04	8.93E-04	34%	3.42E-03	4.20E-03	23%	4.40E-05	5.57E-05	27%	4.44E-05	4.98E-05	12%	4.27E-05	4.80E-05	12%
Tridecanal	13	1.11E-03	1.49E-03	34%	5.70E-03	7.00E-03	23%	7.33E-05	9.28E-05	27%	7.39E-05	8.29E-05	12%	7.12E-05	7.99E-05	12%
1,2,4-Trimethylbenzene	7.3	4.90E-04	6.55E-04	34%	2.51E-03	3.08E-03	23%	3.22E-05	4.08E-05	27%	3.25E-05	3.65E-05	12%	3.13E-05	3.52E-05	12%
1,3,5-Trimethylbenzene	7.3	1.45E-04	1.93E-04	34%	7.41E-04	9.10E-04	23%	9.52E-06	1.21E-05	27%	9.61E-06	1.08E-05	12%	9.25E-06	1.04E-05	12%
Benzene	1.7	1.86E-03	2.37E-03	28%	8.41E-03	1.02E-02	21%	1.64E-04	1.91E-04	16%	1.80E-04	1.93E-04	7%	1.78E-04	1.90E-04	7%
Ethylbenzene	260	2.63E-04	3.51E-04	34%	1.34E-03	1.65E-03	23%	1.74E-05	2.20E-05	27%	1.75E-05	1.96E-05	12%	1.69E-05	1.89E-05	12%
Propylbenzene	1,000	5.57E-05	7.44E-05	34%	2.85E-04	3.50E-04	23%	3.66E-06	4.64E-06	27%	3.70E-06	4.15E-06	12%	3.56E-06	4.00E-06	12%
Indanone	160	3.87E-05	5.17E-05	34%	1.98E-04	2.43E-04	23%	2.55E-06	3.23E-06	27%	2.57E-06	2.88E-06	12%	2.47E-06	2.78E-06	12%
Toluene	260	2.39E-03	3.13E-03	31%	1.17E-02	1.43E-02	22%	1.74E-04	2.13E-04	22%	1.82E-04	2.00E-04	10%	1.77E-04	1.95E-04	10%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	417	1.17E-04	1.56E-04	34%	5.98E-04	7.35E-04	23%	7.69E-06	9.75E-06	27%	7.76E-06	8.71E-06	12%	7.48E-06	8.39E-06	12%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	417	2.89E-04	3.87E-04	34%	1.48E-03	1.82E-03	23%	1.90E-05	2.41E-05	27%	1.92E-05	2.16E-05	12%	1.85E-05	2.08E-05	12%
Acetone	31,000	1.22E-02	1.64E-02	34%	6.27E-02	7.70E-02	23%	8.06E-04	1.02E-03	27%	8.13E-04	9.12E-04	12%	7.83E-04	8.79E-04	12%
Acetophenone	160	2.84E-03	3.79E-03	34%	1.45E-02	1.78E-02	23%	1.87E-04	2.37E-04	27%	1.89E-04	2.12E-04	12%	1.82E-04	2.04E-04	12%
Methyl Ethyl Ketone	5,200	4.18E-03	5.58E-03	34%	2.14E-02	2.62E-02	23%	2.75E-04	3.48E-04	27%	2.77E-04	3.11E-04	12%	2.67E-04	3.00E-04	12%
Xylene	100	1.38E-03	1.82E-03	32%	6.79E-03	8.30E-03	22%	1.01E-04	1.24E-04	23%	1.06E-04	1.16E-04	10%	1.03E-04	1.13E-04	10%
o-Xylene	100	4.63E-04	6.18E-04	34%	2.37E-03	2.91E-03	23%	3.05E-05	3.86E-05	27%	3.08E-05	3.45E-05	12%	2.96E-05	3.33E-05	12%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
Ethylene	6,100	4.77E-03	6.37E-03	34%	2.44E-02	2.99E-02	23%	3.14E-04	3.97E-04	27%	3.16E-04	3.55E-04	12%	3.05E-04	3.42E-04	12%
1,1,1-Trichloroethane (Methyl chloroform)	5,200	1.84E-06	1.84E-06	0%	7.13E-06	7.13E-06	0%	1.75E-07	1.75E-07	0%	2.22E-07	2.22E-07	0%	2.14E-07	2.14E-07	0%
Butane	24,000	2.13E-03	2.85E-03	34%	1.09E-02	1.34E-02	23%	1.40E-04	1.78E-04	27%	1.42E-04	1.59E-04	12%	1.36E-04	1.53E-04	12%
2,2-Dimethylbutane	1,170	1.73E-04	2.31E-04	34%	8.83E-04	1.08E-03	23%	1.14E-05	1.44E-05	27%	1.15E-05	1.29E-05	12%	1.10E-05	1.24E-05	12%
2,3-Dimethylbutane	1,170	3.17E-04	4.24E-04	34%	1.62E-03	1.99E-03	23%	2.09E-05	2.65E-05	27%	2.11E-05	2.36E-05	12%	2.03E-05	2.28E-05	12%
Isobutene	110,000	6.35E-04	8.48E-04	34%	3.25E-03	3.99E-03	23%	4.18E-05	5.29E-05	27%	4.21E-05	4.73E-05	12%	4.06E-05	4.56E-05	12%
cis-2-Butene	1,600	1.45E-04	1.93E-04	34%	7.41E-04	9.10E-04	23%	9.52E-06	1.21E-05	27%	9.61E-06	1.08E-05	12%	9.25E-06	1.04E-05	12%
trans-2-Butene	1,600	2.89E-04	3.87E-04	34%	1.48E-03	1.82E-03	23%	1.90E-05	2.41E-05	27%	1.92E-05	2.16E-05	12%	1.85E-05	2.08E-05	12%
2-Methyl-1-butene	5,300	1.45E-04	1.93E-04	34%	7.41E-04	9.10E-04	23%	9.52E-06	1.21E-05	27%	9.61E-06	1.08E-05	12%	9.25E-06	1.04E-05	12%
3-Methyl-1-butene	5,300	8.91E-05	1.19E-04	34%	4.56E-04	5.60E-04	23%	5.86E-06	7.43E-06	27%	5.91E-06	6.64E-06	12%	5.70E-06	6.39E-06	12%
1,3-Butadiene	0.94	1.73E-04	2.31E-04	34%	8.83E-04	1.08E-03	23%	1.14E-05	1.44E-05	27%	1.15E-05	1.29E-05	12%	1.10E-05	1.24E-05	12%
Cyclopentane	1,130	2.28E-04	3.05E-04	34%	1.17E-03	1.43E-03	23%	1.50E-05	1.90E-05	27%	1.52E-05	1.70E-05	12%	1.46E-05	1.64E-05	12%
Methylcyclopentane	880	3.45E-04	4.61E-04	34%	1.77E-03	2.17E-03	23%	2.27E-05	2.88E-05	27%	2.29E-05	2.57E-05	12%	2.21E-05	2.48E-05	12%
Pentane	1,000	1.04E-03	1.38E-03	34%	5.30E-03	6.51E-03	23%	6.81E-05	8.63E-05	27%	6.88E-05	7.71E-05	12%	6.62E-05	7.43E-05	12%
Isopentane	24,000	1.53E-03	2.04E-03	34%	7.80E-03	9.59E-03	23%	1.00E-04	1.27E-04	27%	1.01E-04	1.14E-04	12%	9.75E-05	1.10E-04	12%
2-Methylpentane	1,170	5.18E-04	6.92E-04	34%	2.65E-03	3.25E-03	23%	3.41E-05	4.32E-05	27%	3.44E-05	3.86E-05	12%	3.31E-05	3.72E-05	12%
3-Methylpentane	1,170	3.73E-04	4.98E-04	34%	1.91E-03	2.34E-03	23%	2.45E-05	3.11E-05	27%	2.48E-05	2.78E-05	12%	2.38E-05	2.68E-05	12%
2,3-Dimethylpentane	1,170	4.01E-04	5.36E-04	34%	2.05E-03	2.52E-03	23%	2.64E-05	3.34E-05	27%	2.66E-05	2.99E-05	12%	2.56E-05	2.88E-05	12%
2,4-Dimethylpentane	1,170	2.28E-04	3.05E-04	34%	1.17E-03	1.43E-03	23%	1.50E-05	1.90E-05	27%	1.52E-05	1.70E-05	12%	1.46E-05	1.64E-05	12%
2,2,4-Trimethylpentane	1,170	6.90E-04	9.23E-04	34%	3.53E-03	4.34E-03	23%	4.54E-05	5.76E-05	27%	4.58E-05	5.14E-05	12%	4.41E-05	4.96E-05	12%
2,3,4-Trimethylpentane	1,170	1.73E-04	2.31E-04	34%	8.83E-04	1.08E-03	23%	1.14E-05	1.44E-05	27%	1.15E-05	1.29E-05	12%	1.10E-05	1.24E-05	12%
2-Methyl-2-pentene	600	1.17E-04	1.56E-04	34%	5.98E-04	7.35E-04	23%	7.69E-06	9.75E-06	27%	7.76E-06	8.71E-06	12%	7.48E-06	8.39E-06	12%
trans-2-Pentene	2,000	2.78E-05	3.72E-05	34%	1.42E-04	1.75E-04	23%	1.83E-06	2.32E-06	27%	1.85E-06	2.07E-06	12%	1.78E-06	2.00E-06	12%
Cyclohexane	6,300	1.17E-04	1.56E-04	34%	5.98E-04	7.35E-04	23%	7.69E-06	9.75E-06	27%	7.76E-06	8.71E-06	12%	7.48E-06	8.39E-06	12%
Methylcyclohexane	5,370	2.89E-04	3.87E-04	34%	1.48E-03	1.82E-03	23%	1.90E-05	2.41E-05	27%	1.92E-05	2.16E-05	12%	1.85E-05	2.08E-05	12%
Pentylcyclohexane	6,300	4.67E-05	6.24E-05	34%	2.39E-04	2.94E-04	23%	3.07E-06	3.89E-06	27%	3.10E-06	3.48E-06	12%	2.99E-06	3.35E-06	12%
Dodecylcyclohexane	33	9.35E-06	1.25E-05	34%	4.78E-05	5.88E-05	23%	6.15E-07	7.80E-07	27%	6.21E-07	6.97E-07	12%	5.98E-07	6.71E-07	12%
Tridecylcyclohexane	33	9.19E-06	1.23E-05	34%	4.70E-05	5.77E-05	23%	6.04E-07	7.66E-07	27%	6.10E-07	6.84E-07	12%	5.87E-07	6.59E-07	12%
Tetradecylcyclohexane	33	8.85E-06	1.18E-05	34%	4.53E-05	5.56E-05	23%	5.82E-07	7.38E-07	27%	5.88E-07	6.59E-07	12%	5.66E-07	6.35E-07	12%
Pentadecylcyclohexane	33	7.13E-06	9.52E-06	34%	3.65E-05	4.48E-05	23%	4.69E-07	5.94E-07	27%	4.73E-07	5.31E-07	12%	4.56E-07	5.12E-07	12%
2-Methylhexane	1,020	3.17E-04	4.24E-04	34%	1.62E-03	1.99E-03	23%	2.09E-05	2.65E-05	27%	2.11E-05	2.36E-05	12%	2.03E-05	2.28E-05	12%
3-Methylhexane	1,020	1.73E-04	2.31E-04	34%	8.83E-04	1.08E-03	23%	1.14E-05	1.44E-05	27%	1.15E-05	1.29E-05	12%	1.10E-05	1.24E-05	12%
3-Ethylhexane	1,170	1.17E-04	1.56E-04	34%	5.98E-04	7.35E-04	23%	7.69E-06	9.75E-06	27%	7.76E-06	8.71E-06	12%	7.48E-06	8.39E-06	12%
2,3-Dimethylhexane	1,170	8.91E-05	1.19E-04	34%	4.56E-04	5.60E-04	23%	5.86E-06	7.43E-06	27%	5.91E-06	6.64E-06	12%	5.70E-06	6.39E-06	12%
2,4-Dimethylhexane	1,170	2.78E-05	3.72E-05	34%	1.42E-04	1.75E-04	23%	1.83E-06	2.32E-06	27%	1.85E-06	2.07E-06	12%	1.78E-06	2.00E-06	12%
2,5-Dimethylhexane	1,170	2.78E-05	3.72E-05	34%	1.42E-04	1.75E-04	23%	1.83E-06	2.32E-06	27%	1.85E-06	2.07E-06	12%	1.78E-06	2.00E-06	12%
cis-2-Hexene	570	5.57E-05	7.44E-05	34%	2.85E-04	3.50E-04	23%	3.66E-06	4.64E-06	27%	3.70E-06	4.15E-06	12%	3.56E-06	4.00E-06	12%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
trans-2-Hexene	570	8.91E-05	1.19E-04	34%	4.56E-04	5.60E-04	23%	5.86E-06	7.43E-06	27%	5.91E-06	6.64E-06	12%	5.70E-06	6.39E-06	12%
Heptane	1,170	2.62E-04	3.50E-04	34%	1.34E-03	1.64E-03	23%	1.72E-05	2.18E-05	27%	1.74E-05	1.95E-05	12%	1.67E-05	1.88E-05	12%
2-Methylheptane	1,170	5.57E-05	7.44E-05	34%	2.85E-04	3.50E-04	23%	3.66E-06	4.64E-06	27%	3.70E-06	4.15E-06	12%	3.56E-06	4.00E-06	12%
Octane	1,170	1.45E-04	1.93E-04	34%	7.41E-04	9.10E-04	23%	9.52E-06	1.21E-05	27%	9.61E-06	1.08E-05	12%	9.25E-06	1.04E-05	12%
Nonane	21	8.91E-05	1.19E-04	34%	4.56E-04	5.60E-04	23%	5.86E-06	7.43E-06	27%	5.91E-06	6.64E-06	12%	5.70E-06	6.39E-06	12%
Dodecane	1,170	2.80E-04	3.74E-04	34%	1.43E-03	1.76E-03	23%	1.84E-05	2.33E-05	27%	1.86E-05	2.09E-05	12%	1.79E-05	2.01E-05	12%
Tridecane	1,170	2.66E-04	3.55E-04	34%	1.36E-03	1.67E-03	23%	1.75E-05	2.21E-05	27%	1.76E-05	1.98E-05	12%	1.70E-05	1.91E-05	12%
Tetradecane	1,170	3.50E-04	4.68E-04	34%	1.79E-03	2.20E-03	23%	2.30E-05	2.92E-05	27%	2.32E-05	2.61E-05	12%	2.24E-05	2.51E-05	12%
n-Pentadecane	33	2.22E-04	2.96E-04	34%	1.13E-03	1.39E-03	23%	1.46E-05	1.85E-05	27%	1.47E-05	1.65E-05	12%	1.42E-05	1.59E-05	12%
Hexadecane	1,170	3.96E-04	5.29E-04	34%	2.03E-03	2.49E-03	23%	2.60E-05	3.30E-05	27%	2.63E-05	2.95E-05	12%	2.53E-05	2.84E-05	12%
n-Heptadecane	33	3.42E-04	4.57E-04	34%	1.75E-03	2.15E-03	23%	2.25E-05	2.85E-05	27%	2.27E-05	2.55E-05	12%	2.19E-05	2.45E-05	12%
n-Octadecane	33	3.35E-04	4.47E-04	34%	1.71E-03	2.10E-03	23%	2.20E-05	2.79E-05	27%	2.22E-05	2.49E-05	12%	2.14E-05	2.40E-05	12%
n-Nonadecane	33	2.29E-04	3.06E-04	34%	1.17E-03	1.44E-03	23%	1.51E-05	1.91E-05	27%	1.52E-05	1.70E-05	12%	1.46E-05	1.64E-05	12%
n-Eicosane	33	1.15E-04	1.53E-04	34%	5.87E-04	7.21E-04	23%	7.55E-06	9.56E-06	27%	7.61E-06	8.54E-06	12%	7.33E-06	8.23E-06	12%
n-Heneicosane	33	3.66E-05	4.90E-05	34%	1.87E-04	2.30E-04	23%	2.41E-06	3.05E-06	27%	2.43E-06	2.73E-06	12%	2.34E-06	2.63E-06	12%
Farnesane	1,170	2.42E-04	3.23E-04	34%	1.24E-03	1.52E-03	23%	1.59E-05	2.01E-05	27%	1.60E-05	1.80E-05	12%	1.54E-05	1.73E-05	12%
Pristane	33	2.47E-04	3.30E-04	34%	1.26E-03	1.55E-03	23%	1.62E-05	2.06E-05	27%	1.64E-05	1.84E-05	12%	1.58E-05	1.77E-05	12%
C ₂ -C ₆ aliphatic	6,300	1.75E-02	2.29E-02	31%	8.55E-02	1.04E-01	22%	1.30E-03	1.58E-03	22%	1.36E-03	1.49E-03	10%	1.33E-03	1.46E-03	10%
>C ₆ -C ₈ aliphatic	1,170	2.99E-03	4.00E-03	34%	1.53E-02	1.88E-02	23%	1.97E-04	2.50E-04	27%	1.99E-04	2.23E-04	12%	1.92E-04	2.15E-04	12%
>C ₈ -C ₁₀ aliphatic	1,170	8.91E-05	1.19E-04	34%	4.56E-04	5.60E-04	23%	5.86E-06	7.43E-06	27%	5.91E-06	6.64E-06	12%	5.70E-06	6.39E-06	12%
>C ₁₀ -C ₁₂ aliphatic	1,170	3.35E-04	4.48E-04	34%	1.71E-03	2.11E-03	23%	2.20E-05	2.79E-05	27%	2.22E-05	2.50E-05	12%	2.14E-05	2.41E-05	12%
>C ₁₂ -C ₁₆ aliphatic	1,170	1.93E-03	2.57E-03	34%	9.86E-03	1.21E-02	23%	1.27E-04	1.61E-04	27%	1.28E-04	1.44E-04	12%	1.23E-04	1.38E-04	12%
>C ₁₆ -C ₂₁ aliphatic	33	1.91E-03	2.55E-03	34%	9.77E-03	1.20E-02	23%	1.26E-04	1.59E-04	27%	1.27E-04	1.42E-04	12%	1.22E-04	1.37E-04	12%
C ₆ -C ₈ aromatic	1.7	4.51E-03	5.86E-03	30%	2.15E-02	2.62E-02	22%	3.56E-04	4.26E-04	20%	3.80E-04	4.13E-04	9%	3.72E-04	4.03E-04	8%
>C ₈ -C ₁₀ aromatic	7.3	4.62E-04	6.18E-04	34%	2.36E-03	2.90E-03	23%	3.04E-05	3.85E-05	27%	3.07E-05	3.44E-05	12%	2.95E-05	3.32E-05	12%
Dioxins and Furans^(a)																
2378 - TCDD	0.000042	8.23E-14	8.23E-14	0%	1.49E-13	1.49E-13	0%	1.53E-14	1.53E-14	0%	1.37E-14	1.37E-14	0%	1.28E-14	1.28E-14	0%
12378 - PeCDD	0.00004	1.33E-13	1.33E-13	0%	2.41E-13	2.41E-13	0%	2.47E-14	2.47E-14	0%	2.22E-14	2.22E-14	0%	2.06E-14	2.06E-14	0%
123478 - HxCDD	0.0004	2.91E-14	2.91E-14	0%	5.26E-14	5.26E-14	0%	5.39E-15	5.39E-15	0%	4.85E-15	4.85E-15	0%	4.50E-15	4.50E-15	0%
123678 - HxCDD	0.0004	7.75E-14	7.75E-14	0%	1.40E-13	1.40E-13	0%	1.44E-14	1.44E-14	0%	1.29E-14	1.29E-14	0%	1.20E-14	1.20E-14	0%
123789 - HxCDD	0.0004	1.19E-13	1.19E-13	0%	2.15E-13	2.15E-13	0%	2.20E-14	2.20E-14	0%	1.98E-14	1.98E-14	0%	1.84E-14	1.84E-14	0%
1234678 - HpCDD	0.004	2.20E-13	2.20E-13	0%	3.98E-13	3.98E-13	0%	4.08E-14	4.08E-14	0%	3.67E-14	3.67E-14	0%	3.41E-14	3.41E-14	0%
1,2,3,4,6,7,8,9-Octa CDD	0.13	2.24E-13	2.24E-13	0%	4.05E-13	4.05E-13	0%	4.15E-14	4.15E-14	0%	3.73E-14	3.73E-14	0%	3.47E-14	3.47E-14	0%
2378 - TCDF	0.00042	1.35E-12	1.35E-12	0%	2.44E-12	2.44E-12	0%	2.50E-13	2.50E-13	0%	2.25E-13	2.25E-13	0%	2.09E-13	2.09E-13	0%
12378 - PeCDF	0.0013	7.05E-13	7.05E-13	0%	1.28E-12	1.28E-12	0%	1.31E-13	1.31E-13	0%	1.18E-13	1.18E-13	0%	1.09E-13	1.09E-13	0%
23478 - PeCDF	0.00013	1.21E-12	1.21E-12	0%	2.20E-12	2.20E-12	0%	2.25E-13	2.25E-13	0%	2.03E-13	2.03E-13	0%	1.88E-13	1.88E-13	0%
123478 - HxCDF	0.0004	1.23E-12	1.23E-12	0%	2.23E-12	2.23E-12	0%	2.29E-13	2.29E-13	0%	2.06E-13	2.06E-13	0%	1.91E-13	1.91E-13	0%

Table B-8 Screening of Predicted Annual Construction Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case	Base Case	Construction Case	% Increase from Base Case to Construction Case
123678 - HxCDF	0.0004	6.63E-13	6.63E-13	0%	1.20E-12	1.20E-12	0%	1.23E-13	1.23E-13	0%	1.11E-13	1.11E-13	0%	1.03E-13	1.03E-13	0%
234678 - HxCDF	0.0004	2.56E-13	2.56E-13	0%	4.64E-13	4.64E-13	0%	4.76E-14	4.76E-14	0%	4.28E-14	4.28E-14	0%	3.97E-14	3.97E-14	0%
123789 - HxCDF	0.0004	2.66E-14	2.66E-14	0%	4.82E-14	4.82E-14	0%	4.94E-15	4.94E-15	0%	4.44E-15	4.44E-15	0%	4.13E-15	4.13E-15	0%
1234678 - HpCDF	0.004	1.01E-12	1.01E-12	0%	1.82E-12	1.82E-12	0%	1.87E-13	1.87E-13	0%	1.68E-13	1.68E-13	0%	1.56E-13	1.56E-13	0%
1234789 - HpCDF	0.004	1.14E-13	1.14E-13	0%	2.06E-13	2.06E-13	0%	2.11E-14	2.11E-14	0%	1.90E-14	1.90E-14	0%	1.76E-14	1.76E-14	0%
1,2,3,4,6,7,8,9-Octa CDF	0.13	1.04E-13	1.04E-13	0%	1.89E-13	1.89E-13	0%	1.94E-14	1.94E-14	0%	1.74E-14	1.74E-14	0%	1.62E-14	1.62E-14	0%
Total PCDDs (TEQ)	0.00004	2.40E-13	2.40E-13	0%	4.35E-13	4.35E-13	0%	4.46E-14	4.46E-14	0%	4.01E-14	4.01E-14	0%	3.72E-14	3.72E-14	0%
Total PCDFs (TEQ)	0.00004	7.50E-13	7.50E-13	0%	1.36E-12	1.36E-12	0%	1.39E-13	1.39E-13	0%	1.25E-13	1.25E-13	0%	1.16E-13	1.16E-13	0%
Total PCDDs + PCDFs	-	2.50E-11	2.50E-11	0%	4.53E-11	4.53E-11	0%	4.64E-12	4.64E-12	0%	4.17E-12	4.17E-12	0%	3.88E-12	3.88E-12	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to Chronic (Const) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																
Nitrogen dioxide	40	2.66E-01	2.98E-01	12%	2.29E+01	2.31E+01	1%	7.74E+00	8.25E+00	7%	7.34E+00	9.39E+00	28%	3.71E+00	4.15E+00	12%
Sulphur dioxide	30	3.18E-04	3.52E-04	11%	1.44E-01	1.45E-01	0%	2.45E-02	2.58E-02	5%	2.22E-02	2.64E-02	19%	7.95E-03	8.49E-03	7%
Total Suspended Particulates (TSP)	60	3.11E+00	3.11E+00	0%	1.25E+01	1.25E+01	0%	3.97E+00	4.11E+00	3%	1.46E+01	1.03E+01	-29%	3.39E+00	3.48E+00	2%
PM _{2.5}	10	1.92E+00	1.93E+00	0%	5.55E+00	5.60E+00	1%	2.59E+00	2.69E+00	4%	3.10E+00	2.82E+00	-9%	2.19E+00	2.25E+00	3%
PM ₁₀	20	2.72E+00	2.73E+00	0%	7.93E+00	7.96E+00	0%	3.61E+00	3.74E+00	4%	8.00E+00	6.04E+00	-24%	3.02E+00	3.11E+00	3%
Metals																
Aluminum	5.2	5.63E-04	7.25E-04	29%	3.20E-01	3.20E-01	0%	4.22E-02	5.00E-02	18%	5.81E-01	3.27E-01	-44%	1.21E-02	1.71E-02	41%
Antimony	0.21	1.57E-08	2.02E-08	29%	9.31E-06	9.33E-06	0%	1.18E-06	1.40E-06	18%	1.67E-05	9.59E-06	-43%	3.41E-07	4.80E-07	40%
Arsenic	0.0065	2.63E-07	2.78E-07	6%	1.25E-04	1.25E-04	0%	1.59E-05	1.69E-05	6%	9.87E-05	6.07E-05	-38%	7.13E-06	7.70E-06	8%
Barium	0.52	5.48E-06	6.87E-06	25%	5.15E-03	5.16E-03	0%	4.33E-04	5.08E-04	17%	8.03E-03	5.54E-03	-31%	1.40E-04	1.83E-04	31%
Beryllium	0.012	1.58E-07	1.59E-07	1%	6.42E-05	6.42E-05	0%	9.08E-06	9.27E-06	2%	2.72E-05	1.53E-05	-44%	4.41E-06	4.53E-06	3%
Cadmium	0.005	3.73E-06	4.34E-06	17%	1.06E-03	1.08E-03	1%	1.52E-04	1.74E-04	15%	2.45E-04	2.34E-04	-4%	6.48E-05	7.38E-05	14%
Chromium (VI) ^(b)	0.00012	2.90E-06	3.00E-06	3%	3.05E-03	3.06E-03	0%	2.10E-04	2.43E-04	16%	4.12E-03	3.14E-03	-24%	7.79E-05	9.40E-05	21%
Chromium (III) ^(b)	0.14	2.90E-06	3.00E-06	3%	3.05E-03	3.06E-03	0%	2.10E-04	2.43E-04	16%	4.12E-03	3.14E-03	-24%	7.79E-05	9.40E-05	21%
Cobalt	0.0031	6.96E-07	8.19E-07	18%	3.34E-04	3.36E-04	1%	3.27E-05	3.78E-05	16%	2.70E-04	2.22E-04	-18%	1.34E-05	1.55E-05	16%
Copper	3.3	1.05E-06	1.19E-06	13%	4.28E-04	4.30E-04	1%	5.31E-05	5.91E-05	11%	2.99E-04	2.11E-04	-29%	2.25E-05	2.53E-05	13%
Iron	3.3	1.65E-04	2.06E-04	25%	1.57E-01	1.58E-01	0%	1.29E-02	1.52E-02	17%	2.42E-01	1.69E-01	-30%	4.22E-03	5.49E-03	30%
Lead	0.15	1.16E-06	1.30E-06	12%	4.28E-04	4.30E-04	0%	5.84E-05	6.40E-05	10%	2.34E-04	1.55E-04	-34%	2.55E-05	2.81E-05	10%
Manganese	0.052	3.52E-06	4.25E-06	21%	3.15E-03	3.16E-03	0%	2.52E-04	2.92E-04	16%	4.38E-03	3.17E-03	-28%	8.97E-05	1.11E-04	24%
Mercury	0.2	2.13E-07	2.19E-07	3%	9.92E-05	9.92E-05	0%	1.15E-05	1.19E-05	4%	6.57E-05	4.49E-05	-32%	5.81E-06	6.07E-06	5%
Molybdenum	10	1.32E-08	1.67E-08	26%	1.14E-05	1.14E-05	0%	1.03E-06	1.21E-06	18%	1.82E-05	1.22E-05	-33%	3.26E-07	4.33E-07	33%
Nickel	0.015	1.28E-06	1.42E-06	10%	2.74E-03	2.75E-03	0%	1.13E-04	1.27E-04	13%	3.52E-03	3.01E-03	-14%	5.07E-05	5.51E-05	9%
Selenium	21	7.13E-07	6.99E-07	-2%	2.77E-04	2.77E-04	0%	3.96E-05	3.96E-05	0%	5.61E-05	3.14E-05	-44%	2.04E-05	2.03E-05	0%
Silver	0.033	5.97E-07	7.00E-07	17%	1.68E-04	1.70E-04	1%	2.40E-05	2.78E-05	16%	4.03E-05	3.86E-05	-4%	1.01E-05	1.16E-05	15%
Strontium	6.7	3.42E-06	4.32E-06	26%	3.00E-03	3.01E-03	0%	2.68E-04	3.15E-04	18%	4.77E-03	3.21E-03	-33%	8.50E-05	1.13E-04	33%
Tellurium	0.33	8.84E-10	1.13E-09	27%	6.43E-07	6.44E-07	0%	6.79E-08	8.01E-08	18%	1.08E-06	6.77E-07	-37%	2.05E-08	2.80E-08	36%
Thallium	0.33	1.07E-08	1.37E-08	29%	5.81E-06	5.83E-06	0%	7.99E-07	9.47E-07	19%	1.08E-05	5.93E-06	-45%	2.27E-07	3.22E-07	42%
Titanium	0.1	1.29E-05	1.65E-05	28%	8.98E-03	9.00E-03	0%	9.86E-04	1.16E-03	18%	1.53E-02	9.42E-03	-38%	2.95E-04	4.05E-04	37%
Tungsten	3.3	3.64E-08	4.68E-08	29%	2.11E-05	2.11E-05	0%	2.74E-06	3.25E-06	18%	3.82E-05	2.16E-05	-43%	7.87E-07	1.11E-06	41%
Uranium	0.04	4.61E-08	5.90E-08	28%	2.98E-05	2.99E-05	0%	3.50E-06	4.14E-06	18%	5.20E-05	3.10E-05	-40%	1.03E-06	1.43E-06	39%
Vanadium	0.1	3.29E-07	4.13E-07	26%	3.00E-04	3.01E-04	0%	2.59E-05	3.04E-05	17%	4.71E-04	3.22E-04	-32%	8.28E-06	1.09E-05	32%
Zinc	6.7	4.79E-06	5.63E-06	18%	1.56E-03	1.58E-03	1%	2.12E-04	2.44E-04	15%	8.21E-04	6.07E-04	-26%	8.61E-05	1.00E-04	16%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	10	1.02E-06	2.33E-06	128%	2.58E-04	2.81E-04	9%	6.79E-05	1.06E-04	56%	1.29E-04	3.63E-04	183%	1.99E-05	3.66E-05	84%
1-Methylphenanthrene	0.17	4.59E-08	1.05E-07	128%	1.16E-05	1.26E-05	9%	3.05E-06	4.75E-06	56%	5.78E-06	1.63E-05	183%	8.94E-07	1.65E-06	84%
2-Methylantracene	0.17	2.81E-08	6.41E-08	128%	7.10E-06	7.72E-06	9%	1.87E-06	2.91E-06	56%	3.54E-06	1.00E-05	183%	5.47E-07	1.01E-06	84%
2-Methylfluorene	3.3	9.47E-10	2.16E-09	128%	2.40E-07	2.60E-07	9%	6.30E-08	9.80E-08	56%	1.19E-07	3.37E-07	183%	1.85E-08	3.40E-08	84%
2-methylnaphthalene	10	1.65E-06	3.76E-06	128%	4.17E-04	4.54E-04	9%	1.10E-04	1.71E-04	56%	2.08E-04	5.88E-04	183%	3.21E-05	5.92E-05	84%
2-Methylphenanthrene	0.17	1.13E-07	2.59E-07	128%	2.87E-05	3.12E-05	9%	7.55E-06	1.17E-05	56%	1.43E-05	4.04E-05	183%	2.21E-06	4.07E-06	84%
2-Methylpyrene	0.17	8.40E-09	1.92E-08	128%	2.13E-06	2.31E-06	9%	5.59E-07	8.69E-07	56%	1.06E-06	2.99E-06	183%	1.64E-07	3.01E-07	84%
3-Methyldibenzothiophene	8.3	1.74E-09	3.96E-09	128%	4.39E-07	4.77E-07	9%	1.16E-07	1.80E-07	56%	2.19E-07	6.18E-07	183%	3.38E-08	6.23E-08	84%
3-Methylphenanthrene	0.17	8.18E-08	1.87E-07	128%	2.07E-05	2.25E-05	9%	5.44E-06	8.47E-06	56%	1.03E-05	2.91E-05	183%	1.59E-06	2.94E-06	84%
4-+9-Methylphenanthrene	0.17	6.18E-08	1.41E-07	128%	1.56E-05	1.70E-05	9%	4.11E-06	6.40E-06	56%	7.79E-06	2.20E-05	183%	1.20E-06	2.22E-06	84%
4-Methyldibenzothiophene	8.3	1.11E-09	2.52E-09	128%	2.80E-07	3.04E-07	9%	7.35E-08	1.14E-07	56%	1.39E-07	3.94E-07	183%	2.15E-08	3.97E-08	84%
9-Methylphenanthrene	-	4.99E-10	4.99E-10	0%	1.46E-07	1.46E-07	0%	9.74E-09	9.74E-09	0%	3.78E-08	3.78E-08	0%	1.10E-08	1.10E-08	0%
Acenaphthene	0.33	3.83E-07	4.49E-07	17%	4.89E-05	5.01E-05	2%	7.75E-06	9.67E-06	25%	1.21E-05	2.35E-05	94%	4.70E-06	5.55E-06	18%
Acenaphthylene	0.33	8.25E-07	1.07E-06	29%	1.14E-04	1.18E-04	4%	2.02E-05	2.72E-05	35%	3.25E-05	7.60E-05	134%	1.06E-05	1.37E-05	29%
Acphenanthrylene	0.17	3.24E-08	7.39E-08	128%	8.20E-06	8.91E-06	9%	2.16E-06	3.35E-06	56%	4.08E-06	1.15E-05	183%	6.31E-07	1.16E-06	84%
Anthracene	0.17	1.19E-07	1.62E-07	36%	1.75E-05	1.82E-05	4%	3.29E-06	4.53E-06	38%	5.47E-06	1.32E-05	141%	1.58E-06	2.14E-06	35%
Benz(a)anthracene	0.092	5.27E-08	6.29E-08	19%	6.95E-06	7.12E-06	3%	1.13E-06	1.43E-06	26%	1.83E-06	3.56E-06	95%	6.60E-07	7.91E-07	20%
Benzo(a)fluorene	0.92	1.02E-08	2.32E-08	128%	2.58E-06	2.80E-06	9%	6.78E-07	1.05E-06	56%	1.28E-06	3.63E-06	183%	1.99E-07	3.66E-07	84%
Benzo(a)pyrene	0.00012	2.21E-08	2.79E-08	26%	2.97E-06	3.07E-06	3%	5.09E-07	6.74E-07	32%	8.01E-07	1.83E-06	128%	2.78E-07	3.51E-07	26%
Benzo(b)fluoranthene	0.092	1.15E-07	1.63E-07	41%	1.79E-05	1.87E-05	5%	3.45E-06	4.83E-06	40%	5.90E-06	1.45E-05	145%	1.59E-06	2.20E-06	39%
Benzo(e)pyrene	0.17	9.39E-10	1.75E-09	86%	2.50E-07	2.64E-07	6%	4.80E-08	7.13E-08	49%	1.03E-07	2.48E-07	141%	1.91E-08	2.95E-08	54%
Benzo(g,h,i)fluoranthene	0.17	1.57E-08	3.58E-08	128%	3.97E-06	4.32E-06	9%	1.05E-06	1.63E-06	56%	1.98E-06	5.60E-06	183%	3.06E-07	5.64E-07	84%
Benzo(g,h,i)perylene	0.17	5.02E-08	6.32E-08	26%	7.01E-06	7.24E-06	3%	1.20E-06	1.57E-06	31%	1.99E-06	4.27E-06	115%	6.50E-07	8.17E-07	26%
Benzo(k)fluoranthene	0.092	1.93E-08	2.47E-08	28%	2.64E-06	2.73E-06	4%	4.63E-07	6.20E-07	34%	7.39E-07	1.72E-06	133%	2.45E-07	3.15E-07	28%
Biphenyl	0.42	2.10E-09	2.10E-09	0%	6.16E-07	6.16E-07	0%	4.11E-08	4.11E-08	0%	1.59E-07	1.59E-07	0%	4.65E-08	4.65E-08	0%
Chrysene	0.92	1.16E-07	1.27E-07	10%	1.37E-05	1.39E-05	1%	1.92E-06	2.26E-06	17%	2.74E-06	4.75E-06	73%	1.35E-06	1.50E-06	11%
Coronene	0.17	7.89E-11	1.80E-10	128%	2.00E-08	2.17E-08	9%	5.25E-09	8.16E-09	56%	9.94E-09	2.81E-08	183%	1.54E-09	2.83E-09	84%
Cyclopenta(c,d)pyrene	0.0012	5.56E-09	1.27E-08	128%	1.41E-06	1.53E-06	9%	3.70E-07	5.76E-07	56%	7.01E-07	1.98E-06	183%	1.08E-07	2.00E-07	84%
Dibenzo(a,h)anthracene	0.0084	3.62E-08	5.11E-08	41%	5.61E-06	5.87E-06	5%	1.10E-06	1.53E-06	39%	1.89E-06	4.53E-06	140%	5.01E-07	6.92E-07	38%
Dibenzothiophene	8.3	6.72E-10	1.53E-09	128%	1.70E-07	1.85E-07	9%	4.47E-08	6.95E-08	56%	8.46E-08	2.39E-07	183%	1.31E-08	2.41E-08	84%
Fluoranthene	0.17	4.27E-07	6.10E-07	43%	6.70E-05	7.01E-05	5%	1.30E-05	1.83E-05	41%	2.24E-05	5.52E-05	146%	5.94E-06	8.28E-06	40%
Fluorene	3.3	1.15E-06	1.50E-06	30%	1.60E-04	1.66E-04	4%	2.86E-05	3.85E-05	35%	4.61E-05	1.08E-04	134%	1.48E-05	1.92E-05	30%
Indeno(1,2,3-cd)fluoranthene	0.092	3.95E-10	9.00E-10	128%	9.98E-08	1.08E-07	9%	2.62E-08	4.08E-08	56%	4.97E-08	1.40E-07	183%	7.69E-09	1.42E-08	84%
Indeno(1,2,3-cd)pyrene	0.092	2.94E-08	2.93E-08	0%	3.19E-06	3.19E-06	0%	3.84E-07	3.83E-07	0%	5.06E-07	4.44E-07	-12%	3.28E-07	3.28E-07	0%
Indeno(1,2,3-W)pyrene	0.092	7.09E-09	1.62E-08	128%	1.79E-06	1.95E-06	9%	4.72E-07	7.33E-07	56%	8.93E-07	2.52E-06	183%	1.38E-07	2.54E-07	84%
Naphthalene	3.1	1.35E-05	1.86E-05	38%	2.07E-03	2.16E-03	4%	3.98E-04	5.47E-04	37%	6.94E-04	1.59E-03	129%	1.86E-04	2.52E-04	35%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	0.091	6.31E-09	1.44E-08	128%	1.60E-06	1.73E-06	9%	4.20E-07	6.53E-07	56%	7.94E-07	2.25E-06	183%	1.23E-07	2.26E-07	84%
Perylene	0.17	7.89E-11	1.80E-10	128%	2.00E-08	2.17E-08	9%	5.25E-09	8.16E-09	56%	9.94E-09	2.81E-08	183%	1.54E-09	2.83E-09	84%
Phenanthrene	0.17	3.07E-06	3.39E-06	10%	3.59E-04	3.64E-04	2%	5.07E-05	6.00E-05	18%	7.06E-05	1.28E-04	81%	3.55E-05	3.96E-05	12%
Picene	0.0084	7.89E-11	1.80E-10	128%	2.00E-08	2.17E-08	9%	5.25E-09	8.16E-09	56%	9.94E-09	2.81E-08	183%	1.54E-09	2.83E-09	84%
Pyrene	0.17	4.56E-07	7.05E-07	54%	7.76E-05	8.19E-05	6%	1.62E-05	2.33E-05	44%	2.85E-05	7.31E-05	156%	6.69E-06	9.87E-06	48%
Volatile Organic Compounds																
Methacrolein	8.1	1.13E-04	1.95E-04	72%	6.06E-02	6.19E-02	2%	8.09E-03	1.06E-02	30%	9.63E-03	1.65E-02	72%	2.69E-03	3.79E-03	41%
Acrolein	0.021	9.69E-05	1.67E-04	72%	5.16E-02	5.27E-02	2%	6.89E-03	8.98E-03	30%	8.20E-03	1.41E-02	72%	2.30E-03	3.23E-03	41%
Benzaldehyde	30	1.08E-04	1.85E-04	72%	5.75E-02	5.88E-02	2%	7.69E-03	1.00E-02	30%	9.15E-03	1.57E-02	72%	2.56E-03	3.60E-03	41%
2,5-dimethylbenzaldehyde	30	1.16E-04	2.00E-04	72%	6.21E-02	6.35E-02	2%	8.29E-03	1.08E-02	30%	9.87E-03	1.70E-02	72%	2.76E-03	3.88E-03	41%
Butanal (Butyraldehyde)	100	3.68E-05	6.35E-05	72%	1.97E-02	2.01E-02	2%	2.63E-03	3.43E-03	30%	3.13E-03	5.38E-03	72%	8.75E-04	1.23E-03	41%
Formaldehyde	2.2	6.59E-04	1.12E-03	69%	3.42E-01	3.50E-01	2%	4.63E-02	6.00E-02	30%	5.57E-02	9.32E-02	67%	1.56E-02	2.17E-02	39%
Acetaldehyde	9.4	1.19E-03	2.04E-03	72%	6.33E-01	6.48E-01	2%	8.46E-02	1.10E-01	30%	1.01E-01	1.73E-01	72%	2.82E-02	3.96E-02	41%
Propanal	8.3	3.97E-04	6.83E-04	72%	2.12E-01	2.17E-01	2%	2.83E-02	3.69E-02	30%	3.37E-02	5.79E-02	72%	9.43E-03	1.33E-02	41%
Crotonaldehyde	10	3.80E-04	6.54E-04	72%	2.03E-01	2.08E-01	2%	2.71E-02	3.54E-02	30%	3.23E-02	5.54E-02	72%	9.02E-03	1.27E-02	41%
Hexanal	2,730	6.23E-05	1.07E-04	72%	3.33E-02	3.41E-02	2%	4.45E-03	5.81E-03	30%	5.30E-03	9.10E-03	72%	1.48E-03	2.08E-03	41%
Heptanal	133	9.06E-05	1.56E-04	72%	4.85E-02	4.96E-02	2%	6.47E-03	8.44E-03	30%	7.71E-03	1.32E-02	72%	2.15E-03	3.03E-03	41%
Octanal	500	8.78E-05	1.51E-04	72%	4.69E-02	4.80E-02	2%	6.27E-03	8.18E-03	30%	7.47E-03	1.28E-02	72%	2.09E-03	2.94E-03	41%
Nonanal	500	1.25E-04	2.15E-04	72%	6.66E-02	6.81E-02	2%	8.90E-03	1.16E-02	30%	1.06E-02	1.82E-02	72%	2.96E-03	4.17E-03	41%
Decanal	13	7.93E-05	1.37E-04	72%	4.24E-02	4.34E-02	2%	5.66E-03	7.39E-03	30%	6.74E-03	1.16E-02	72%	1.89E-03	2.65E-03	41%
Undecanal	33	7.36E-05	1.27E-04	72%	3.94E-02	4.03E-02	2%	5.26E-03	6.86E-03	30%	6.26E-03	1.08E-02	72%	1.75E-03	2.46E-03	41%
Dodecanal	13	3.40E-05	5.86E-05	72%	1.82E-02	1.86E-02	2%	2.43E-03	3.17E-03	30%	2.89E-03	4.96E-03	72%	8.08E-04	1.14E-03	41%
Tridecanal	13	5.66E-05	9.76E-05	72%	3.03E-02	3.10E-02	2%	4.05E-03	5.28E-03	30%	4.82E-03	8.27E-03	72%	1.35E-03	1.89E-03	41%
1,2,4-Trimethylbenzene	7.3	2.49E-05	4.30E-05	72%	1.33E-02	1.36E-02	2%	1.78E-03	2.32E-03	30%	2.12E-03	3.64E-03	72%	5.93E-04	8.33E-04	41%
1,3,5-Trimethylbenzene	7.3	7.36E-06	1.27E-05	72%	3.94E-03	4.03E-03	2%	5.26E-04	6.86E-04	30%	6.26E-04	1.08E-03	72%	1.75E-04	2.46E-04	41%
Benzene	1.7	1.36E-04	1.92E-04	41%	4.79E-02	4.88E-02	2%	6.60E-03	8.29E-03	26%	7.40E-03	1.21E-02	64%	2.53E-03	3.28E-03	30%
Ethylbenzene	260	1.34E-05	2.30E-05	72%	7.14E-03	7.30E-03	2%	9.54E-04	1.24E-03	30%	1.14E-03	1.95E-03	71%	3.19E-04	4.47E-04	40%
Propylbenzene	1,000	2.83E-06	4.88E-06	72%	1.51E-03	1.55E-03	2%	2.02E-04	2.64E-04	30%	2.41E-04	4.14E-04	72%	6.73E-05	9.47E-05	41%
Indanone	160	1.97E-06	3.39E-06	72%	1.05E-03	1.08E-03	2%	1.41E-04	1.83E-04	30%	1.67E-04	2.87E-04	72%	4.68E-05	6.58E-05	41%
Toluene	260	1.39E-04	2.20E-04	59%	6.35E-02	6.48E-02	2%	8.64E-03	1.11E-02	28%	1.03E-02	1.70E-02	65%	3.03E-03	4.12E-03	36%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	417	5.95E-06	1.03E-05	72%	3.18E-03	3.25E-03	2%	4.25E-04	5.54E-04	30%	5.06E-04	8.69E-04	72%	1.41E-04	1.99E-04	41%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	417	1.47E-05	2.54E-05	72%	7.87E-03	8.05E-03	2%	1.05E-03	1.37E-03	30%	1.25E-03	2.15E-03	72%	3.50E-04	4.92E-04	41%
Acetone	31,000	6.23E-04	1.07E-03	72%	3.33E-01	3.41E-01	2%	4.45E-02	5.81E-02	30%	5.30E-02	9.10E-02	72%	1.48E-02	2.08E-02	41%
Acetophenone	160	1.44E-04	2.49E-04	72%	7.72E-02	7.90E-02	2%	1.03E-02	1.35E-02	30%	1.23E-02	2.11E-02	72%	3.43E-03	4.83E-03	41%
Methyl Ethyl Ketone	5,200	2.12E-04	3.66E-04	72%	1.14E-01	1.16E-01	2%	1.52E-02	1.98E-02	30%	1.81E-02	3.10E-02	72%	5.05E-03	7.10E-03	41%
Xylene	100	8.06E-05	1.28E-04	59%	3.69E-02	3.77E-02	2%	4.98E-03	6.41E-03	29%	5.82E-03	9.85E-03	69%	1.74E-03	2.38E-03	37%
o-Xylene	100	2.36E-05	4.06E-05	72%	1.26E-02	1.29E-02	2%	1.68E-03	2.19E-03	30%	2.00E-03	3.44E-03	71%	5.61E-04	7.88E-04	41%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	6,100	2.42E-04	4.18E-04	72%	1.30E-01	1.33E-01	2%	1.73E-02	2.26E-02	30%	2.06E-02	3.54E-02	72%	5.76E-03	8.11E-03	41%
1,1,1-Trichloroethane (Methyl chloroform)	5,200	1.55E-07	1.48E-07	-4%	2.89E-05	2.89E-05	0%	7.56E-06	7.50E-06	-1%	1.35E-05	6.67E-06	-51%	3.65E-06	3.60E-06	-1%
Butane	24,000	1.08E-04	1.87E-04	72%	5.80E-02	5.93E-02	2%	7.75E-03	1.01E-02	30%	9.22E-03	1.58E-02	72%	2.58E-03	3.63E-03	41%
2,2-Dimethylbutane	1,170	8.78E-06	1.51E-05	72%	4.69E-03	4.80E-03	2%	6.27E-04	8.18E-04	30%	7.47E-04	1.28E-03	72%	2.09E-04	2.94E-04	41%
2,3-Dimethylbutane	1,170	1.61E-05	2.78E-05	72%	8.63E-03	8.83E-03	2%	1.15E-03	1.50E-03	30%	1.37E-03	2.36E-03	72%	3.84E-04	5.40E-04	41%
Isobutene	110,000	3.23E-05	5.56E-05	72%	1.73E-02	1.77E-02	2%	2.31E-03	3.01E-03	30%	2.75E-03	4.72E-03	72%	7.68E-04	1.08E-03	41%
cis-2-Butene	1,600	7.36E-06	1.27E-05	72%	3.94E-03	4.03E-03	2%	5.26E-04	6.86E-04	30%	6.26E-04	1.08E-03	72%	1.75E-04	2.46E-04	41%
trans-2-Butene	1,600	1.47E-05	2.54E-05	72%	7.87E-03	8.05E-03	2%	1.05E-03	1.37E-03	30%	1.25E-03	2.15E-03	72%	3.50E-04	4.92E-04	41%
2-Methyl-1-butene	5,300	7.36E-06	1.27E-05	72%	3.94E-03	4.03E-03	2%	5.26E-04	6.86E-04	30%	6.26E-04	1.08E-03	72%	1.75E-04	2.46E-04	41%
3-Methyl-1-butene	5,300	4.53E-06	7.81E-06	72%	2.42E-03	2.48E-03	2%	3.24E-04	4.22E-04	30%	3.85E-04	6.62E-04	72%	1.08E-04	1.52E-04	41%
1,3-Butadiene	0.94	8.78E-06	1.51E-05	72%	4.69E-03	4.80E-03	2%	6.27E-04	8.18E-04	30%	7.47E-04	1.28E-03	72%	2.09E-04	2.94E-04	41%
Cyclopentane	1130	1.16E-05	2.00E-05	72%	6.21E-03	6.35E-03	2%	8.29E-04	1.08E-03	30%	9.87E-04	1.70E-03	72%	2.76E-04	3.88E-04	41%
Methylcyclopentane	880	1.76E-05	3.03E-05	72%	9.39E-03	9.60E-03	2%	1.25E-03	1.64E-03	30%	1.49E-03	2.56E-03	72%	4.18E-04	5.87E-04	41%
Pentane	1,000	5.27E-05	9.08E-05	72%	2.82E-02	2.88E-02	2%	3.76E-03	4.91E-03	30%	4.48E-03	7.69E-03	72%	1.25E-03	1.76E-03	41%
Isopentane	24,000	7.76E-05	1.34E-04	72%	4.15E-02	4.24E-02	2%	5.54E-03	7.23E-03	30%	6.60E-03	1.13E-02	72%	1.85E-03	2.60E-03	41%
2-Methylpentane	1,170	2.63E-05	4.54E-05	72%	1.41E-02	1.44E-02	2%	1.88E-03	2.45E-03	30%	2.24E-03	3.85E-03	72%	6.26E-04	8.81E-04	41%
3-Methylpentane	1,170	1.90E-05	3.27E-05	72%	1.01E-02	1.04E-02	2%	1.36E-03	1.77E-03	30%	1.61E-03	2.77E-03	72%	4.51E-04	6.35E-04	41%
2,3-Dimethylpentane	1,170	2.04E-05	3.51E-05	72%	1.09E-02	1.12E-02	2%	1.46E-03	1.90E-03	30%	1.73E-03	2.98E-03	72%	4.85E-04	6.82E-04	41%
2,4-Dimethylpentane	1,170	1.16E-05	2.00E-05	72%	6.21E-03	6.35E-03	2%	8.29E-04	1.08E-03	30%	9.87E-04	1.70E-03	72%	2.76E-04	3.88E-04	41%
2,2,4-Trimethylpentane	1,170	3.51E-05	6.05E-05	72%	1.88E-02	1.92E-02	2%	2.51E-03	3.27E-03	30%	2.99E-03	5.13E-03	72%	8.35E-04	1.17E-03	41%
2,3,4-Trimethylpentane	1,170	8.78E-06	1.51E-05	72%	4.69E-03	4.80E-03	2%	6.27E-04	8.18E-04	30%	7.47E-04	1.28E-03	72%	2.09E-04	2.94E-04	41%
2-Methyl-2-pentene	600	5.95E-06	1.03E-05	72%	3.18E-03	3.25E-03	2%	4.25E-04	5.54E-04	30%	5.06E-04	8.69E-04	72%	1.41E-04	1.99E-04	41%
trans-2-Pentene	2,000	1.42E-06	2.44E-06	72%	7.57E-04	7.74E-04	2%	1.01E-04	1.32E-04	30%	1.20E-04	2.07E-04	72%	3.37E-05	4.74E-05	41%
Cyclohexane	6,300	5.95E-06	1.03E-05	72%	3.18E-03	3.25E-03	2%	4.25E-04	5.54E-04	30%	5.06E-04	8.69E-04	72%	1.41E-04	1.99E-04	41%
Methylcyclohexane	5,370	1.47E-05	2.54E-05	72%	7.87E-03	8.05E-03	2%	1.05E-03	1.37E-03	30%	1.25E-03	2.15E-03	72%	3.50E-04	4.92E-04	41%
Pentylcyclohexane	6,300	2.38E-06	4.10E-06	72%	1.27E-03	1.30E-03	2%	1.70E-04	2.21E-04	30%	2.02E-04	3.47E-04	72%	5.65E-05	7.95E-05	41%
Dodecylcyclohexane	33	4.76E-07	8.20E-07	72%	2.54E-04	2.60E-04	2%	3.40E-05	4.43E-05	30%	4.05E-05	6.95E-05	72%	1.13E-05	1.59E-05	41%
Tridecylcyclohexane	33	4.67E-07	8.05E-07	72%	2.50E-04	2.56E-04	2%	3.34E-05	4.35E-05	30%	3.97E-05	6.82E-05	72%	1.11E-05	1.56E-05	41%
Tetradecylcyclohexane	33	4.50E-07	7.76E-07	72%	2.41E-04	2.46E-04	2%	3.22E-05	4.20E-05	30%	3.83E-05	6.58E-05	72%	1.07E-05	1.51E-05	41%
Pentadecylcyclohexane	33	3.63E-07	6.25E-07	72%	1.94E-04	1.98E-04	2%	2.59E-05	3.38E-05	30%	3.08E-05	5.29E-05	72%	8.62E-06	1.21E-05	41%
2-Methylhexane	1,020	1.61E-05	2.78E-05	72%	8.63E-03	8.83E-03	2%	1.15E-03	1.50E-03	30%	1.37E-03	2.36E-03	72%	3.84E-04	5.40E-04	41%
3-Methylhexane	1,020	8.78E-06	1.51E-05	72%	4.69E-03	4.80E-03	2%	6.27E-04	8.18E-04	30%	7.47E-04	1.28E-03	72%	2.09E-04	2.94E-04	41%
3-Ethylhexane	1,170	5.95E-06	1.03E-05	72%	3.18E-03	3.25E-03	2%	4.25E-04	5.54E-04	30%	5.06E-04	8.69E-04	72%	1.41E-04	1.99E-04	41%
2,3-Dimethylhexane	1,170	4.53E-06	7.81E-06	72%	2.42E-03	2.48E-03	2%	3.24E-04	4.22E-04	30%	3.85E-04	6.62E-04	72%	1.08E-04	1.52E-04	41%
2,4-Dimethylhexane	1,170	1.42E-06	2.44E-06	72%	7.57E-04	7.74E-04	2%	1.01E-04	1.32E-04	30%	1.20E-04	2.07E-04	72%	3.37E-05	4.74E-05	41%
2,5-Dimethylhexane	1,170	1.42E-06	2.44E-06	72%	7.57E-04	7.74E-04	2%	1.01E-04	1.32E-04	30%	1.20E-04	2.07E-04	72%	3.37E-05	4.74E-05	41%
cis-2-Hexene	570	2.83E-06	4.88E-06	72%	1.51E-03	1.55E-03	2%	2.02E-04	2.64E-04	30%	2.41E-04	4.14E-04	72%	6.73E-05	9.47E-05	41%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	570	4.53E-06	7.81E-06	72%	2.42E-03	2.48E-03	2%	3.24E-04	4.22E-04	30%	3.85E-04	6.62E-04	72%	1.08E-04	1.52E-04	41%
Heptane	1,170	1.33E-05	2.29E-05	72%	7.12E-03	7.28E-03	2%	9.51E-04	1.24E-03	30%	1.13E-03	1.94E-03	72%	3.16E-04	4.45E-04	41%
2-Methylheptane	1,170	2.83E-06	4.88E-06	72%	1.51E-03	1.55E-03	2%	2.02E-04	2.64E-04	30%	2.41E-04	4.14E-04	72%	6.73E-05	9.47E-05	41%
Octane	1,170	7.36E-06	1.27E-05	72%	3.94E-03	4.03E-03	2%	5.26E-04	6.86E-04	30%	6.26E-04	1.08E-03	72%	1.75E-04	2.46E-04	41%
Nonane	21	4.53E-06	7.81E-06	72%	2.42E-03	2.48E-03	2%	3.24E-04	4.22E-04	30%	3.85E-04	6.62E-04	72%	1.08E-04	1.52E-04	41%
Dodecane	1,170	1.42E-05	2.46E-05	72%	7.62E-03	7.79E-03	2%	1.02E-03	1.33E-03	30%	1.21E-03	2.08E-03	72%	3.39E-04	4.76E-04	41%
Tridecane	1,170	1.35E-05	2.33E-05	72%	7.22E-03	7.39E-03	2%	9.65E-04	1.26E-03	30%	1.15E-03	1.97E-03	72%	3.21E-04	4.52E-04	41%
Tetradecane	1,170	1.78E-05	3.07E-05	72%	9.52E-03	9.74E-03	2%	1.27E-03	1.66E-03	30%	1.51E-03	2.60E-03	72%	4.24E-04	5.96E-04	41%
n-Pentadecane	33	1.13E-05	1.94E-05	72%	6.03E-03	6.16E-03	2%	8.05E-04	1.05E-03	30%	9.58E-04	1.65E-03	72%	2.68E-04	3.77E-04	41%
Hexadecane	1,170	2.01E-05	3.47E-05	72%	1.08E-02	1.10E-02	2%	1.44E-03	1.88E-03	30%	1.71E-03	2.94E-03	72%	4.79E-04	6.73E-04	41%
n-Heptadecane	33	1.74E-05	3.00E-05	72%	9.30E-03	9.51E-03	2%	1.24E-03	1.62E-03	30%	1.48E-03	2.54E-03	72%	4.13E-04	5.82E-04	41%
n-Octadecane	33	1.70E-05	2.93E-05	72%	9.10E-03	9.31E-03	2%	1.22E-03	1.59E-03	30%	1.45E-03	2.49E-03	72%	4.05E-04	5.69E-04	41%
n-Nonadecane	33	1.16E-05	2.01E-05	72%	6.22E-03	6.37E-03	2%	8.31E-04	1.08E-03	30%	9.90E-04	1.70E-03	72%	2.77E-04	3.89E-04	41%
n-Eicosane	33	5.83E-06	1.01E-05	72%	3.12E-03	3.19E-03	2%	4.17E-04	5.44E-04	30%	4.96E-04	8.52E-04	72%	1.39E-04	1.95E-04	41%
n-Heneicosane	33	1.86E-06	3.21E-06	72%	9.96E-04	1.02E-03	2%	1.33E-04	1.74E-04	30%	1.58E-04	2.72E-04	72%	4.43E-05	6.23E-05	41%
Farnesane	1170	1.23E-05	2.12E-05	72%	6.57E-03	6.72E-03	2%	8.78E-04	1.15E-03	30%	1.05E-03	1.80E-03	72%	2.92E-04	4.11E-04	41%
Pristane	33	1.25E-05	2.16E-05	72%	6.71E-03	6.86E-03	2%	8.96E-04	1.17E-03	30%	1.07E-03	1.83E-03	72%	2.98E-04	4.20E-04	41%
C ₂ -C ₆ aliphatic	6,300	1.04E-03	1.64E-03	58%	4.66E-01	4.76E-01	2%	6.29E-02	8.10E-02	29%	7.31E-02	1.24E-01	69%	2.21E-02	3.01E-02	36%
>C ₆ -C ₈ aliphatic	1,170	1.52E-04	2.63E-04	72%	8.15E-02	8.33E-02	2%	1.09E-02	1.42E-02	30%	1.30E-02	2.23E-02	72%	3.62E-03	5.10E-03	41%
>C ₈ -C ₁₀ aliphatic	1,170	4.53E-06	7.81E-06	72%	2.42E-03	2.48E-03	2%	3.24E-04	4.22E-04	30%	3.85E-04	6.62E-04	72%	1.08E-04	1.52E-04	41%
>C ₁₀ -C ₁₂ aliphatic	1,170	1.70E-05	2.94E-05	72%	9.11E-03	9.32E-03	2%	1.22E-03	1.59E-03	30%	1.45E-03	2.49E-03	72%	4.05E-04	5.70E-04	41%
>C ₁₂ -C ₁₆ aliphatic	1,170	9.80E-05	1.69E-04	72%	5.24E-02	5.36E-02	2%	7.00E-03	9.13E-03	30%	8.33E-03	1.43E-02	72%	2.33E-03	3.28E-03	41%
>C ₁₆ -C ₂₁ aliphatic	33	9.72E-05	1.68E-04	72%	5.20E-02	5.31E-02	2%	6.94E-03	9.06E-03	30%	8.26E-03	1.42E-02	72%	2.31E-03	3.25E-03	41%
C ₆ -C ₈ aromatic	1.7	2.88E-04	4.35E-04	51%	1.18E-01	1.21E-01	2%	1.62E-02	2.06E-02	27%	1.88E-02	3.11E-02	65%	5.88E-03	7.85E-03	33%
>C ₈ -C ₁₀ aromatic	7.3	2.35E-05	4.05E-05	72%	1.26E-02	1.29E-02	2%	1.68E-03	2.19E-03	30%	2.00E-03	3.43E-03	72%	5.59E-04	7.86E-04	41%
Dioxins and Furans^(a)																
2378 - TCDD	0.000042	9.67E-15	9.67E-15	0%	2.04E-12	2.04E-12	0%	1.57E-13	1.57E-13	0%	2.00E-12	2.00E-12	0%	1.62E-13	1.62E-13	0%
12378 - PeCDD	0.00004	1.56E-14	1.56E-14	0%	3.30E-12	3.30E-12	0%	2.55E-13	2.55E-13	0%	3.23E-12	3.23E-12	0%	2.62E-13	2.62E-13	0%
123478 - HxCDD	0.0004	3.41E-15	3.41E-15	0%	7.21E-13	7.21E-13	0%	5.56E-14	5.56E-14	0%	7.05E-13	7.05E-13	0%	5.71E-14	5.71E-14	0%
123678 - HxCDD	0.0004	9.09E-15	9.09E-15	0%	1.92E-12	1.92E-12	0%	1.48E-13	1.48E-13	0%	1.88E-12	1.88E-12	0%	1.52E-13	1.52E-13	0%
123789 - HxCDD	0.0004	1.39E-14	1.39E-14	0%	2.94E-12	2.94E-12	0%	2.27E-13	2.27E-13	0%	2.88E-12	2.88E-12	0%	2.33E-13	2.33E-13	0%
1234678 - HpCDD	0.004	2.58E-14	2.58E-14	0%	5.46E-12	5.46E-12	0%	4.21E-13	4.21E-13	0%	5.34E-12	5.34E-12	0%	4.33E-13	4.33E-13	0%
1,2,3,4,6,7,8,9-Octa CDD	0.13	2.63E-14	2.63E-14	0%	5.55E-12	5.55E-12	0%	4.28E-13	4.28E-13	0%	5.43E-12	5.43E-12	0%	4.40E-13	4.40E-13	0%
2378 - TCDF	0.00042	1.58E-13	1.58E-13	0%	3.35E-11	3.35E-11	0%	2.58E-12	2.58E-12	0%	3.27E-11	3.27E-11	0%	2.65E-12	2.65E-12	0%
12378 - PeCDF	0.0013	8.28E-14	8.28E-14	0%	1.75E-11	1.75E-11	0%	1.35E-12	1.35E-12	0%	1.71E-11	1.71E-11	0%	1.39E-12	1.39E-12	0%
23478 - PeCDF	0.00013	1.43E-13	1.43E-13	0%	3.01E-11	3.01E-11	0%	2.32E-12	2.32E-12	0%	2.95E-11	2.95E-11	0%	2.39E-12	2.39E-12	0%
123478 - HxCDF	0.0004	1.45E-13	1.45E-13	0%	3.06E-11	3.06E-11	0%	2.36E-12	2.36E-12	0%	3.00E-11	3.00E-11	0%	2.43E-12	2.43E-12	0%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part A

Parameter	Air Threshold	Courageous Lake Lodge			Diavik Camp			Diavik TK Camp			Ekati Camp/Admin			Lac de Gras Winter Road Rest Stop		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	0.0004	7.79E-14	7.79E-14	0%	1.65E-11	1.65E-11	0%	1.27E-12	1.27E-12	0%	1.61E-11	1.61E-11	0%	1.30E-12	1.30E-12	0%
234678 - HxCDF	0.0004	3.01E-14	3.01E-14	0%	6.36E-12	6.36E-12	0%	4.90E-13	4.90E-13	0%	6.22E-12	6.22E-12	0%	5.04E-13	5.04E-13	0%
123789 - HxCDF	0.0004	3.13E-15	3.13E-15	0%	6.61E-13	6.61E-13	0%	5.09E-14	5.09E-14	0%	6.46E-13	6.46E-13	0%	5.24E-14	5.24E-14	0%
1234678 - HpCDF	0.004	1.18E-13	1.18E-13	0%	2.50E-11	2.50E-11	0%	1.93E-12	1.93E-12	0%	2.44E-11	2.44E-11	0%	1.98E-12	1.98E-12	0%
1234789 - HpCDF	0.004	1.34E-14	1.34E-14	0%	2.82E-12	2.82E-12	0%	2.18E-13	2.18E-13	0%	2.76E-12	2.76E-12	0%	2.24E-13	2.24E-13	0%
1,2,3,4,6,7,8,9-Octa CDF	0.13	1.23E-14	1.23E-14	0%	2.59E-12	2.59E-12	0%	2.00E-13	2.00E-13	0%	2.53E-12	2.53E-12	0%	2.05E-13	2.05E-13	0%
Total PCDDs (TEQ)	0.00004	2.82E-14	2.82E-14	0%	5.96E-12	5.96E-12	0%	4.59E-13	4.59E-13	0%	5.83E-12	5.83E-12	0%	4.73E-13	4.73E-13	0%
Total PCDFs (TEQ)	0.00004	8.80E-14	8.80E-14	0%	1.86E-11	1.86E-11	0%	1.43E-12	1.43E-12	0%	1.82E-11	1.82E-11	0%	1.47E-12	1.47E-12	0%
Total PCDDs + PCDFs	-	2.94E-12	2.94E-12	0%	6.21E-10	6.21E-10	0%	4.78E-11	4.78E-11	0%	6.07E-10	6.07E-10	0%	4.92E-11	4.92E-11	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to Chronic (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/Hp CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/Hp CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Critical Air Contaminants																
Nitrogen dioxide	40	2.39E+00	3.95E+00	65%	6.93E+00	1.00E+01	45%	2.92E-01	3.69E-01	26%	3.58E-01	3.92E-01	9%	3.63E-01	3.95E-01	9%
Sulphur dioxide	30	4.59E-03	6.41E-03	40%	1.62E-02	2.38E-02	47%	3.71E-04	4.51E-04	21%	4.33E-04	4.68E-04	8%	4.28E-04	4.63E-04	8%
Total Suspended Particulates (TSP)	60	3.47E+00	3.70E+00	7%	1.68E+01	8.23E+00	-51%	3.12E+00	3.12E+00	0%	3.11E+00	3.11E+00	0%	3.11E+00	3.11E+00	0%
PM _{2.5}	10	2.16E+00	2.32E+00	7%	3.64E+00	3.40E+00	-7%	1.93E+00	1.94E+00	1%	1.93E+00	1.93E+00	0%	1.93E+00	1.93E+00	0%
PM ₁₀	20	3.17E+00	3.39E+00	7%	1.15E+01	6.62E+00	-42%	2.73E+00	2.74E+00	0%	2.72E+00	2.73E+00	0%	2.72E+00	2.73E+00	0%
Metals																
Aluminum	5.2	2.14E-02	3.51E-02	64%	8.60E-01	3.02E-01	-65%	1.03E-03	1.23E-03	20%	5.94E-04	7.00E-04	18%	5.72E-04	6.57E-04	15%
Antimony	0.21	5.96E-07	9.76E-07	64%	2.39E-05	8.41E-06	-65%	2.86E-08	3.42E-08	20%	1.65E-08	1.95E-08	18%	1.59E-08	1.83E-08	15%
Arsenic	0.0065	4.89E-06	6.49E-06	33%	1.09E-04	4.47E-05	-59%	3.19E-07	3.35E-07	5%	3.40E-07	3.47E-07	2%	3.32E-07	3.37E-07	1%
Barium	0.52	1.93E-04	3.13E-04	62%	7.06E-03	2.67E-03	-62%	9.66E-06	1.14E-05	18%	5.91E-06	6.83E-06	16%	5.70E-06	6.43E-06	13%
Beryllium	0.012	2.31E-06	2.67E-06	16%	3.07E-05	1.49E-05	-51%	1.70E-07	1.69E-07	0%	2.12E-07	2.11E-07	-1%	2.08E-07	2.06E-07	-1%
Cadmium	0.005	3.58E-05	6.45E-05	80%	1.51E-04	3.23E-04	114%	4.20E-06	5.45E-06	30%	4.94E-06	5.57E-06	13%	4.97E-06	5.59E-06	13%
Chromium (VI) ^(b)	0.00012	7.66E-05	1.23E-04	61%	2.25E-03	9.88E-04	-56%	4.49E-06	5.00E-06	11%	3.38E-06	4.00E-06	18%	3.30E-06	4.00E-06	21%
Chromium (III) ^(b)	0.14	7.66E-05	1.23E-04	61%	2.25E-03	9.88E-04	-56%	4.49E-06	5.00E-06	11%	3.38E-06	4.00E-06	18%	3.30E-06	4.00E-06	21%
Cobalt	0.0031	8.66E-06	1.52E-05	75%	1.06E-04	9.18E-05	-14%	8.40E-07	1.07E-06	28%	9.02E-07	1.02E-06	13%	9.03E-07	1.02E-06	13%
Copper	3.3	1.52E-05	2.37E-05	56%	2.63E-04	1.50E-04	-43%	1.26E-06	1.51E-06	20%	1.36E-06	1.49E-06	9%	1.35E-06	1.47E-06	9%
Iron	3.3	5.68E-03	9.22E-03	62%	2.05E-01	7.82E-02	-62%	2.87E-04	3.40E-04	18%	1.79E-04	2.06E-04	15%	1.72E-04	1.94E-04	13%
Lead	0.15	1.61E-05	2.41E-05	50%	2.51E-04	1.46E-04	-42%	1.35E-06	1.59E-06	18%	1.52E-06	1.64E-06	8%	1.51E-06	1.63E-06	7%
Manganese	0.052	9.89E-05	1.59E-04	61%	3.17E-03	1.29E-03	-59%	5.54E-06	6.55E-06	18%	4.05E-06	4.57E-06	13%	3.95E-06	4.38E-06	11%
Mercury	0.2	3.31E-06	4.07E-06	23%	5.40E-05	2.45E-05	-55%	2.52E-07	2.58E-07	2%	2.82E-07	2.84E-07	1%	2.75E-07	2.76E-07	0%
Molybdenum	10	4.73E-07	7.69E-07	63%	1.77E-05	6.57E-06	-63%	2.34E-08	2.78E-08	19%	1.42E-08	1.64E-08	16%	1.37E-08	1.55E-08	13%
Nickel	0.015	2.79E-05	4.12E-05	48%	3.31E-04	3.12E-04	-6%	1.87E-06	2.04E-06	9%	1.56E-06	1.64E-06	6%	1.51E-06	1.58E-06	5%
Selenium	21	8.65E-06	8.59E-06	-1%	3.61E-05	3.34E-05	-7%	7.09E-07	6.80E-07	-4%	9.80E-07	9.58E-07	-2%	9.62E-07	9.43E-07	-2%
Silver	0.033	5.72E-06	1.05E-05	84%	2.62E-05	5.35E-05	104%	6.76E-07	8.85E-07	31%	7.89E-07	8.94E-07	13%	7.94E-07	8.99E-07	13%
Strontium	6.7	1.22E-04	1.99E-04	63%	4.56E-03	1.70E-03	-63%	6.08E-06	7.20E-06	19%	3.68E-06	4.27E-06	16%	3.55E-06	4.01E-06	13%
Tellurium	0.33	3.27E-08	5.33E-08	63%	1.27E-06	4.57E-07	-64%	1.59E-09	1.90E-09	19%	9.41E-10	1.10E-09	17%	9.06E-10	1.03E-09	14%
Thallium	0.33	4.09E-07	6.71E-07	64%	1.66E-05	5.79E-06	-65%	1.95E-08	2.34E-08	20%	1.12E-08	1.32E-08	18%	1.08E-08	1.24E-08	15%
Titanium	0.1	4.79E-04	7.83E-04	63%	1.87E-02	6.73E-03	-64%	2.33E-05	2.78E-05	19%	1.37E-05	1.60E-05	17%	1.32E-05	1.50E-05	14%
Tungsten	3.3	1.39E-06	2.27E-06	64%	5.58E-05	1.96E-05	-65%	6.64E-08	7.95E-08	20%	3.83E-08	4.52E-08	18%	3.69E-08	4.24E-08	15%
Uranium	0.04	1.73E-06	2.83E-06	64%	6.85E-05	2.44E-05	-64%	8.35E-08	9.98E-08	19%	4.88E-08	5.72E-08	17%	4.70E-08	5.37E-08	14%
Vanadium	0.1	1.17E-05	1.89E-05	62%	4.30E-04	1.61E-04	-62%	5.81E-07	6.88E-07	18%	3.54E-07	4.10E-07	16%	3.41E-07	3.86E-07	13%
Zinc	6.7	5.81E-05	1.02E-04	75%	8.05E-04	6.05E-04	-25%	5.69E-06	7.29E-06	28%	6.24E-06	7.05E-06	13%	6.25E-06	7.04E-06	13%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	10	2.12E-05	7.27E-05	243%	1.39E-04	3.38E-04	143%	1.48E-06	4.52E-06	205%	1.32E-06	2.77E-06	109%	1.27E-06	2.67E-06	111%
1-Methylphenanthrene	0.17	9.53E-07	3.27E-06	243%	6.24E-06	1.52E-05	143%	6.66E-08	2.04E-07	205%	5.95E-08	1.24E-07	109%	5.70E-08	1.20E-07	111%
2-Methylantracene	0.17	5.83E-07	2.00E-06	243%	3.82E-06	9.29E-06	143%	4.08E-08	1.24E-07	205%	3.64E-08	7.61E-08	109%	3.49E-08	7.34E-08	111%
2-Methylfluorene	3.3	1.97E-08	6.75E-08	243%	1.29E-07	3.13E-07	143%	1.37E-09	4.20E-09	205%	1.23E-09	2.57E-09	109%	1.18E-09	2.48E-09	111%
2-methylnaphthalene	10	3.42E-05	1.17E-04	243%	2.24E-04	5.46E-04	143%	2.39E-06	7.31E-06	205%	2.14E-06	4.47E-06	109%	2.05E-06	4.31E-06	111%
2-Methylphenanthrene	0.17	2.35E-06	8.08E-06	243%	1.54E-05	3.75E-05	143%	1.65E-07	5.03E-07	205%	1.47E-07	3.07E-07	109%	1.41E-07	2.96E-07	111%
2-Methylpyrene	0.17	1.74E-07	5.98E-07	243%	1.14E-06	2.78E-06	143%	1.22E-08	3.73E-08	205%	1.09E-08	2.28E-08	109%	1.04E-08	2.20E-08	111%
3-Methyldibenzothiophene	8.3	3.60E-08	1.24E-07	243%	2.36E-07	5.74E-07	143%	2.52E-09	7.70E-09	205%	2.25E-09	4.70E-09	109%	2.15E-09	4.54E-09	111%
3-Methylphenanthrene	0.17	1.70E-06	5.83E-06	243%	1.11E-05	2.71E-05	143%	1.19E-07	3.63E-07	205%	1.06E-07	2.22E-07	109%	1.02E-07	2.14E-07	111%
4-+9-Methylphenanthrene	0.17	1.28E-06	4.40E-06	243%	8.41E-06	2.05E-05	143%	8.97E-08	2.74E-07	205%	8.01E-08	1.68E-07	109%	7.67E-08	1.62E-07	111%
4-Methyldibenzothiophene	8.3	2.29E-08	7.87E-08	243%	1.50E-07	3.66E-07	143%	1.60E-09	4.90E-09	205%	1.43E-09	2.99E-09	109%	1.37E-09	2.89E-09	111%
9-Methylphenanthrene	-	4.39E-09	4.39E-09	0%	7.49E-09	7.49E-09	0%	6.45E-10	6.45E-10	0%	6.91E-10	6.91E-10	0%	6.55E-10	6.55E-10	0%
Acenaphthene	0.33	2.63E-06	5.25E-06	100%	1.02E-05	2.04E-05	99%	4.37E-07	5.91E-07	35%	5.18E-07	5.91E-07	14%	5.25E-07	5.96E-07	13%
Acenaphthylene	0.33	6.77E-06	1.63E-05	141%	3.09E-05	6.78E-05	119%	9.67E-07	1.53E-06	58%	1.11E-06	1.38E-06	24%	1.12E-06	1.38E-06	23%
Acephenanthrylene	0.17	6.73E-07	2.31E-06	243%	4.41E-06	1.07E-05	143%	4.70E-08	1.44E-07	205%	4.20E-08	8.78E-08	109%	4.02E-08	8.47E-08	111%
Anthracene	0.17	1.09E-06	2.79E-06	157%	5.31E-06	1.19E-05	124%	1.42E-07	2.42E-07	71%	1.60E-07	2.07E-07	30%	1.60E-07	2.07E-07	29%
Benz(a)anthracene	0.092	3.79E-07	7.85E-07	107%	1.55E-06	3.11E-06	101%	6.05E-08	8.42E-08	39%	7.13E-08	8.25E-08	16%	7.20E-08	8.29E-08	15%
Benzo(a)fluorene	0.92	2.12E-07	7.26E-07	243%	1.39E-06	3.37E-06	143%	1.48E-08	4.52E-08	205%	1.32E-08	2.76E-08	109%	1.26E-08	2.66E-08	111%
Benzo(a)pyrene	0.00012	1.72E-07	3.97E-07	131%	7.50E-07	1.62E-06	116%	2.57E-08	3.90E-08	52%	2.98E-08	3.61E-08	21%	3.01E-08	3.62E-08	20%
Benzo(b)fluoranthene	0.092	1.13E-06	3.02E-06	166%	5.76E-06	1.30E-05	127%	1.40E-07	2.51E-07	80%	1.55E-07	2.07E-07	34%	1.55E-07	2.06E-07	33%
Benzo(e)pyrene	0.17	1.58E-08	4.76E-08	201%	9.04E-08	2.13E-07	136%	1.31E-09	3.20E-09	143%	1.24E-09	2.14E-09	72%	1.19E-09	2.05E-09	73%
Benzo(g,h,i)fluoranthene	0.17	3.26E-07	1.12E-06	243%	2.14E-06	5.20E-06	143%	2.28E-08	6.97E-08	205%	2.04E-08	4.26E-08	109%	1.95E-08	4.11E-08	111%
Benzo(g,h,i)perylene	0.17	4.01E-07	9.15E-07	128%	1.77E-06	3.76E-06	112%	5.86E-08	8.89E-08	52%	6.76E-08	8.20E-08	21%	6.82E-08	8.21E-08	20%
Benzo(k)fluoranthene	0.092	1.55E-07	3.70E-07	138%	7.01E-07	1.53E-06	118%	2.25E-08	3.52E-08	56%	2.59E-08	3.19E-08	23%	2.61E-08	3.20E-08	22%
Biphenyl	0.42	1.85E-08	1.85E-08	0%	3.16E-08	3.16E-08	0%	2.72E-09	2.72E-09	0%	2.91E-09	2.91E-09	0%	2.76E-09	2.76E-09	0%
Chrysene	0.92	6.75E-07	1.13E-06	68%	2.16E-06	3.92E-06	82%	1.30E-07	1.57E-07	21%	1.57E-07	1.70E-07	8%	1.60E-07	1.72E-07	8%
Coronene	0.17	1.64E-09	5.62E-09	243%	1.07E-08	2.61E-08	143%	1.15E-10	3.50E-10	205%	1.02E-10	2.14E-10	109%	9.79E-11	2.06E-10	111%
Cyclopenta(c,d)pyrene	0.0012	1.15E-07	3.96E-07	243%	7.56E-07	1.84E-06	143%	8.07E-09	2.47E-08	205%	7.21E-09	1.51E-08	109%	6.90E-09	1.45E-08	111%
Dibenzo(a,h)anthracene	0.0084	3.57E-07	9.47E-07	165%	1.83E-06	4.10E-06	125%	4.37E-08	7.85E-08	79%	4.85E-08	6.50E-08	34%	4.86E-08	6.46E-08	33%
Dibenzothiophene	8.3	1.39E-08	4.78E-08	243%	9.13E-08	2.22E-07	143%	9.75E-10	2.98E-09	205%	8.71E-10	1.82E-09	109%	8.34E-10	1.76E-09	111%
Fluoranthene	0.17	4.28E-06	1.15E-05	169%	2.19E-05	4.98E-05	127%	5.18E-07	9.45E-07	82%	5.72E-07	7.74E-07	35%	5.72E-07	7.68E-07	34%
Fluorene	3.3	9.56E-06	2.32E-05	142%	4.39E-05	9.64E-05	120%	1.35E-06	2.16E-06	59%	1.55E-06	1.93E-06	25%	1.56E-06	1.93E-06	24%
Indeno(1,2,3-cd)fluoranthene	0.092	8.19E-09	2.81E-08	243%	5.36E-08	1.31E-07	143%	5.73E-10	1.75E-09	205%	5.11E-10	1.07E-09	109%	4.90E-10	1.03E-09	111%
Indeno(1,2,3-cd)pyrene	0.092	1.38E-07	1.38E-07	0%	2.86E-07	2.86E-07	0%	3.21E-08	3.20E-08	0%	4.00E-08	4.00E-08	0%	4.09E-08	4.08E-08	0%
Indeno(1,2,3-W)pyrene	0.092	1.47E-07	5.05E-07	243%	9.64E-07	2.35E-06	143%	1.03E-08	3.14E-08	205%	9.18E-09	1.92E-08	109%	8.80E-09	1.85E-08	111%
Naphthalene	3.1	1.29E-04	3.33E-04	157%	6.51E-04	1.44E-03	121%	1.62E-05	2.81E-05	74%	1.81E-05	2.38E-05	31%	1.81E-05	2.36E-05	30%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Nitro-pyrene	0.091	1.31E-07	4.49E-07	243%	8.58E-07	2.09E-06	143%	9.15E-09	2.80E-08	205%	8.17E-09	1.71E-08	109%	7.83E-09	1.65E-08	111%
Perylene	0.17	1.64E-09	5.62E-09	243%	1.07E-08	2.61E-08	143%	1.15E-10	3.50E-10	205%	1.02E-10	2.14E-10	109%	9.79E-11	2.06E-10	111%
Phenanthrene	0.17	1.79E-05	3.06E-05	71%	5.74E-05	1.06E-04	85%	3.44E-06	4.18E-06	22%	4.16E-06	4.51E-06	9%	4.23E-06	4.57E-06	8%
Picene	0.0084	1.64E-09	5.62E-09	243%	1.07E-08	2.61E-08	143%	1.15E-10	3.50E-10	205%	1.02E-10	2.14E-10	109%	9.79E-11	2.06E-10	111%
Pyrene	0.17	5.24E-06	1.50E-05	187%	2.87E-05	6.65E-05	132%	5.68E-07	1.15E-06	102%	6.08E-07	8.82E-07	45%	6.05E-07	8.71E-07	44%
Volatile Organic Compounds																
Methacrolein	8.1	2.23E-03	5.75E-03	158%	1.14E-02	2.10E-02	84%	1.47E-04	3.47E-04	137%	1.48E-04	2.37E-04	61%	1.42E-04	2.30E-04	61%
Acrolein	0.021	1.90E-03	4.89E-03	158%	9.69E-03	1.78E-02	84%	1.25E-04	2.96E-04	136%	1.26E-04	2.03E-04	60%	1.22E-04	1.96E-04	61%
Benzaldehyde	30	2.12E-03	5.46E-03	158%	1.08E-02	1.99E-02	84%	1.39E-04	3.30E-04	137%	1.40E-04	2.26E-04	61%	1.35E-04	2.18E-04	61%
2,5-dimethylbenzaldehyde	30	2.28E-03	5.90E-03	158%	1.17E-02	2.15E-02	84%	1.50E-04	3.56E-04	137%	1.52E-04	2.43E-04	61%	1.46E-04	2.36E-04	61%
Butanal (Butyraldehyde)	100	7.24E-04	1.87E-03	158%	3.70E-03	6.82E-03	84%	4.76E-05	1.13E-04	137%	4.81E-05	7.72E-05	61%	4.63E-05	7.47E-05	61%
Formaldehyde	2.2	1.27E-02	3.24E-02	155%	6.46E-02	1.18E-01	83%	8.48E-04	1.96E-03	132%	8.63E-04	1.36E-03	58%	8.32E-04	1.32E-03	58%
Acetaldehyde	9.4	2.33E-02	6.01E-02	158%	1.19E-01	2.19E-01	84%	1.53E-03	3.63E-03	137%	1.55E-03	2.48E-03	60%	1.49E-03	2.40E-03	61%
Propanal	8.3	7.79E-03	2.01E-02	158%	3.99E-02	7.34E-02	84%	5.13E-04	1.21E-03	137%	5.17E-04	8.31E-04	61%	4.98E-04	8.04E-04	61%
Crotonaldehyde	10	7.46E-03	1.93E-02	158%	3.82E-02	7.03E-02	84%	4.91E-04	1.16E-03	137%	4.95E-04	7.95E-04	61%	4.77E-04	7.70E-04	61%
Hexanal	2,730	1.22E-03	3.16E-03	158%	6.27E-03	1.15E-02	84%	8.06E-05	1.91E-04	137%	8.13E-05	1.31E-04	61%	7.83E-05	1.26E-04	61%
Heptanal	133	1.78E-03	4.60E-03	158%	9.11E-03	1.68E-02	84%	1.17E-04	2.78E-04	137%	1.18E-04	1.90E-04	61%	1.14E-04	1.84E-04	61%
Octanal	500	1.73E-03	4.46E-03	158%	8.83E-03	1.63E-02	84%	1.14E-04	2.69E-04	137%	1.15E-04	1.84E-04	61%	1.10E-04	1.78E-04	61%
Nonanal	500	2.45E-03	6.33E-03	158%	1.25E-02	2.31E-02	84%	1.61E-04	3.82E-04	137%	1.63E-04	2.61E-04	61%	1.57E-04	2.53E-04	61%
Decanal	13	1.56E-03	4.03E-03	158%	7.97E-03	1.47E-02	84%	1.03E-04	2.43E-04	137%	1.03E-04	1.66E-04	61%	9.97E-05	1.61E-04	61%
Undecanal	33	1.45E-03	3.74E-03	158%	7.41E-03	1.36E-02	84%	9.52E-05	2.26E-04	137%	9.61E-05	1.54E-04	61%	9.25E-05	1.49E-04	61%
Dodecanal	13	6.68E-04	1.73E-03	158%	3.42E-03	6.30E-03	84%	4.40E-05	1.04E-04	137%	4.44E-05	7.12E-05	61%	4.27E-05	6.89E-05	61%
Tridecanal	13	1.11E-03	2.88E-03	158%	5.70E-03	1.05E-02	84%	7.33E-05	1.73E-04	137%	7.39E-05	1.19E-04	61%	7.12E-05	1.15E-04	61%
1,2,4-Trimethylbenzene	7.3	4.90E-04	1.27E-03	158%	2.51E-03	4.62E-03	84%	3.22E-05	7.63E-05	137%	3.25E-05	5.22E-05	61%	3.13E-05	5.06E-05	61%
1,3,5-Trimethylbenzene	7.3	1.45E-04	3.74E-04	158%	7.41E-04	1.36E-03	84%	9.52E-06	2.26E-05	137%	9.61E-06	1.54E-05	61%	9.25E-06	1.49E-05	61%
Benzene	1.7	1.86E-03	4.27E-03	130%	8.41E-03	1.50E-02	78%	1.64E-04	3.01E-04	84%	1.80E-04	2.42E-04	34%	1.78E-04	2.38E-04	34%
Ethylbenzene	260	2.63E-04	6.77E-04	158%	1.34E-03	2.47E-03	84%	1.74E-05	4.09E-05	136%	1.75E-05	2.80E-05	60%	1.69E-05	2.71E-05	61%
Propylbenzene	1,000	5.57E-05	1.44E-04	158%	2.85E-04	5.25E-04	84%	3.66E-06	8.67E-06	137%	3.70E-06	5.93E-06	61%	3.56E-06	5.74E-06	61%
Indanone	160	3.87E-05	9.99E-05	158%	1.98E-04	3.65E-04	84%	2.55E-06	6.03E-06	137%	2.57E-06	4.12E-06	61%	2.47E-06	3.99E-06	61%
Toluene	260	2.39E-03	5.90E-03	147%	1.17E-02	2.13E-02	81%	1.74E-04	3.73E-04	114%	1.82E-04	2.71E-04	49%	1.77E-04	2.64E-04	49%
3-Ethyl-toluene (<i>m</i> -ethyltoluene)	417	1.17E-04	3.02E-04	158%	5.98E-04	1.10E-03	84%	7.69E-06	1.82E-05	137%	7.76E-06	1.25E-05	61%	7.48E-06	1.21E-05	61%
4-Ethyl-toluene (<i>p</i> -ethyltoluene)	417	2.89E-04	7.48E-04	158%	1.48E-03	2.73E-03	84%	1.90E-05	4.51E-05	137%	1.92E-05	3.09E-05	61%	1.85E-05	2.99E-05	61%
Acetone	31,000	1.22E-02	3.16E-02	158%	6.27E-02	1.15E-01	84%	8.06E-04	1.91E-03	137%	8.13E-04	1.31E-03	61%	7.83E-04	1.26E-03	61%
Acetophenone	160	2.84E-03	7.33E-03	158%	1.45E-02	2.68E-02	84%	1.87E-04	4.42E-04	137%	1.89E-04	3.03E-04	61%	1.82E-04	2.93E-04	61%
Methyl Ethyl Ketone	5,200	4.18E-03	1.08E-02	158%	2.14E-02	3.93E-02	84%	2.75E-04	6.51E-04	137%	2.77E-04	4.45E-04	61%	2.67E-04	4.31E-04	61%
Xylene	100	1.38E-03	3.43E-03	149%	6.79E-03	1.24E-02	82%	1.01E-04	2.18E-04	115%	1.06E-04	1.58E-04	49%	1.03E-04	1.54E-04	49%
o-Xylene	100	4.63E-04	1.19E-03	158%	2.37E-03	4.36E-03	84%	3.05E-05	7.21E-05	136%	3.08E-05	4.94E-05	60%	2.96E-05	4.78E-05	61%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
Ethylene	6,100	4.77E-03	1.23E-02	158%	2.44E-02	4.49E-02	84%	3.14E-04	7.43E-04	137%	3.16E-04	5.08E-04	61%	3.05E-04	4.92E-04	61%
1,1,1-Trichloroethane (Methyl chloroform)	5,200	1.84E-06	1.78E-06	-3%	7.13E-06	7.03E-06	-1%	1.75E-07	1.59E-07	-9%	2.22E-07	2.12E-07	-4%	2.14E-07	2.06E-07	-4%
Butane	24,000	2.13E-03	5.51E-03	158%	1.09E-02	2.01E-02	84%	1.40E-04	3.32E-04	137%	1.42E-04	2.27E-04	61%	1.36E-04	2.20E-04	61%
2,2-Dimethylbutane	1,170	1.73E-04	4.46E-04	158%	8.83E-04	1.63E-03	84%	1.14E-05	2.69E-05	137%	1.15E-05	1.84E-05	61%	1.10E-05	1.78E-05	61%
2,3-Dimethylbutane	1,170	3.17E-04	8.20E-04	158%	1.62E-03	2.99E-03	84%	2.09E-05	4.94E-05	137%	2.11E-05	3.38E-05	61%	2.03E-05	3.27E-05	61%
Isobutene	110,000	6.35E-04	1.64E-03	158%	3.25E-03	5.98E-03	84%	4.18E-05	9.89E-05	137%	4.21E-05	6.77E-05	61%	4.06E-05	6.55E-05	61%
cis-2-Butene	1,600	1.45E-04	3.74E-04	158%	7.41E-04	1.36E-03	84%	9.52E-06	2.26E-05	137%	9.61E-06	1.54E-05	61%	9.25E-06	1.49E-05	61%
trans-2-Butene	1,600	2.89E-04	7.48E-04	158%	1.48E-03	2.73E-03	84%	1.90E-05	4.51E-05	137%	1.92E-05	3.09E-05	61%	1.85E-05	2.99E-05	61%
2-Methyl-1-butene	5,300	1.45E-04	3.74E-04	158%	7.41E-04	1.36E-03	84%	9.52E-06	2.26E-05	137%	9.61E-06	1.54E-05	61%	9.25E-06	1.49E-05	61%
3-Methyl-1-butene	5,300	8.91E-05	2.30E-04	158%	4.56E-04	8.39E-04	84%	5.86E-06	1.39E-05	137%	5.91E-06	9.50E-06	61%	5.70E-06	9.19E-06	61%
1,3-Butadiene	0.94	1.73E-04	4.46E-04	158%	8.83E-04	1.63E-03	84%	1.14E-05	2.69E-05	137%	1.15E-05	1.84E-05	61%	1.10E-05	1.78E-05	61%
Cyclopentane	1,130	2.28E-04	5.90E-04	158%	1.17E-03	2.15E-03	84%	1.50E-05	3.56E-05	137%	1.52E-05	2.43E-05	61%	1.46E-05	2.36E-05	61%
Methylcyclopentane	880	3.45E-04	8.92E-04	158%	1.77E-03	3.25E-03	84%	2.27E-05	5.38E-05	137%	2.29E-05	3.68E-05	61%	2.21E-05	3.56E-05	61%
Pentane	1,000	1.04E-03	2.67E-03	158%	5.30E-03	9.76E-03	84%	6.81E-05	1.61E-04	137%	6.88E-05	1.10E-04	61%	6.62E-05	1.07E-04	61%
Isopentane	24,000	1.53E-03	3.94E-03	158%	7.80E-03	1.44E-02	84%	1.00E-04	2.38E-04	137%	1.01E-04	1.63E-04	61%	9.75E-05	1.57E-04	61%
2-Methylpentane	1,170	5.18E-04	1.34E-03	158%	2.65E-03	4.88E-03	84%	3.41E-05	8.07E-05	137%	3.44E-05	5.52E-05	61%	3.31E-05	5.34E-05	61%
3-Methylpentane	1,170	3.73E-04	9.63E-04	158%	1.91E-03	3.51E-03	84%	2.45E-05	5.81E-05	137%	2.48E-05	3.98E-05	61%	2.38E-05	3.85E-05	61%
2,3-Dimethylpentane	1,170	4.01E-04	1.04E-03	158%	2.05E-03	3.78E-03	84%	2.64E-05	6.25E-05	137%	2.66E-05	4.27E-05	61%	2.56E-05	4.14E-05	61%
2,4-Dimethylpentane	1,170	2.28E-04	5.90E-04	158%	1.17E-03	2.15E-03	84%	1.50E-05	3.56E-05	137%	1.52E-05	2.43E-05	61%	1.46E-05	2.36E-05	61%
2,2,4-Trimethylpentane	1,170	6.90E-04	1.78E-03	158%	3.53E-03	6.51E-03	84%	4.54E-05	1.08E-04	137%	4.58E-05	7.36E-05	61%	4.41E-05	7.12E-05	61%
2,3,4-Trimethylpentane	1,170	1.73E-04	4.46E-04	158%	8.83E-04	1.63E-03	84%	1.14E-05	2.69E-05	137%	1.15E-05	1.84E-05	61%	1.10E-05	1.78E-05	61%
2-Methyl-2-pentene	600	1.17E-04	3.02E-04	158%	5.98E-04	1.10E-03	84%	7.69E-06	1.82E-05	137%	7.76E-06	1.25E-05	61%	7.48E-06	1.21E-05	61%
trans-2-Pentene	2,000	2.78E-05	7.19E-05	158%	1.42E-04	2.62E-04	84%	1.83E-06	4.34E-06	137%	1.85E-06	2.97E-06	61%	1.78E-06	2.87E-06	61%
Cyclohexane	6,300	1.17E-04	3.02E-04	158%	5.98E-04	1.10E-03	84%	7.69E-06	1.82E-05	137%	7.76E-06	1.25E-05	61%	7.48E-06	1.21E-05	61%
Methylcyclohexane	5,370	2.89E-04	7.48E-04	158%	1.48E-03	2.73E-03	84%	1.90E-05	4.51E-05	137%	1.92E-05	3.09E-05	61%	1.85E-05	2.99E-05	61%
Pentylcyclohexane	6,300	4.67E-05	1.21E-04	158%	2.39E-04	4.40E-04	84%	3.07E-06	7.28E-06	137%	3.10E-06	4.98E-06	61%	2.99E-06	4.82E-06	61%
Dodecylcyclohexane	33	9.35E-06	2.42E-05	158%	4.78E-05	8.81E-05	84%	6.15E-07	1.46E-06	137%	6.21E-07	9.97E-07	61%	5.98E-07	9.65E-07	61%
Tridecylcyclohexane	33	9.19E-06	2.37E-05	158%	4.70E-05	8.66E-05	84%	6.04E-07	1.43E-06	137%	6.10E-07	9.79E-07	61%	5.87E-07	9.48E-07	61%
Tetradecylcyclohexane	33	8.85E-06	2.29E-05	158%	4.53E-05	8.34E-05	84%	5.82E-07	1.38E-06	137%	5.88E-07	9.44E-07	61%	5.66E-07	9.13E-07	61%
Pentadecylcyclohexane	33	7.13E-06	1.84E-05	158%	3.65E-05	6.71E-05	84%	4.69E-07	1.11E-06	137%	4.73E-07	7.60E-07	61%	4.56E-07	7.35E-07	61%
2-Methylhexane	1,020	3.17E-04	8.20E-04	158%	1.62E-03	2.99E-03	84%	2.09E-05	4.94E-05	137%	2.11E-05	3.38E-05	61%	2.03E-05	3.27E-05	61%
3-Methylhexane	1,020	1.73E-04	4.46E-04	158%	8.83E-04	1.63E-03	84%	1.14E-05	2.69E-05	137%	1.15E-05	1.84E-05	61%	1.10E-05	1.78E-05	61%
3-Ethylhexane	1,170	1.17E-04	3.02E-04	158%	5.98E-04	1.10E-03	84%	7.69E-06	1.82E-05	137%	7.76E-06	1.25E-05	61%	7.48E-06	1.21E-05	61%
2,3-Dimethylhexane	1,170	8.91E-05	2.30E-04	158%	4.56E-04	8.39E-04	84%	5.86E-06	1.39E-05	137%	5.91E-06	9.50E-06	61%	5.70E-06	9.19E-06	61%
2,4-Dimethylhexane	1,170	2.78E-05	7.19E-05	158%	1.42E-04	2.62E-04	84%	1.83E-06	4.34E-06	137%	1.85E-06	2.97E-06	61%	1.78E-06	2.87E-06	61%
2,5-Dimethylhexane	1,170	2.78E-05	7.19E-05	158%	1.42E-04	2.62E-04	84%	1.83E-06	4.34E-06	137%	1.85E-06	2.97E-06	61%	1.78E-06	2.87E-06	61%
cis-2-Hexene	570	5.57E-05	1.44E-04	158%	2.85E-04	5.25E-04	84%	3.66E-06	8.67E-06	137%	3.70E-06	5.93E-06	61%	3.56E-06	5.74E-06	61%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
trans-2-Hexene	570	8.91E-05	2.30E-04	158%	4.56E-04	8.39E-04	84%	5.86E-06	1.39E-05	137%	5.91E-06	9.50E-06	61%	5.70E-06	9.19E-06	61%
Heptane	1,170	2.62E-04	6.76E-04	158%	1.34E-03	2.47E-03	84%	1.72E-05	4.08E-05	137%	1.74E-05	2.79E-05	61%	1.67E-05	2.70E-05	61%
2-Methylheptane	1,170	5.57E-05	1.44E-04	158%	2.85E-04	5.25E-04	84%	3.66E-06	8.67E-06	137%	3.70E-06	5.93E-06	61%	3.56E-06	5.74E-06	61%
Octane	1,170	1.45E-04	3.74E-04	158%	7.41E-04	1.36E-03	84%	9.52E-06	2.26E-05	137%	9.61E-06	1.54E-05	61%	9.25E-06	1.49E-05	61%
Nonane	21	8.91E-05	2.30E-04	158%	4.56E-04	8.39E-04	84%	5.86E-06	1.39E-05	137%	5.91E-06	9.50E-06	61%	5.70E-06	9.19E-06	61%
Dodecane	1,170	2.80E-04	7.23E-04	158%	1.43E-03	2.64E-03	84%	1.84E-05	4.36E-05	137%	1.86E-05	2.99E-05	61%	1.79E-05	2.89E-05	61%
Tridecane	1,170	2.66E-04	6.86E-04	158%	1.36E-03	2.50E-03	84%	1.75E-05	4.14E-05	137%	1.76E-05	2.83E-05	61%	1.70E-05	2.74E-05	61%
Tetradecane	1,170	3.50E-04	9.05E-04	158%	1.79E-03	3.30E-03	84%	2.30E-05	5.46E-05	137%	2.32E-05	3.73E-05	61%	2.24E-05	3.61E-05	61%
n-Pentadecane	33	2.22E-04	5.72E-04	158%	1.13E-03	2.09E-03	84%	1.46E-05	3.45E-05	137%	1.47E-05	2.36E-05	61%	1.42E-05	2.29E-05	61%
Hexadecane	1,170	3.96E-04	1.02E-03	158%	2.03E-03	3.73E-03	84%	2.60E-05	6.17E-05	137%	2.63E-05	4.22E-05	61%	2.53E-05	4.08E-05	61%
n-Heptadecane	33	3.42E-04	8.83E-04	158%	1.75E-03	3.22E-03	84%	2.25E-05	5.33E-05	137%	2.27E-05	3.64E-05	61%	2.19E-05	3.53E-05	61%
n-Octadecane	33	3.35E-04	8.64E-04	158%	1.71E-03	3.15E-03	84%	2.20E-05	5.21E-05	137%	2.22E-05	3.57E-05	61%	2.14E-05	3.45E-05	61%
n-Nonadecane	33	2.29E-04	5.91E-04	158%	1.17E-03	2.16E-03	84%	1.51E-05	3.57E-05	137%	1.52E-05	2.44E-05	61%	1.46E-05	2.36E-05	61%
n-Eicosane	33	1.15E-04	2.96E-04	158%	5.87E-04	1.08E-03	84%	7.55E-06	1.79E-05	137%	7.61E-06	1.22E-05	61%	7.33E-06	1.18E-05	61%
n-Heneicosane	33	3.66E-05	9.46E-05	158%	1.87E-04	3.45E-04	84%	2.41E-06	5.71E-06	137%	2.43E-06	3.91E-06	61%	2.34E-06	3.78E-06	61%
Farnesane	1,170	2.42E-04	6.24E-04	158%	1.24E-03	2.28E-03	84%	1.59E-05	3.76E-05	137%	1.60E-05	2.58E-05	61%	1.54E-05	2.49E-05	61%
Pristane	33	2.47E-04	6.37E-04	158%	1.26E-03	2.32E-03	84%	1.62E-05	3.84E-05	137%	1.64E-05	2.63E-05	61%	1.58E-05	2.54E-05	61%
C ₂ -C ₆ aliphatic	6,300	1.75E-02	4.33E-02	148%	8.55E-02	1.56E-01	82%	1.30E-03	2.76E-03	113%	1.36E-03	2.02E-03	48%	1.33E-03	1.97E-03	48%
>C ₆ -C ₈ aliphatic	1,170	2.99E-03	7.74E-03	158%	1.53E-02	2.82E-02	84%	1.97E-04	4.67E-04	137%	1.99E-04	3.19E-04	61%	1.92E-04	3.09E-04	61%
>C ₈ -C ₁₀ aliphatic	1,170	8.91E-05	2.30E-04	158%	4.56E-04	8.39E-04	84%	5.86E-06	1.39E-05	137%	5.91E-06	9.50E-06	61%	5.70E-06	9.19E-06	61%
>C ₁₀ -C ₁₂ aliphatic	1,170	3.35E-04	8.65E-04	158%	1.71E-03	3.16E-03	84%	2.20E-05	5.22E-05	137%	2.22E-05	3.57E-05	61%	2.14E-05	3.46E-05	61%
>C ₁₂ -C ₁₆ aliphatic	1,170	1.93E-03	4.98E-03	158%	9.86E-03	1.82E-02	84%	1.27E-04	3.00E-04	137%	1.28E-04	2.05E-04	61%	1.23E-04	1.99E-04	61%
>C ₁₆ -C ₂₁ aliphatic	33	1.91E-03	4.93E-03	158%	9.77E-03	1.80E-02	84%	1.26E-04	2.98E-04	137%	1.27E-04	2.04E-04	61%	1.22E-04	1.97E-04	61%
C ₆ -C ₈ aromatic	1.7	4.51E-03	1.08E-02	140%	2.15E-02	3.87E-02	80%	3.56E-04	7.16E-04	101%	3.80E-04	5.41E-04	42%	3.72E-04	5.29E-04	42%
>C ₈ -C ₁₀ aromatic	7.3	4.62E-04	1.19E-03	158%	2.36E-03	4.35E-03	84%	3.04E-05	7.20E-05	137%	3.07E-05	4.93E-05	61%	2.95E-05	4.77E-05	61%
Dioxins and Furans^(a)																
2378 - TCDD	0.000042	8.23E-14	8.23E-14	0%	1.49E-13	1.49E-13	0%	1.53E-14	1.53E-14	0%	1.37E-14	1.37E-14	0%	1.28E-14	1.28E-14	0%
12378 - PeCDD	0.00004	1.33E-13	1.33E-13	0%	2.41E-13	2.41E-13	0%	2.47E-14	2.47E-14	0%	2.22E-14	2.22E-14	0%	2.06E-14	2.06E-14	0%
123478 - HxCDD	0.0004	2.91E-14	2.91E-14	0%	5.26E-14	5.26E-14	0%	5.39E-15	5.39E-15	0%	4.85E-15	4.85E-15	0%	4.50E-15	4.50E-15	0%
123678 - HxCDD	0.0004	7.75E-14	7.75E-14	0%	1.40E-13	1.40E-13	0%	1.44E-14	1.44E-14	0%	1.29E-14	1.29E-14	0%	1.20E-14	1.20E-14	0%
123789 - HxCDD	0.0004	1.19E-13	1.19E-13	0%	2.15E-13	2.15E-13	0%	2.20E-14	2.20E-14	0%	1.98E-14	1.98E-14	0%	1.84E-14	1.84E-14	0%
1234678 - HpCDD	0.004	2.20E-13	2.20E-13	0%	3.98E-13	3.98E-13	0%	4.08E-14	4.08E-14	0%	3.67E-14	3.67E-14	0%	3.41E-14	3.41E-14	0%
1,2,3,4,6,7,8,9-Octa CDD	0.13	2.24E-13	2.24E-13	0%	4.05E-13	4.05E-13	0%	4.15E-14	4.15E-14	0%	3.73E-14	3.73E-14	0%	3.47E-14	3.47E-14	0%
2378 - TCDF	0.00042	1.35E-12	1.35E-12	0%	2.44E-12	2.44E-12	0%	2.50E-13	2.50E-13	0%	2.25E-13	2.25E-13	0%	2.09E-13	2.09E-13	0%
12378 - PeCDF	0.0013	7.05E-13	7.05E-13	0%	1.28E-12	1.28E-12	0%	1.31E-13	1.31E-13	0%	1.18E-13	1.18E-13	0%	1.09E-13	1.09E-13	0%
23478 - PeCDF	0.00013	1.21E-12	1.21E-12	0%	2.20E-12	2.20E-12	0%	2.25E-13	2.25E-13	0%	2.03E-13	2.03E-13	0%	1.88E-13	1.88E-13	0%
123478 - HxCDF	0.0004	1.23E-12	1.23E-12	0%	2.23E-12	2.23E-12	0%	2.29E-13	2.29E-13	0%	2.06E-13	2.06E-13	0%	1.91E-13	1.91E-13	0%

Table B-9 Screening of Predicted Annual Application Case Air Concentrations
Part B

Parameter	Air Threshold	LDG Hunting Camp			Misery Camp			Pellatt Lake Cabin			Salmita Airstrip			Treeline Lodge		
		Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case	Base Case	Application Case	% Increase from Base Case to Application Case
123678 - HxCDF	0.0004	6.63E-13	6.63E-13	0%	1.20E-12	1.20E-12	0%	1.23E-13	1.23E-13	0%	1.11E-13	1.11E-13	0%	1.03E-13	1.03E-13	0%
234678 - HxCDF	0.0004	2.56E-13	2.56E-13	0%	4.64E-13	4.64E-13	0%	4.76E-14	4.76E-14	0%	4.28E-14	4.28E-14	0%	3.97E-14	3.97E-14	0%
123789 - HxCDF	0.0004	2.66E-14	2.66E-14	0%	4.82E-14	4.82E-14	0%	4.94E-15	4.94E-15	0%	4.44E-15	4.44E-15	0%	4.13E-15	4.13E-15	0%
1234678 - HpCDF	0.004	1.01E-12	1.01E-12	0%	1.82E-12	1.82E-12	0%	1.87E-13	1.87E-13	0%	1.68E-13	1.68E-13	0%	1.56E-13	1.56E-13	0%
1234789 - HpCDF	0.004	1.14E-13	1.14E-13	0%	2.06E-13	2.06E-13	0%	2.11E-14	2.11E-14	0%	1.90E-14	1.90E-14	0%	1.76E-14	1.76E-14	0%
1,2,3,4,6,7,8,9-Octa CDF	0.13	1.04E-13	1.04E-13	0%	1.89E-13	1.89E-13	0%	1.94E-14	1.94E-14	0%	1.74E-14	1.74E-14	0%	1.62E-14	1.62E-14	0%
Total PCDDs (TEQ)	0.00004	2.40E-13	2.40E-13	0%	4.35E-13	4.35E-13	0%	4.46E-14	4.46E-14	0%	4.01E-14	4.01E-14	0%	3.72E-14	3.72E-14	0%
Total PCDFs (TEQ)	0.00004	7.50E-13	7.50E-13	0%	1.36E-12	1.36E-12	0%	1.39E-13	1.39E-13	0%	1.25E-13	1.25E-13	0%	1.16E-13	1.16E-13	0%
Total PCDDs + PCDFs	-	2.50E-11	2.50E-11	0%	4.53E-11	4.53E-11	0%	4.64E-12	4.64E-12	0%	4.17E-12	4.17E-12	0%	3.88E-12	3.88E-12	0%

a) Dioxin and furan emissions do not change between Base or Application cases; therefore, predicted MPOI concentrations will remain the same for all cases.

b) As speciation data were not available for chromium, it was assumed that chromium was either entirely in the trivalent or hexavalent form.

Note:

All units are in µg/m³ unless otherwise specified.

Bolded values = Percent change from Base Case to Chronic (App) Case is greater than 10%.

Shaded value = Predicted concentration is greater than selected screening value.

As described in Appendix B, a constituent of potential concern (COPC) was identified where the predicted Construction or Application Case concentration exceeded a screening threshold and was predicted to increase by more than 10% compared to the Base Case.

> = greater than; "-" = no value; % = percent; PCDD = polychlorinated dibenzodioxins; PCDF = polychlorinated dibenzofurans; Pe/Hx/He CDD = penta/hexa/hepta chlorinated dibenzo-p-dioxins; Pe/Hx/He CDF = penta/hexa/hepta chlorinated dibenzofurans; PM₁₀ = particulate matter with diameter less than 10 microns; PM_{2.5} = particulate matter with diameter less than 2.5 microns; TCDD = tetrachlorodibenzodioxin; TCDF = tetrachlorodibenzofuran; TEQ = Toxic Equivalent Quotients.

B3 SUMMARY OF CONTAMINANTS OF POTENTIAL CONCERN IDENTIFIED FOR THE HUMAN HEALTH AIR INHALATION RISK ASSESSMENT

B3.1 Short-Term Inhalation Risk Assessment

B3.1.1 1-Hour Inhalation Risk Assessment

The predicted 1-hour air concentrations for selected receptor locations screened against the selected thresholds are presented in Table B-3 (Construction Case) and Table B-4 (Application Case). Based on the screening process, the following COPCs were retained for further assessment:

Construction Case

- Aluminum
- Chromium
- Iron

Application Case

- Aluminum
- Barium
- Beryllium
- Cadmium
- Chromium
- Iron
- Manganese
- Nickel

B3.1.2 24-Hour Inhalation Risk Assessment

The predicted 24-hour air concentrations for selected receptor locations screened against the selected thresholds are presented in Table B-5 (Construction Case) and Table B-6 (Application Case). Based on the screening process, the following COPCs were retained for further assessment:

Construction Case

- PM_{2.5}
- PM₁₀
- Aluminum

- Chromium
- Iron
- Manganese

Application Case

- NO₂
- PM_{2.5}
- PM₁₀
- Aluminum
- Cadmium
- Chromium
- Iron
- Manganese
- Nickel

B3.2 Long-Term Inhalation Risk Assessment

The predicted annual air concentrations for selected receptor locations screened against the selected thresholds are presented in Table B-8 (Construction Case) and Table B-9 (Application Case). Based on the screening process, chromium was retained for the long-term (chronic) inhalation risk assessment.

B3.3 Particulate Matter Assessment

The predicted 24-hour and annual air particulate matter concentrations for selected receptor locations screened against the selected thresholds are presented in Table B-5 (24-hour Construction Case), Table B-6 (24-hour Application Case), Table B-8 (Annual Construction Case), and Table B-9 (Annual Application Case). For short-term inhalation exposure, PM_{2.5} and PM₁₀ were retained for evaluation under the Construction Case and Application Case, and were evaluated under the 24-hour particulate matter assessment. For long-term inhalation exposure, PM_{2.5} and PM₁₀ were not retained for further assessment; predicted annual concentrations at the health receptor locations were below the selected chronic health-based thresholds for both the Construction Case and Application Case.

B4 REFERENCES

- ATSDR (Agency for Toxic Substances and Disease Registry). 1998. Toxicological profile for sulfur dioxide. December 1998. US Department of Health and Human Services, Public Health Service, ATSDR.
- ATSDR. 1999. Toxicological profile for formaldehyde. July 1999. US Department of Health and Human Services, Public Health Service, ATSDR.
- ATSDR. 2007. Toxicological Profile for Benzene. August 2007. US Department of Health and Human Services, Public Health Service, ATSDR.
- ATSDR. 2013. Minimal Risk Levels list. Available at: <http://www.atsdr.cdc.gov/mrls/mrlolist.asp>. Accessed September 2014.
- Cal OEHHA (California Office of Environmental Health Hazard Assessment). 2008. Appendix D2: Acute RELs and toxicity summaries using the previous version of the Hot Spots Risk Assessment guidelines (OEHHA 1999). In: Air Toxics Hot Spots Risk Assessment Guidelines Technical Support Document For the Derivation of Noncancer Reference Exposure Levels. June 2008. Air Toxicology and Epidemiology Branch, Office of Environmental Health Hazard Assessment. Oakland, CA.
- Cal OEHHA. 2014a. Office of Environmental Health and Hazard Assessment Acute, 8-hour and chronic reference exposure level (REL) summary. Air Toxicology and Epidemiology. Available at: <http://oehha.ca.gov/air/allrels.html>. Accessed September 2014.
- Cal OEHHA. 2014b. Appendix D: Individual acute, 8-hour, and chronic reference exposure level summaries. December 2008 (updated July 2014). In: Air Toxics Hot Spots Risk Assessment Guidelines Technical Support Document For the Derivation of Noncancer Reference Exposure Levels. June 2008. Air Toxicology and Epidemiology Branch, Office of Environmental Health Hazard Assessment. Oakland, CA.
- Canadian Environmental Protection Act. 1999. SC 1999, c. 33. Available at: <http://laws-lois.justice.gc.ca/eng/acts/c-15.31/>. Accessed September 2014.
- CCME (Canadian Council of Ministers of the Environment). 1999. Canadian National Ambient Air Quality Objectives: Process and status. In: Canadian Environmental Quality Guidelines, 1999 (including updates to 2012). CCME. Winnipeg, MB.
- CCME. 2012. Guidance document on achievement determination: Canadian Ambient Air Quality Standards for fine particulate matter and ozone. October 2012. CCME. Winnipeg, MB.
- GNWT-ENR (Government of the Northwest Territories – Environment and Natural Resources). 2014. Guideline for Ambient Air Quality Standards in the Northwest Territories. Yellowknife, NWT, Canada, 5 pp.

- Health Canada. 1994. National Ambient Air Quality Objectives for carbon monoxide – Desirable, acceptable & tolerable Levels, Executive Summary. A Report by the CEPA/FPAC Working Group on Air Quality Objectives and Guidelines.
- Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada Part I: Guidance on human health preliminary quantitative risk assessment (PQRA), Version 2.0. Revised 2012. Health Canada. Ottawa, ON.
- International Programme on Chemical Safety. 1997. Environmental Health Criteria 188: Nitrogen oxides, Second Edition. United Nations Environment Programme, International Labour Organisation, World Health Organization. Geneva, Switzerland.
- OMOE (Ontario Ministry of the Environment). 2007. Ontario air standards for lead and lead compounds. Standards Development Branch, OMOE. June 2007.
- OMOE. 2008. Jurisdictional screening level list. A screening tool for Ontario Regulation 419: Air pollution – local air quality. Version 1. Standards Development Branch, OMOE. February 2008.
- OMOE. 2011. Ontario air standards for benzene. Standards Development Branch, OMOE. June 2011.
- OMOE. 2012. Ontario's Ambient Air Quality Criteria. Standards Development Branch, OMOE. April 2012.
- TCEQ (Texas Commission on Environmental Quality). 2008. Formaldehyde. Development Support Document. August 2008.. Office of the Executive Director, TCEQ.
- TCEQ. 2011. Nickel and inorganic nickel compounds. Development Support Document. June 2011. Office of the Executive Director, TCEQ.
- TCEQ. 2012a. TCEQ Guidelines to Develop Toxicity Factors. October 2012. Office of the Executive Director, Toxicology Division.
- TCEQ. 2014a. TCEQ Guidelines to Develop 24-Hour Inhalation Reference Values. White Paper, Final. Office of the Executive Director, TCEQ. June 16, 2014.
- TCEQ. 2014b. Arsenic and inorganic arsenic compounds. Development Support Document. July 2012. Office of the Executive Director, TCEQ.
- TCEQ. 2014c. Hexavalent chromium (particulate compounds). Development Support Document. August 2014. Office of the Executive Director, TCEQ.
- TCEQ. 2014d. Crotonaldehyde (cis and trans). Development Support Document. August 2014. Office of the Executive Director, TCEQ.
- TCEQ. 2014e. March 2014 Effects Screening Levels. Last updated March 17, 2014. Accessed September 2014 from http://www.tceq.texas.gov/toxicology/esl/list_main.html.
- TCEQ. 2014f. Development Support Document for Benzene – 24-Hour Ambient Air Monitoring Comparison Value. June 2014. Office of the Executive Director, TCEQ.

- TERA (Toxicology Excellence for Risk Assessment). 2009. Independent peer review of the arsenic chronic noncancer and acute toxicity assessment for the Texas Commission on Environmental Quality, State of Texas. Available at: <http://www.tera.org/Peer/Arsenic/>. Accessed September 2014.
- US EPA (United States Environmental Protection Agency). 1993. Air quality criteria for oxides of nitrogen. August 1993. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development. Research Triangle Park, NC.
- US EPA. 1997. Health Effects Assessment Summary Tables. Updated July 1997. Solid Waste and Emergency Response. Washington, DC.
- US EPA. 2006. Provisional peer reviewed toxicity values for aluminum. Superfund Health Risk Technical Support Center, National Center for Environmental Assessment. Cincinnati, OH
- US EPA. 2007. Provisional peer reviewed toxicity values for 1,2,4-trimethylbenzene. Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. Cincinnati, OH.
- US EPA. 2008. Provisional peer reviewed toxicity values for cobalt. Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. Cincinnati, OH.
- US EPA. 2009a. Provisional peer reviewed toxicity values for nonane. Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. Cincinnati, OH.
- US EPA. 2009b. Provisional peer reviewed toxicity values for pentane. Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. Cincinnati, OH.
- US EPA. 2011a. Provisional peer reviewed toxicity values for 1,1-biphenyl. Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. Cincinnati, OH.
- US EPA 2011b. United States National Ambient Air Quality Standards (NAAQS). Air and Radiation. Available at: <http://www.epa.gov/air/criteria.html>. Accessed September 2014.
- US EPA. 2014a. Regional Screening Level (formerly PRGs), Screening levels for chemical contaminants. Residential air supporting table. Available at: <http://www.epa.gov/region09/superfund/prg/>. Accessed December 2014.
- US EPA. 2014b. Provisional Peer Reviewed Toxicity Values for Superfund. Derivation support documents (2001-2014). Available at: http://hhprrtv.ornl.gov/quickview/pprtv_papers.php. Accessed September 2014.
- US EPA. 2014c. Integrated Risk Information System (IRIS) Online Database. Last updated October 2, 2014. Accessed September 2014 from <http://www.epa.gov/iris/>.
- WHO (World Health Organization). 2000. Air Quality Guidelines for Europe, Second Edition. WHO Regional Publications, European Series. No. 91. Copenhagen, DK.
- WHO. 2006. WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Global Update 2005. Summary of risk assessment. Geneva, Switzerland.



Personal Communication

Halm C. 2010. California Environmental Protection Agency Air Resources Board.

APPENDIX C

CHEMICAL DATA SCREENING FOR MULTIMEDIA ASSESSMENT

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Abbreviations

Abbreviation	Definition
BAF	bioaccumulation factor
CCME	Canadian Council of Ministers of the Environment
COPC	constituent of potential concern
CSR	Contaminated Sites Regulation
DAR	Developer's Assessment Report
Eco-SSL	Ecological Soil Screening Levels
HQ	hazard quotient
i.e.	that is
Project	Jay Project
RSL	Regional Screening Level
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

Units of Measure

Unit	Definition
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre

C1 INTRODUCTION

This appendix provides the screening values used in the human and wildlife health multimedia risk assessment completed as part of the Developer's Assessment Report (DAR) for the Dominion Diamond Ekati Corporation Jay Project (Project).

For the Application Case assessment, the screening for constituents of potential concern (COPCs) entailed a comparison between predicted concentrations of constituents in exposure media (i.e., water, soil, and dietary items [fish]) against both environmental quality guidelines and a 10 percent (%) or greater increase above the Base Case concentration at any location. Baseline data collected for the environmental assessment can be found in Appendix A (baseline data collection and results) and Annex IX (Water and Sediment Quality Baseline Report). Methods for the prediction of water quality concentrations can be found in the DAR Section 8 (Water Quality and Quantity). Project-related changes in sediment quality are not anticipated (DAR Section 8); therefore, sediment data were not screened for selection of COPCs. Baseline sediment quality data are presented in the Water and Sediment Quality Baseline (Annex IX), and the exposure concentrations used in the multi-media models are summarized in Appendix D (exposure parameters). Predicted aerial deposition rates, used to predict Application Case soil concentrations, are summarized in Appendix D (exposure assessment). Detailed methods for the prediction of environmental concentrations in soil and dietary items based on deposition rates are also provided in Appendix D.

Measured concentrations of metals and/or polycyclic aromatic hydrocarbons in soil and fish data collected as part of baseline studies were also compared to environmental quality guidelines for information purposes, and are summarized in Appendix A.

C2 SCREENING VALUES USED IN THE HUMAN HEALTH MULTIMEDIA RISK ASSESSMENT

A chemical screening process was used to determine the COPCs in environmental media as outlined in Section 4.4.1.2 of the Environmental Assessment report.

C2.1 Summary of Guidelines and Standards Used

Canadian (i.e., Canadian Council of Ministers of the Environment [CCME] and Health Canada) and international (i.e., World Health Organization [WHO]) environmental quality regulations and guidelines were used to identify COPCs. In the absence of Canadian environmental quality regulations and guidelines for a particular constituent, environmental quality criteria from other international regulatory jurisdictions (i.e., United States Environmental Protection Agency [USEPA]) were used. Environmental quality regulations or guidelines used in this assessment are summarized below by media type, with the exception of the air quality criteria, which are presented in Appendix B (Air Quality Screening).



C2.1.1 Surface Water

Predicted depth-averaged water quality concentrations of major ions, nutrients, and total metals (obtained from Section 8 of the DAR and Golder [2015]) were screened against the health-based guidelines listed below (Tables C2.1-1 to C2.1-3). Depth-averaged concentrations were predicted for each Project phase starting with the median of baseline concentrations measured at sampling stations in Lac du Sauvage and Lac de Gras. The maximum predicted concentrations across all Project phases (i.e., construction, operations, closure, and post-closure) in each lake were used in the screening process. Screening was conducted for both under-ice and open water conditions to account for seasonality of the lakes.

For Lac du Sauvage, the maximum depth-averaged water quality predictions at Lac du Sauvage stations across all Project phases were compared to the median baseline concentrations from the lake (Table C2.1-1).

For Lac de Gras, predicted concentrations (depth-averaged concentrations) from station P1 were compared to the median baseline concentrations from the eastern part of the lake (Lac de Gras East) (Table C2.-2). Maximum predicted depth-averaged concentrations across all Project phases for stations P2 through P6 (refer to the DAR, Section 8.5.4, Map 8.5-2) were compared to median baseline concentrations from the western portion of the lake (Lac de Gras West; Table C2.1-3).

The comparison of the maximum predicted depth-averaged concentrations to the median of the measured baseline concentrations is appropriate because the water quality modelling used the median of measured baseline concentrations as the starting point (i.e., the maximum depth-averaged concentration is the maximum prediction based on this median starting point).

The guidelines applied for the surface water screening process for the human health multimedia assessment included:

- Health Canada Guidelines for Canadian Drinking Water Quality (Health Canada 2014). The Health Canada drinking water guidelines typically assume a total daily intake allocated to drinking water of 20% (i.e., assuming 20% of a person's tolerable daily intake from a chemical comes from water, and the remaining 80% comes from other sources such as food).
- In the absence of a Health Canada guideline, WHO Guidelines for Drinking Water Quality, Fourth Edition (WHO 2011) were used. The WHO guidelines are typically based on an allocation of 20% of the provisional tolerable daily intake of drinking water.
- In the absence of guidelines from the agencies listed above, USEPA Residential Tap Water Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA 2014) were used. For non-carcinogens, USEPA RSLs were adjusted to a hazard quotient (HQ) of 0.2 (to reflect an allocation of 20% of a person's tolerable daily intake from water), and for carcinogens, RSLs were adjusted to reflect a cancer risk level of 1 in 100,000 (to be consistent with WHO and Health Canada guidance).

Table C2.1-1 Water Screening for Human Health – Lac du Sauvage

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice (2006, 2010, 2011, and 2012)					Open Water (2004, 2006, and 2010 to 2013)				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions																	
Calcium	mg/L	-		-		-	-	0.99	18	Yes	NG	No ^(g)	0.83	15	Yes	NG	No ^(g)
Chloride	mg/L	250	AO	250	ATO	-	250	0.25	48	Yes	No	No	0.25	40	Yes	No	No
Fluoride	mg/L	1.5		1.5		-	1.5	0.025	0.016	No	No	No	0.010	0.013	Yes	No	No
Magnesium	mg/L	-		-		-	-	0.67	1.7	Yes	NG	No ^(g)	0.58	1.3	Yes	NG	No ^(g)
Potassium	mg/L	-		-		-	-	0.62	0.9	Yes	NG	No ^(g)	0.53	0.74	Yes	NG	No ^(g)
Sodium	mg/L	200	AO	200	ATO	-	200	0.66	12	Yes	No	No	0.56	9.5	Yes	No	No
Sulphate	mg/L	500	AO	250	ATO	-	500	1.5	2.5	Yes	No	No	1.2	2.0	Yes	No	No
Nutrients																	
Total nitrogen (calculated)	mg-N/L	-		-		-	-	-	1.0	No	NG	No	-	0.89	No	NG	No
Total ammonia	mg-N/L	-		-		-	-	0.024	0.18	Yes	NG	No ^(h)	0.0070	0.13	Yes	NG	No ^(h)
Nitrate	mg-N/L	10		11		-	10	0.020	0.66	Yes	No	No	0.0025	0.60	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-		-		-	-	0.0052	0.012	Yes	NG	No ^(g)	0.0064	0.0091	Yes	NG	No ^(g)
Dissolved orthophosphate	mg-P/L	-		-		-	-	0.0022	0.0065	Yes	NG	No ^(g)	0.00050	0.0032	Yes	NG	No ^(g)
Phytoplankton (as Chlorophyll a)	µg/L	-		-		-	-	-	12	No	NG	No	-	15	No	NG	No
Silica, reactive	mg/L	-		-		-	-	-	0.27	No	NG	No	-	0.22	No	NG	No
Total Metals																	
Aluminum	µg/L	100 to 200	OG	100 to 200	OG	4,000	4,000	4.4	63	Yes	No	No	8.8	62	Yes	No	No
Arsenic	µg/L	10		10	PA, PT	-	10	0.35	0.42	Yes	No	No	0.30	0.35	Yes	No	No
Barium	µg/L	1,000		700		-	1,000	1.3	4.5	Yes	No	No	1.2	3.8	Yes	No	No
Beryllium	µg/L	-		12		-	12	0.10	0.10	No	No	No	0.10	0.10	No	No	No
Bismuth	µg/L	-		-		-	-	0.0050	0.012	Yes	NG	No ⁽ⁱ⁾	0.0050	0.0098	Yes	NG	No ⁽ⁱ⁾
Cadmium	µg/L	5		3		-	5	0.025	0.033	Yes	No	No	0.025	0.031	Yes	No	No
Chromium	µg/L	50		50	P	-	50	0.17	0.26	Yes	No	No	0.10	0.19	Yes	No	No
Cobalt	µg/L	-		-		1.2	1.2	0.050	0.25	Yes	No	No	0.050	0.21	Yes	No	No
Copper	µg/L	1,000	AO	2,000		-	2,000	0.68	0.84	Yes	No	No	0.60	0.73	Yes	No	No
Iron	µg/L	300	AO	300	ATO	2,800	2,800	5.0	38	Yes	No	No	16	44	Yes	No	No
Lead	µg/L	10		10	PA, PT	-	10	0.025	0.054	Yes	No	No	0.058	0.081	Yes	No	No
Manganese	µg/L	50	AO	400	ATO	86	86	1.7	10	Yes	No	No	4.7	11	Yes	No	No
Mercury	µg/L	1		6		-	1	0.0010	0.0060	Yes	No	No	0.0010	0.0054	Yes	No	No
Molybdenum	µg/L	-		-		20	20	0.025	0.64	Yes	No	No	0.025	0.44	Yes	No	No
Nickel	µg/L	-		70		-	70	0.30	0.69	Yes	No	No	0.32	0.62	Yes	No	No
Selenium	µg/L	50		40	P	-	50	0.050	0.064	Yes	No	No	0.050	0.061	Yes	No	No
Silver	µg/L	-		-		18.8	18.8	0.050	0.052	No	No	No	0.050	0.051	No	No	No

Table C2.1-1 Water Screening for Human Health – Lac du Sauvage

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice (2006, 2010, 2011, and 2012)					Open Water (2004, 2006, and 2010 to 2013)				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-		-		2,400	2,400	7.2	534	Yes	No	No	5.3	345	Yes	No	No
Uranium	µg/L	20		30	P	-	20	0.022	0.63	Yes	No	No	0.022	0.50	Yes	No	No
Vanadium	µg/L	-		-		17.2	17.2	0.025	0.080	Yes	No	No	0.025	0.074	Yes	No	No
Zinc	µg/L	5,000	AO	-		1,200	1,200	0.50	0.95	Yes	No	No	0.50	0.86	Yes	No	No

Notes:
Italicized values - Indicates concentration presented is half the detection limit.
"Yes"- Indicates parameter is a constituent of potential concern (COPC) because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.
a) Guidelines are from Health Canada. 2014. Guidelines for Canadian Drinking Water Quality Summary Table. October 2014. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.
b) Guidelines are from World Health Organization (WHO). 2011. Drinking Water Guidelines, Fourth Edition. Geneva, Switzerland.
c) Guidelines are from United States Environmental Protection Agency (USEPA). 2014. Regional Screening Levels (RSLs) for Residential Tapwaters. November 2014. RSLs were adjusted to a hazard quotient of 0.2 for non-carcinogens, and adjusted to an incremental lifetime cancer risk of 1 in 100,000 (10⁻⁵) for carcinogens. USEPA RSLs are only shown if health-based screening values are not available from Health Canada or WHO.
d) Health-based screening values were chosen by agency in the following order: Health Canada > WHO > USEPA.
e) Measured baseline median at all stations.
f) Predicted maximum of depth-averaged water quality in Lac du Sauvage.
g) Not retained as a COPC because parameter is considered an essential mineral.
h) Not retained as a COPC because ammonia is produced in the body, efficiently metabolized in healthy individuals, and occurs in drinking water at concentrations well below those of human health concern.
i) Not retained as a COPC because bismuth and most of its compounds are generally less toxic compared to other heavy metals (e.g., lead, antimony) and it is not bioaccumulative.
"- " = no value or not measured; > = greater than; < = less than detection limit; µg/L = micrograms per litre; ATO = Concentration of the substance at or below health-based guideline value may affect the appearance, taste or odour of the water, leading to consumer complaints; COPC = constituent of potential concern; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per litre; NG = no guideline; P = Provisional guideline value because of uncertainties in the health database; PA = Provisional guideline value as the calculated guideline value is below the achievable quantification level; PT = Provisional guideline value because calculated guideline value is below the level that can be achieved through practical treatment methods; AO = aesthetic objective; OG = operational guideline

Table C2.1-2 Water Screening for Human Health – Lac de Gras East

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice					Open Water				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions																	
Calcium	mg/L	-		-		-	-	1.5	2.8	Yes	NG	No ^(g)	1.3	3.0	Yes	NG	No ^(g)
Chloride	mg/L	250	AO	250	ATO	-	250	2.0	6.2	Yes	No	No	1.7	6.9	Yes	No	No
Fluoride	mg/L	1.5		1.5		-	1.5	0.025	0.014	No	No	No	0.025	0.014	No	No	No
Magnesium	mg/L	-		-		-	-	0.85	1.13	Yes	NG	No ^(g)	0.82	1.1	Yes	NG	No ^(g)
Potassium	mg/L	-		-		-	-	0.88	1.2	Yes	NG	No ^(g)	0.72	1.1	Yes	NG	No ^(g)
Sodium	mg/L	200	AO	200	ATO	-	200	1.5	2.4	Yes	No	No	1.3	2.5	Yes	No	No
Sulphate	mg/L	500	AO	250	ATO	-	500	2.7	4.5	Yes	No	No	2.1	4.2	Yes	No	No
Nutrients																	
Total nitrogen (calculated)	mg-N/L	-		-		-	-	0.24	0.32	Yes	NG	No ^(h)	0.19	0.32	Yes	NG	No ^(h)
Total ammonia	mg-N/L	-		-		-	-	0.026	0.034	Yes	NG	No ⁽ⁱ⁾	0.0025	0.030	Yes	NG	No ⁽ⁱ⁾
Nitrate	mg-N/L	10		11		-	10	0.057	0.075	Yes	No	No	0.021	0.082	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-		-		-	-	0.0032	0.0036	Yes	NG	No ^(g)	0.0029	0.0035	Yes	NG	No ^(g)
Dissolved orthophosphate	mg-P/L	-		-		-	-	-	0.0022	No	NG	No	-	0.0021	No	NG	No
Phytoplankton (as Chlorophyll a)	µg/L	-		-		-	-	-	2.0	No	NG	No	-	2.2	No	NG	No
Silica, reactive	mg/L	-		-		-	-	-	0.14	No	NG	No	-	0.13	No	NG	No
Total Metals																	
Aluminum	µg/L	100 to 200	OG	100 to 200	OG	4,000	4,000	4.1	29	Yes	No	No	5.4	28	Yes	No	No
Arsenic	µg/L	10		10	PA, PT	-	10	0.23	0.41	Yes	No	No	0.23	0.39	Yes	No	No
Barium	µg/L	1,000		700		-	1,000	4.0	7.9	Yes	No	No	3.1	6.7	Yes	No	No
Beryllium	µg/L	-		12		-	12	0.10	0.12	Yes	No	No	0.10	0.12	Yes	No	No
Bismuth	µg/L	-		-		-	-	-	0.013	No	NG	No	-	0.012	No	NG	No
Cadmium	µg/L	5		3		-	5	0.025	0.036	Yes	No	No	0.025	0.035	Yes	No	No
Chromium	µg/L	50		50	P	-	50	0.030	0.11	Yes	No	No	0.030	0.11	Yes	No	No
Cobalt	µg/L	-		-		1.2	1.2	0.050	0.088	Yes	No	No	0.050	0.086	Yes	No	No
Copper	µg/L	1,000	AO	2,000		-	2,000	0.30	0.42	Yes	No	No	0.30	0.40	Yes	No	No
Iron	µg/L	300	AO	300	ATO	2,800	2,800	2.5	37	Yes	No	No	5.4	38	Yes	No	No
Lead	µg/L	10		10	PA, PT	-	10	0.025	0.038	Yes	No	No	0.025	0.037	Yes	No	No
Manganese	µg/L	50	AO	400	ATO	86	86	1.1	3.8	Yes	No	No	3.3	5.7	Yes	No	No
Mercury	µg/L	1		6		-	1	0.010	0.012	Yes	No	No	0.010	0.012	Yes	No	No
Molybdenum	µg/L	-		-		20	20	0.293	3.4	Yes	No	No	0.301	3.0	Yes	No	No
Nickel	µg/L	-		70		-	70	0.8	1.2	Yes	No	No	0.7	1.1	Yes	No	No
Selenium	µg/L	50		40	P	-	50	0.050	0.15	Yes	No	No	0.050	0.14	Yes	No	No
Silver	µg/L	-		-		18.8	18.8	0.050	0.061	Yes	No	No	0.050	0.061	Yes	No	No

Table C2.1-2 Water Screening for Human Health – Lac de Gras East

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice					Open Water				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-		-		2,400	2,400	15.0	105	Yes	No	No	12.5	82	Yes	No	No
Uranium	µg/L	20		30	P	-	20	0.089	0.45	Yes	No	No	0.089	0.43	Yes	No	No
Vanadium	µg/L	-		-		17.2	17.2	0.025	0.62	Yes	No	No	0.025	0.58	Yes	No	No
Zinc	µg/L	5,000	AO	-		1,200	1,200	0.40	0.63	Yes	No	No	0.40	0.60	Yes	No	No

Notes:
Italicized values - Indicates concentration presented is half the detection limit.
"Yes"- Indicates parameter is a constituent of potential concern (COPC) because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.
a) Guidelines are from Health Canada. 2014. Guidelines for Canadian Drinking Water Quality Summary Table. October 2014. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.
b) Guidelines are from World Health Organization (WHO). 2011. Drinking Water Guidelines, Fourth Edition. Geneva, Switzerland.
c) Guidelines are from United States Environmental Protection Agency (USEPA). 2014. Regional Screening Levels (RSLs) for Residential Tapwaters. May 2014. RSLs were adjusted to a hazard quotient of 0.2 for non-carcinogens, and adjusted to an incremental lifetime cancer risk of 1 in 100,000 (10⁻⁵) for carcinogens. USEPA RSLs are only shown if health-based screening values are not available from Health Canada or WHO.
d) Health-based screening values were chosen by agency in the following order: Health Canada > WHO > USEPA.
e) Measured baseline median at Lac de Gras East.
f) Predicted maximum of depth-averaged water quality at P1 in Lac de Gras.
g) Not retained as a COPC because parameter is considered an essential mineral.
h) Not retained as a COPC because total nitrogen is assessed separately as nitrate- and nitrite-nitrogen.
i) Not retained as a COPC because ammonia is produced in the body, efficiently metabolized in healthy individuals, and occurs in drinking water at concentrations well below those of human health concern.
"- " = no value or not measured; > = greater than; < = less than detection limit; µg/L = micrograms per litre; ATO = Concentration of the substance at or below health-based guideline value may affect the appearance, taste or odour of the water, leading to consumer complaints; COPC = constituent of potential concern; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per litre; NG = no guideline; P = Provisional guideline value because of uncertainties in the health database; PA = Provisional guideline value as the calculated guideline value is below the achievable quantification level; PT = Provisional guideline value because calculated guideline value is below the level that can be achieved through practical treatment methods; AO = ***aesthetic objective; OG = ***.operational guideline

Table C2.1-3 Water Screening for Human Health – Lac de Gras West

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice					Open Water				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions																	
Calcium	mg/L	-		-		-	-	1.1	2.5	Yes	NG	No ^(g)	1.1	2.4	Yes	NG	No ^(g)
Chloride	mg/L	250	AO	250	ATO	-	250	0.78	5.2	Yes	No	No	0.67	5.0	Yes	No	No
Fluoride	mg/L	1.5		1.5		-	1.5	0.025	0.015	No	No	No	0.025	0.014	No	No	No
Magnesium	mg/L	-		-		-	-	0.71	1.3	Yes	NG	No ^(g)	0.68	1.1	Yes	NG	No ^(g)
Potassium	mg/L	-		-		-	-	0.59	1.3	Yes	NG	No ^(g)	0.59	1.1	Yes	NG	No ^(g)
Sodium	mg/L	200	AO	200	ATO	-	200	0.50	2.6	Yes	No	No	0.50	2.2	Yes	No	No
Sulphate	mg/L	500	AO	250	ATO	-	500	2.2	4.8	Yes	No	No	1.9	4.1	Yes	No	No
Nutrients																	
Total nitrogen (calculated)	mg-N/L	-		-		-	-	0.15	0.31	Yes	NG	No ^(h)	0.14	0.29	Yes	NG	No ^(h)
Total ammonia	mg-N/L	-		-		-	-	0.017	0.0399	Yes	NG	No ⁽ⁱ⁾	0.0025	0.029	Yes	NG	No ⁽ⁱ⁾
Nitrate	mg-N/L	10		11		-	10	0.0074	0.062	Yes	No	No	0.0030	0.059	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-		-		-	-	0.0024	0.0037	Yes	NG	No ^(g)	0.0028	0.0033	Yes	NG	No ^(g)
Dissolved orthophosphate	mg-P/L	-		-		-	-	-	0.0023	No	NG	No	-	0.0019	No	NG	No
Phytoplankton (as Chlorophyll a)	µg/L	-		-		-	-	-	2.5	No	NG	No	-	3.4	No	NG	No
Silica, reactive	mg/L	-		-		-	-	-	0.16	No	NG	No	-	0.14	No	NG	No
Total Metals																	
Aluminum	µg/L	100 to 200	OG	100 to 200	OG	4000	4,000	3.4	28	Yes	No	No	4.2	25	Yes	No	No
Arsenic	µg/L	10		10	PA, PT	-	10	0.18	0.36	Yes	No	No	0.17	0.32	Yes	No	No
Barium	µg/L	1,000		700		-	1,000	2.0	6.1	Yes	No	No	1.9	5.2	Yes	No	No
Beryllium	µg/L	-		12		-	12	0.10	0.12	Yes	No	No	0.10	0.12	Yes	No	No
Bismuth	µg/L	-		-		-	-	-	0.012	No	NG	No	-	0.011	No	NG	No
Cadmium	µg/L	5		3		-	5	0.025	0.037	Yes	No	No	0.025	0.034	Yes	No	No
Chromium	µg/L	50		50	P	-	50	0.030	0.12	Yes	No	No	0.030	0.10	Yes	No	No
Cobalt	µg/L	-		-		1.2	1.2	0.050	0.083	Yes	No	No	0.050	0.078	Yes	No	No
Copper	µg/L	1,000	AO	2,000		-	2,000	0.30	0.44	Yes	No	No	0.30	0.40	Yes	No	No
Iron	µg/L	300	AO	300	ATO	2,800	2,800	2.5	36	Yes	No	No	5.35	35	Yes	No	No
Lead	µg/L	10		10	PA, PT	-	10	0.025	0.038	Yes	No	No	0.025	0.036	Yes	No	No
Manganese	µg/L	50	AO	400	ATO	86	86	1.4	4.2	Yes	No	No	3.5	5.7	Yes	No	No
Mercury	µg/L	1		6		-	1	0.010	0.012	Yes	No	No	0.010	0.012	Yes	No	No
Molybdenum	µg/L	-		-		20	20	0.08	3.8	Yes	No	No	0.09	2.8	Yes	No	No
Nickel	µg/L	-		70		-	70	1.02	1.4	Yes	No	No	1.03	1.3	Yes	No	No
Selenium	µg/L	50		40	P	-	50	0.050	0.15	Yes	No	No	0.050	0.13	Yes	No	No
Silver	µg/L	-		-		18.8	18.8	0.050	0.061	Yes	No	No	0.050	0.060	Yes	No	No

Table C2.1-3 Water Screening for Human Health – Lac de Gras West

Parameter	Unit	Guidelines for Canadian Drinking Water Quality ^(a)	Notes	WHO Drinking Water Guidelines ^(b)	Notes	USEPA Regional Screening Level ^(c)	Chosen Screening Value ^(d)	Under Ice					Open Water				
								Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(e)	Maximum Application Case Concentration ^(f)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-		-		2,400	2,400	8	93	Yes	No	No	8	62	Yes	No	No
Uranium	µg/L	20		30	P	-	20	0.025	0.36	Yes	No	No	0.025	0.33	Yes	No	No
Vanadium	µg/L	-		-		17.2	17.2	0.025	0.62	Yes	No	No	0.025	0.53	Yes	No	No
Zinc	µg/L	5,000	AO	-		1,200	1,200	1.25	1.4	Yes	No	No	0.61	0.78	Yes	No	No

Notes:
Italicized values - Indicates concentration presented is half the detection limit.
"Yes"- Indicates parameter is a constituent of potential concern (COPC) because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.
a) Guidelines are from Health Canada. 2014. Guidelines for Canadian Drinking Water Quality Summary Table. October 2014. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.
b) Guidelines are from World Health Organization (WHO). 2011. Drinking Water Guidelines, Fourth Edition. Geneva, Switzerland.
c) Guidelines are from United States Environmental Protection Agency (USEPA). 2014. Regional Screening Levels (RSLs) for Residential Tapwaters. May 2014. RSLs were adjusted to a hazard quotient of 0.2 for non-carcinogens, and adjusted to an incremental lifetime cancer risk of 1 in 100,000 (10⁻⁵) for carcinogens. USEPA RSLs are only shown if health-based screening values are not available from Health Canada or WHO.
d) Health-based screening values were chosen by agency in the following order: Health Canada > WHO > USEPA.
e) Measured baseline median at Lac de Gras West.
f) Predicted maximum of depth-averaged water quality at P2, P3, P4, P5, and P6 in Lac de Gras.
g) Not retained as a COPC because parameter is considered an essential mineral.
h) Not retained as a COPC because total nitrogen is assessed separately as nitrate- and nitrite-nitrogen.
i) Not retained as a COPC because ammonia is produced in the body, efficiently metabolized in healthy individuals, and occurs in drinking water at concentrations well below those of human health concern.
"- " = no value or not measured; > = greater than; < = less than detection limit; µg/L = micrograms per litre; ATO = Concentration of the substance at or below health-based guideline value may affect the appearance, taste or odour of the water, leading to consumer complaints; COPC = constituent of potential concern; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per litre; NG = no guideline; P = Provisional guideline value because of uncertainties in the health database; PA = Provisional guideline value as the calculated guideline value is below the achievable quantification level; PT = Provisional guideline value because calculated guideline value is below the level that can be achieved through practical treatment methods; AO = ***aesthetic objective; OG = ***operational guideline



C2.1.2 Soil

Concentrations in soil for the Application Case were predicted using measured baseline data and modelled air deposition rates (see methods in Appendix D – exposure assessment). The maximum predicted concentrations in soil were screened against the health-based soil quality guidelines listed below for selection of COPCs (Table C2.1-4).

The guidelines applied for the soil screening process included:

- CCME Canadian soil quality guidelines for protection of human health (residential) (CCME 1999). Where available, pathway-specific screening values were used (i.e., soil ingestion, direct contact). The CCME soil quality guidelines for protection of human health are typically based on an allocation of 20% of the provisional tolerable daily intake of soil (i.e., assuming 20% of a person's tolerable daily intake of a chemical comes from soil, and the remaining 80% comes from other sources such as food and water).
- In the absence of CCME guidelines, USEPA Residential Soil RSLs for Chemical Contaminants at Superfund Sites (USEPA 2014) were used. For non-carcinogens, USEPA RSLs were adjusted to a HQ of 0.2 (to reflect an allocation of 20% of a person's tolerable daily intake from soil), and for carcinogens, RSLs were adjusted to reflect a cancer risk level of 1 in 100,000 (to be consistent with WHO and Health Canada guidance).

C2.1.3 Fish

Large-bodied fish, such as Lake Trout, Lake Whitefish, and Round Whitefish, were collected from Lac du Sauvage, Lac de Gras, Hammer (Fisher) Lake, Lynx Lake, Counts Lake, Nanuq Lake, and Ursula Lake. Bioaccumulation factors (BAFs) were derived based on muscle tissue concentrations of each COPC of Lake Trout and Round Whitefish. The BAFs were calculated for each species, lake, and year for each constituent. If the water and/or tissue concentrations were less than the detection limit, concentrations were set at the detection limit to calculate BAFs. The maximum reliable BAF (e.g., the maximum BAF with detected values for both water and fish) was selected as the final BAF for predicting fish tissue concentration. More information regarding the BAF methodology is available in DAR Section 8 (Water Quality and Quantity).

Base and Application Case fish tissue concentrations were estimated for Lac du Sauvage, Lac de Gras East, and Lac de Gras West, using the water quality data (baseline and predicted Application Case, Section C2.1.1) multiplied by the selected BAFs. Predicted fish tissue concentrations were screened against the USEPA RSLs for fish ingestion (USEPA 2014). The predicted mercury concentrations in fish were screened against the guideline for methyl mercury, conservatively assuming that 100% of the mercury concentration in fish was in the methyl mercury form. Both non-carcinogenic and carcinogenic screening levels are available. Non-carcinogenic RSLs were adjusted to a HQ of 0.2, and carcinogenic RSLs were adjusted to reflect a cancer risk level of 1 in 100,000. The baseline and predicted fish tissue screening based on predicted maximum depth-averaged water concentrations are provided in Tables C2.1-5 to C2.1-7.

Table C2.1-4 Soil Screening of Predicted Base Case and Application Case Concentrations for Human Health

Parameter	CCME Residential Guidelines ^(a)	Notes	USEPA RSLs for Residential Soils ^(b)	Selected Human Health Screening Value ^(c)	Maximum Predicted Base Case Soil Concentration (mg/kg dry weight)	Maximum Application Case Predicted Soil Concentration (mg/kg dry weight)	Location of Maximum Application Soil Concentration	Is Predicted Application Soil Concentration >Base Case + 10%?	Is Predicted Application Soil Concentration >Selected Human Health Screening Value?	Is Parameter a COPC?
aluminum	-		15,400	15,400	22,055	22,833	MPOI	No	Yes	No
antimony	20	G		20	0.12	0.14	MPOI	Yes	No	No
arsenic	12	SI		12	14	14	MPOI	No	Yes	No
barium	6,800	DC		6,800	180	187	MPOI	No	No	No
beryllium	4	G		4	0.9	0.9	MPOI	No	No	No
cadmium	1.4	SI		1.4	1.0	1.0	Jay Fenceline	No	No	No
chromium	220	SI		220	84	86	MPOI	No	No	No
cobalt	50	G		50	15	15	MPOI	No	No	No
copper	1,100	SI		1,100	119	119	MPOI	No	No	No
iron	-		11,000	11,000	30,779	30,963	MPOI	No	Yes	No
lead	140	SI	-	140	9	9	MPOI	No	No	No
manganese	-		360	360	349	352	MPOI	No	No	No
mercury	6.6	SI		6.6	0.27	0.3	MPOI	Yes	No	No
molybdenum	10	G		10	1.3	1.3	MPOI	No	No	No
nickel	50	G		50	48	49	MPOI	No	No	No
selenium	80	DC		80	0.58	0.59	MPOI	No	No	No
silver	20	G		20	0.27	0.28	Jay Fenceline	No	No	No
strontium	-		9,400	9,400	38	42	MPOI	Yes	No	No
thallium	1	P/SI		1	0.47	0.49	MPOI	No	No	No
titanium	-		28,000 ^{TiCl4}	28,000	1,576	1,593	MPOI	No	No	No
uranium	23	DC		23	11	12	MPOI	No	No	No
vanadium	130	G		130	66	67	MPOI	No	No	No
Zinc	200	G		200	81	82	MPOI	No	No	No
1-methylnaphthalene (surrogate: 2-methylnaphthalene)			46	46	0.012	0.03	MPOI	Yes	No	No
1-Methylphenanthrene (surrogate: anthracene)			3,400	3,400	0.010	0.011	MPOI	No	No	No
2-Methylanthracene (surrogate: anthracene)			3,400	3,400	0.010	0.010	MPOI	No	No	No
2-Methylfluorene (surrogate: fluorene)			460	460	0.010	0.010	MPOI	No	No	No
2-methylnaphthalene	-		46	46	0.034	0.06	MPOI	Yes	No	No
2-Methylphenanthrene (surrogate: anthracene)			3,400	3,400	0.010	0.012	MPOI	Yes	No	No
2-Methylpyrene (surrogate: pyrene)			340	340	0.010	0.010	MPOI	No	No	No
3-Methyldibenzothiophene (surrogate: dibenzothiophene)			156	156	0.010	0.010	MPOI	No	No	No
3-Methylphenanthrene (surrogate: anthracene)			3,400	3,400	0.010	0.011	MPOI	Yes	No	No
4-+9-Methylphenanthrene (surrogate: anthracene)			3,400	3,400	0.010	0.011	MPOI	No	No	No
4-Methyldibenzothiophene (surrogate: dibenzothiophene)			156	156	0.010	0.010	MPOI	No	No	No
9-Methylphenanthrene (surrogate: anthracene)			3,400	3,400	0.010	0.010	Diavik_Camp	No	No	No
Acenaphthene	-		700	700	0.021	0.021	MPOI	No	No	No
Acenaphthylene (surrogate: acenaphthene)	-		700	700	0.041	0.043	MPOI	No	No	No
Acephenanthrylene (surrogate: benzo(b)fluoranthene)			-	B(a)P TPE	0.010	0.011	MPOI	No	No	No
Anthracene	-		3,400	3,400	0.020	0.021	MPOI	No	No	No
Benz(a)anthracene	-		-	B(a)P TPE	0.09	0.09	MPOI	No	No	No
Benzo(a)fluorene (surrogate: chrysene)			-	B(a)P TPE	0.010	0.010	MPOI	No	No	No
Benzo(a)pyrene	-		-	B(a)P TPE	0.80	0.80	Diavik_Camp	No	No	No
Benzo(b)fluoranthene	-		-	B(a)P TPE	0.30	0.30	MPOI	No	No	No

Table C2.1-4 Soil Screening of Predicted Base Case and Application Case Concentrations for Human Health

Parameter	CCME Residential Guidelines ^(a)	Notes	USEPA RSLs for Residential Soils ^(b)	Selected Human Health Screening Value ^(c)	Maximum Predicted Base Case Soil Concentration (mg/kg dry weight)	Maximum Application Case Predicted Soil Concentration (mg/kg dry weight)	Location of Maximum Application Soil Concentration	Is Predicted Application Soil Concentration >Base Case + 10%?	Is Predicted Application Soil Concentration >Selected Human Health Screening Value?	Is Parameter a COPC?
Benzo(e)pyrene (surrogate: benzo(a)pyrene)			-	B(a)P TPE	0.010	0.010	Misery_Camp	No	No	No
Benzo(g,h,i)fluoranthene (surrogate: benzo(g,h,i)perylene)			-	B(a)P TPE	0.010	0.010	MPOI	No	No	No
Benzo(g,h,i)perylene	-		-	B(a)P TPE	0.40	0.40	MPOI	No	No	No
Benzo(k)fluoranthene	-		-	B(a)P TPE	2.0	2.0	MPOI	No	No	No
Biphenyl			9.4	9.4	0.010	0.010	Diavik_Camp	No	No	No
Chrysene	-		-	B(a)P TPE	0.20	0.20	Diavik_Camp	No	No	No
Coronene (surrogate: benzo(g,h,i)perylene)			-	B(a)P TPE	0.010	0.010	MPOI	No	No	No
Cyclopenta(c,d)pyrene (surrogate: benzo(a)pyrene)			-	B(a)P TPE	0.010	0.010	MPOI	No	No	No
Dibenzo(a,h)anthracene	-		-	B(a)P TPE	0.020	0.020	Misery_Camp	No	No	No
Dibenzothiophene			156	156	0.010	0.010	MPOI	No	No	No
Fluoranthene	-		460	460	0.030	0.030	MPOI	No	No	No
Fluorene	-		460	460	0.40	0.40	MPOI	No	No	No
Indeno(1,2,3-cd)fluoranthene (surrogate: indeno(1,2,3-cd)pyrene)			-	B(a)P TPE	0.010	0.010	MPOI	No	No	No
Indeno(1,2,3-cd)pyrene	-		-	B(a)P TPE	0.20	0.20	MPOI	No	No	No
Indeno(1,2,3-W)pyrene (surrogate: indeno(1,2,3-cd)pyrene)			-	B(a)P TPE	0.010	0.010	Diavik_Camp	No	No	No
Naphthalene	-		26	26	0.021	0.022	MPOI	No	No	No
Nitro-pyrene (surrogate: nitrobenzene)			26	26	0.011	0.012	MPOI	Yes	No	No
Perylene (surrogate: pyrene)			340	340	0.012	0.014	MPOI	Yes	No	No
Phenanthrene (surrogate: anthracene)	-		3,400	3400	0.022	0.025	MPOI	Yes	No	No
Picene (surrogate: dibenzo(a,h)anthracene)			-	B(a)P TPE	0.011	0.011	MPOI	No	No	No
Pyrene	-		340	340	0.040	0.040	Diavik_Camp	No	No	No
B(a)P TPE ^(d)	5.3		-	5.3	1.1	1.1	MPOI	No	No	No

Notes:

All units are in milligrams per kilogram (mg/kg) dry weight.

Red font - Indicates that the parameter was not measured so the max was assumed to be the full standard detection limit of PAHs (i.e. 0.01 mg/kg)

Bold values - Indicates concentration exceeds selected human health screening value.

a) CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Environmental Quality Guidelines; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.

b) USEPA (United States Environmental Protection Agency). 2014. RSLs (Regional Screening Levels) for Soil, November 2014. Non-cancer RSL values were adjusted from an HQ = 1.0 to an HQ = 0.2 by dividing the RSL by 5. RSL values for carcinogens were adjusted to reflect an incremental lifetime cancer risk of 1 in 100,000 by multiplying by 10. USEPA RSLs are only shown when a CCME guideline is not available.

c) CCME guideline was used as screening value. If no CCME guideline was available, USEPA RSL value was used.

d) The B[a]P TPE for a soil sample was calculated by multiplying the concentration of each PAH in the sample by its B[a]P potency equivalence factor (PEF; based on the World Health Organization (WHO/IPCS, 1998) scheme) and summing the products, as follows: [benz[a]anthracene] x 0.1 + [benzo[b]fluoranthene] x 0.1 + [benzo[k]fluoranthene] x 0.1 + [benzo[g,h,i]perylene] x 0.01+ [benzo[a]pyrene] x 1.0 + [chrysene] x 0.01 + dibenz[a,h]anthracene] x 1.0 + [indeno[c,d]pyrene] x 0.1, where [parameter] is the concentration in mg/kg. Where a parameter was not detected, the full detection limit was used in the calculation. Benzo[j]fluoranthene was not measured so the maximum was assumed to be the full standard detection limit of PAHs (i.e. 0.01 mg/kg).

MPOI = maximum point of impingement; < = below laboratory detection limit; % = percent; B(a)P TPE = Benzo(a)pyrene Total Potency Equivalents; DC = Direct contact; G = Generic; P = Provisionary; SI = Soil ingestion; TiCl₄ = titanium tetrachloride; - = not available

Table C2.1-5 Fish Tissue Screening – Lac du Sauvage

Parameter	BAF ^(a)	USEPA RSLs ^(b)		Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
		Fish Tissue (mg/kg ww)	Notes	Under Ice					Open Water				
Aluminum	730	300		3.2	46	Yes	No	No	6.4	45	Yes	No	No
Arsenic	393	0.028	C	0.14	0.16	Yes	Yes	Yes	0.12	0.14	Yes	Yes	Yes
Barium	156	62		0.20	0.71	Yes	No	No	0.19	0.59	Yes	No	No
Beryllium	600	0.62		0.060	0.062	No	No	No	0.060	0.062	No	No	No
Cadmium	176	0.30		0.0044	0.0057	Yes	No	No	0.0044	0.0054	Yes	No	No
Chromium	1,429	0.083	Cr 6, C	0.24	0.37	Yes	Yes	Yes	0.14	0.26	Yes	Yes	Yes
Cobalt	80	0.092		0.0040	0.020	Yes	No	No	0.0040	0.017	Yes	No	No
Copper	874	12		0.59	0.74	Yes	No	No	0.52	0.64	Yes	No	No
Iron	1,043	220		5.2	40	Yes	No	No	17	46	Yes	No	No
Lead	832	2.35		0.021	0.045	Yes	No	No	0.048	0.067	Yes	No	No
Manganese	165	44		0.28	1.6	Yes	No	No	0.78	1.8	Yes	No	No
Mercury	30,000	0.03	MeHg	0.030	0.18	Yes	Yes	Yes	0.030	0.16	Yes	Yes	Yes
Molybdenum	118	1.5		0.0030	0.075	Yes	No	No	0.0030	0.052	Yes	No	No
Nickel	651	3.4		0.20	0.448	Yes	No	No	0.21	0.41	Yes	No	No
Selenium	10,925	1.5		0.55	0.70	Yes	No	No	0.55	0.66	Yes	No	No
Strontium	220	186		1.6	118	Yes	No	No	1.2	76	Yes	No	No
Uranium	182	0.92		0.0040	0.11	Yes	No	No	0.0040	0.091	Yes	No	No
Vanadium	1,600	1.6		0.040	0.13	Yes	No	No	0.040	0.12	Yes	No	No
Zinc	4,800	92		2.4	4.6	Yes	No	No	2.4	4.1	Yes	No	No

Notes:
a) Site-specific BAFs from Developer's Assessment Report, Section 8 (Water Quality and Quantity).
b) USEPA RSLs (United States Environmental Protection Agency). 2014. Regional Screening Levels (RSLs) for Fish Tissue Ingestion (November 2014). Available online at: www.epa.gov/reg3hwmd/risk/human/index.htm. RSLs were adjusted to an HQ of 0.2 by dividing by 5 for non-carcinogenic endpoints and adjusted to an ILCR (Incremental Lifetime Cancer Risk) of 1 in 100,000 by multiplying by 10.
Italicized values - Indicates fish tissue concentrations are calculated using half the detection limit in water.
Percentage of methyl mercury to total mercury applied **100%**
BAF = Bioaccumulation Factor; mg/kg = milligrams per kilogram; ww = wet weight; > = greater than; COPC = constituent of potential concern; C = carcinogenic; Cr 6 = Hexavalent chromium; MeHg = Methyl mercury.

Table C2.1-6 Fish Tissue Screening – Lac de Gras East

Parameter	BAF ^(a)	USEPA RSLs ^(b)		Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
		Fish Tissue (mg/kg ww)	Notes	Under Ice					Open Water				
Aluminum	730	300		3.0	21	Yes	No	No	3.9	21	Yes	No	No
Arsenic	393	0.028	C	0.090	0.16	Yes	Yes	Yes	0.088	0.15	Yes	Yes	Yes
Barium	156	62		0.62	1.2	Yes	No	No	0.49	1.0	Yes	No	No
Beryllium	600	0.62		0.060	0.074	Yes	No	No	0.060	0.073	Yes	No	No
Cadmium	176	0.30		0.0044	0.0063	Yes	No	No	0.0044	0.0061	Yes	No	No
Chromium	1,429	0.083	Cr 6, C	0.043	0.16	Yes	Yes	Yes	0.043	0.15	Yes	Yes	Yes
Cobalt	80	0.092		0.0040	0.0070	Yes	No	No	0.0040	0.0069	Yes	No	No
Copper	874	12		0.26	0.37	Yes	No	No	0.26	0.35	Yes	No	No
Iron	1,043	220		2.6	38	Yes	No	No	5.6	39	Yes	No	No
Lead	832	6.2		0.021	0.032	Yes	No	No	0.021	0.031	Yes	No	No
Manganese	165	44		0.18	0.63	Yes	No	No	0.55	0.95	Yes	No	No
Mercury	30,000	0.03	MeHg	0.30	0.37	Yes	Yes	Yes	0.30	0.37	Yes	Yes	Yes
Molybdenum	118	1.5		0.035	0.41	Yes	No	No	0.036	0.36	Yes	No	No
Nickel	651	3.4		0.55	0.80	Yes	No	No	0.46	0.69	Yes	No	No
Selenium	10,925	1.5		0.55	1.6	Yes	Yes	Yes	0.5	1.6	Yes	Yes	Yes
Strontium	220	186		3.3	23	Yes	No	No	2.8	18	Yes	No	No
Uranium	182	0.92		0.016	0.081	Yes	No	No	0.016	0.078	Yes	No	No
Vanadium	1,600	1.6		0.040	1.0	Yes	No	No	0.040	0.94	Yes	No	No
Zinc	4,800	92		1.9	3.0	Yes	No	No	1.9	2.9	Yes	No	No

Notes:

a) Site-specific BAFs from Developer's Assessment Report, Section 8 (Water Quality and Quantity).

b) USEPA RSLs (United States Environmental Protection Agency). 2014. Regional Screening Levels (RSLs) for Fish Tissue Ingestion (November 2014). Available online at: www.epa.gov/reg3hwm/risk/human/index.htm. RSLs were adjusted to an HQ of 0.2 by dividing by 5 for non-carcinogenic endpoints and adjusted to an ILCR (Incremental Lifetime Cancer Risk) of 1 in 100,000 by multiplying by 10.

Italicized values - Indicates fish tissue concentrations are calculated using half the detection limit in water.

Percentage of methyl mercury to total mercury applied **100%**

LDG = Lac de Gras; BAF = Bioaccumulation Factor; mg/kg = milligrams per kilogram; ww = wet weight; > = greater than; COPC = constituent of potential concern; C = carcinogenic; Cr 6 = Hexavalent chromium; MeHg = Methyl mercury.

Table C2.1-7 Fish Tissue Screening – Lac de Gras West

Parameter	BAF ^(a)	USEPA RSLs ^(b)		Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Predicted Baseline Fish Tissue Concentrations (mg/kg ww)	Predicted Application Case Fish Tissue Concentrations from Depth-Averaged Water Concentrations (mg/kg ww)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
		Fish Tissue (mg/kg ww)	Notes	Under Ice					Open Water				
Aluminum	730	300		2.5	20	Yes	No	No	3.1	18	Yes	No	No
Arsenic	393	0.028	C	0.070	0.14	Yes	Yes	Yes	0.066	0.12	Yes	Yes	Yes
Barium	156	62		0.31	0.9	Yes	No	No	0.29	0.81	Yes	No	No
Beryllium	600	0.62		0.060	0.073	Yes	No	No	0.060	0.072	Yes	No	No
Cadmium	176	0.30		0.0044	0.0065	Yes	No	No	0.0044	0.0060	Yes	No	No
Chromium	1,429	0.083	Cr 6, C	0.043	0.17	Yes	Yes	Yes	0.043	0.14	Yes	Yes	Yes
Cobalt	80	0.092		0.0040	0.0067	Yes	No	No	0.0040	0.0063	Yes	No	No
Copper	874	12		0.26	0.39	Yes	No	No	0.26	0.35	Yes	No	No
Iron	1,043	220		2.6	37	Yes	No	No	5.6	36	Yes	No	No
Lead	832	6.2		0.021	0.032	Yes	No	No	0.021	0.030	Yes	No	No
Manganese	165	44		0.24	0.68	Yes	No	No	0.58	0.94	Yes	No	No
Mercury	30,000	0.03	MeHg	0.30	0.36	Yes	Yes	Yes	0.30	0.36	Yes	Yes	Yes
Molybdenum	118	1.5		0.0090	0.45	Yes	No	No	0.011	0.33	Yes	No	No
Nickel	651	3.4		0.66	0.92	Yes	No	No	0.67	0.87	Yes	No	No
Selenium	10,925	1.5		0.55	1.6	Yes	Yes	Yes	0.55	1.5	Yes	No	Yes
Strontium	220	186		1.8	21	Yes	No	No	1.7	14	Yes	No	No
Uranium	182	0.92		0.0046	0.066	Yes	No	No	0.0046	0.060	Yes	No	No
Vanadium	1,600	1.6		0.040	0.99	Yes	No	No	0.040	0.85	Yes	No	No
Zinc	4,800	92		6.0	7.0	Yes	No	No	2.9	3.8	Yes	No	No

Notes:

a) Site-specific BAFs from Developer's Assessment Report, Section 8 (Water Quality and Quantity).

b) USEPA RSLs (United States Environmental Protection Agency). 2014. Regional Screening Levels (RSLs) for Fish Tissue Ingestion (November 2014). Available online at: www.epa.gov/reg3hwm/risk/human/index.htm. RSLs were adjusted to an HQ of 0.2 by dividing by 5 for non-carcinogenic endpoints and adjusted to an ILCR (Incremental Lifetime Cancer Risk) of 1 in 100,000 by multiplying by 10.

Italicized values - Indicates fish tissue concentrations are calculated using half the detection limit in water.

Percentage of methyl mercury to total mercury applied **100%**

LDG = Lac de Gras; BAF = Bioaccumulation Factor; mg/kg = milligrams per kilogram; ww = wet weight; > = greater than; COPC = constituent of potential concern; C = carcinogenic; Cr 6 = Hexavalent chromium; MeHg = Methyl mercury.



C2.2 Elimination of Non-Toxic Constituents

Some metals and essential minerals are commonly analyzed in environmental samples (as part of the standard suite of metals treated by the analytical method) but generally have low toxicological hazard at environmentally realistic concentrations, even at industrial sites such as a mine. Many of these constituents are present in parent rock and soil materials and are present in a toxicologically inert form, and some are essential micro- and macro-nutrients.

Although essential minerals (i.e., calcium, magnesium, phosphorus [including orthophosphate], potassium, and sodium) may be present in media in the effects study area, they were excluded from further consideration in the COPC screening process based on their expected low toxicological hazard. These essential minerals serve a variety of biochemical, intracellular, and ion balance purposes in human tissues, and are naturally occurring substances included in routine analytical chemical analyses. Government agencies often do not develop regulatory criteria for these parameters and other innocuous substances. Because these constituents are not known or expected to be associated with on-site activities, they have been excluded from the risk assessment (Health Canada 2010).

Bismuth and ammonia were predicted to increase more than 10% in Lac du Sauvage, Lac de Gras East, and Lac de Gras West, but there is no screening guideline for these constituents. Inorganic bismuth salts have a long history of use in the pharmaceutical industry as a treatment for diarrhea and other gastrointestinal ailments. Because bismuth is poorly absorbed by the gastrointestinal tract and has been used historically as a pharmaceutical agent, adverse health effects are not likely at concentrations typically found in the environment. Therefore, bismuth was not retained as a COPC. Ammonia is produced in the body and is readily metabolized by healthy individuals (Health Canada 2014). At 1.5 milligrams per litre (mg/L), ammonia may pose odour issues and at 35 mg/L, ammonia in water may have a distinct taste. However, ammonia is not of concern to human health at these concentrations (WHO 2011). The predicted Application Case concentrations of ammonia are well below these levels (maximum predicted concentration = 0.18 mg/L); therefore, ammonia was not retained as a COPC.

C2.3 Summary of Constituent of Potential Concern Screening for the Human Health Multimedia Risk Assessment

The results of the COPC screening for the human health multimedia assessment are summarized in Tables C2.1-1 through C2.1-7. Based on the screening process outlined in Section 4.4.1.2, arsenic, chromium, and mercury were identified as COPCs in fish tissue in Lac du Sauvage and Lac de Gras. Selenium was also identified as a COPC in fish tissue in Lac de Gras. No COPCs were identified as part of the soil and water screening. Although all of the COPCs were identified in fish tissue only, they were evaluated in all applicable exposure pathways as part of the multimedia risk assessment, because people may come in contact with the COPCs through multiple routes and pathways. The exposure pathways evaluated as part of the human health multimedia risk assessment are provided in Section 4.4.1.3.

C3 SCREENING VALUES USED IN THE WILDLIFE HEALTH RISK ASSESSMENT

A chemical screening process was used to determine the COPCs in environmental media as outlined in Section 4.4.1.2 of the main report.

C3.1 Summary of Guidelines and Standards Used

Canadian (i.e., CCME) environmental quality guidelines relevant to wildlife health were used preferentially as part of the COPC identification process. In the absence of Canadian environmental quality criteria for a particular constituent, environmental quality guidelines from other jurisdictions (e.g., USEPA) or applicable to human health (e.g., Health Canada drinking water guidelines) were used. Environmental quality guidelines used in this assessment are summarized below by media type.

C3.1.1 Surface Water

Predicted maximum depth-averaged water quality concentrations of major ions, nutrients, and total metals were screened against the wildlife health-based guidelines listed below (Tables C3.1-1 to C3.1-3). Depth-averaged concentrations were predicted for each Project phase starting with the median of baseline concentrations measured at sampling stations in Lac du Sauvage and Lac de Gras. Predicted concentrations across all Project phases (i.e., construction, operations, closure, and post-closure) were included in the screening process. The screening was conducted for under-ice and open-water conditions to account for seasonality of the lakes.

For Lac du Sauvage, the Base Case concentrations are the measured median concentrations from all water quality stations and the Application Case concentration is the maximum depth-averaged water quality prediction for Lac du Sauvage across all Project phases (Table C3.1-1).

Baseline water quality data were available for the eastern part of the lake (Lac de Gras East) and for the western part of the lake (Lac de Gras West). The predicted maximum depth-averaged Application Case concentrations at P1 across all Project phases were compared to the median baseline concentration for Lac de Gras East (Table C3.1-2). The predicted maximum depth-averaged Application Case concentrations at P2 through P6 across all Project phases were compared to the median baseline concentration for Lac de Gras West (Table C3.1-3).

The comparison of the maximum predicted depth-averaged concentrations to the median of the measured baseline concentrations is appropriate because the water quality modelling used the median of measured baseline concentrations as the starting point (i.e., the maximum depth-averaged concentration is the maximum prediction based on this median starting point).

The guidelines applied for the surface water screening process for the wildlife health assessment included:

- CCME water quality guidelines for the protection of agriculture (livestock) (CCME 1999). The CCME livestock watering guidelines are based on the tolerable daily intake rates of a parameter, daily water ingestion rates, body weights, and potential for bioaccumulation.
- In the absence of a CCME guideline, the selected human health water screening value was applied.

Where guidelines protective of livestock were not available, the selected screening guidelines used for human health were chosen, as described in Section C2.1.1 above.

Table C3.1-1 Water Screening for Ecological Health – Lac du Sauvage

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice (2006, 2010, 2011, and 2012)					Open Water (2004, 2006, and 2010 to 2013)				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions														
Calcium	mg/L	1000	-	1,000	0.99	18	Yes	No	No	0.83	15	Yes	No	No
Chloride	mg/L	-	250	600	0.25	48	Yes	No	No	0.25	40	Yes	No	No
Fluoride	mg/L	2 ^(f)	1.5	2	0.025	0.016	No	No	No	0.010	0.013	Yes	No	No
Magnesium	mg/L	-	-	-	0.67	1.7	Yes	NG	No ^(f)	0.58	1.3	Yes	NG	No ^(f)
Potassium	mg/L	-	-	-	0.62	0.90	Yes	NG	No ^(f)	0.53	0.74	Yes	NG	No ^(f)
Sodium	mg/L	-	200	200	0.66	12	Yes	No	No	0.56	10	Yes	No	No
Sulphate	mg/L	1,000	500	1,000	1.5	2.5	Yes	No	No	1.2	2.0	Yes	No	No
Nutrients														
Total nitrogen (calculated)	mg-N/L	100	-	100	-	1.0	No	No	No	-	0.89	No	No	No
Total ammonia	mg-N/L	-	-	-	0.024	0.18	Yes	NG	No ^(g)	0.0070	0.13	Yes	NG	No ^(g)
Nitrate	mg-N/L	-	10	100	0.020	0.66	Yes	No	No	0.0025	0.60	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-	-	-	0.0052	0.012	Yes	NG	No ^(f)	0.0064	0.009	Yes	NG	No ^(f)
Dissolved orthophosphate	mg-P/L	-	-	-	0.0022	0.0065	Yes	NG	No ^(f)	0.00050	0.0032	Yes	NG	No ^(f)
Phytoplankton (as Chlorophyll a)	µg/L	-	-	-	-	12	No	NG	No	-	15	No	NG	No
Silica, reactive	mg/L	-	-	-	-	0.27	No	NG	No	-	0.22	No	NG	No
Total Metals														
Aluminum	µg/L	5,000	4,000	5,000	4.4	63	Yes	No	No	8.8	62	Yes	No	No
Arsenic	µg/L	25 ^(j)	10	25	0.35	0.42	Yes	No	No	0.30	0.35	Yes	No	No
Barium	µg/L	-	1,000	1,000	1.3	4.5	Yes	No	No	1.2	3.8	Yes	No	No
Beryllium	µg/L	100 ^b	12	100	0.10	0.10	No	No	No	0.10	0.10	No	No	No
Bismuth	µg/L	-	-	-	0.0050	0.012	Yes	NG	No ^(h)	0.0050	0.010	Yes	NG	No ^(h)
Cadmium	µg/L	80	5	80	0.025	0.033	Yes	No	No	0.025	0.031	Yes	No	No
Chromium	µg/L	50 ^(j)	50	50	0.17	0.26	Yes	No	No	0.10	0.19	Yes	No	No
Cobalt	µg/L	1,000	1.2	1,000	0.050	0.25	Yes	No	No	0.050	0.21	Yes	No	No
Copper	µg/L	500 ^(k)	2,000	500	0.68	0.84	Yes	No	No	0.60	0.73	Yes	No	No
Iron	µg/L	-	2,800	2,800	5.0	38	Yes	No	No	16	44	Yes	No	No
Lead	µg/L	100	10	100	0.025	0.054	Yes	No	No	0.058	0.081	Yes	No	No
Manganese	µg/L	-	86	86	1.7	9.6	Yes	No	No	4.7	11	Yes	No	No
Mercury	µg/L	3	1	3	0.0010	0.0060	Yes	No	No	0.0010	0.0054	Yes	No	No
Molybdenum	µg/L	500	20	500	0.025	0.64	Yes	No	No	0.025	0.44	Yes	No	No
Nickel	µg/L	1,000	70	1,000	0.30	0.69	Yes	No	No	0.32	0.62	Yes	No	No
Selenium	µg/L	50	50	50	0.050	0.064	Yes	No	No	0.050	0.061	Yes	No	No
Silver	µg/L	-	18.8	18.8	0.050	0.052	No	No	No	0.050	0.051	No	No	No

Table C3.1-1 Water Screening for Ecological Health – Lac du Sauvage

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice (2006, 2010, 2011, and 2012)					Open Water (2004, 2006, and 2010 to 2013)				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-	2,400	2,400	7.2	534	Yes	No	No	5.3	345	Yes	No	No
Uranium	µg/L	200	20	200	0.022	0.63	Yes	No	No	0.022	0.50	Yes	No	No
Vanadium	µg/L	100	17.2	100	0.025	0.080	Yes	No	No	0.025	0.074	Yes	No	No
Zinc	µg/L	50,000	1,200	50,000	0.50	0.95	Yes	No	No	0.50	0.86	Yes	No	No

Notes:

Italicized values - Indicates concentration presented is half the detection limit.

"Yes"- Indicates parameter is a constituent of potential concern (COPC) because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.

a) Guidelines are from Canadian Council of Ministers of the Environment (CCME). 1999. Water Quality Guidelines for the Protection of Agriculture, Livestock.

b) Value selected for water quality screening in the human health risk assessment.

c) If no ecological screening value was available, then the value selected for water quality screening in the human health risk assessment was used.

d) Measured baseline median at all stations.

e) Predicted maximum of depth-averaged water quality in Lac du Sauvage.

f) Not retained as a COPC because parameter is considered an essential mineral.

g) Not retained as a COPC because ammonia is a major component of the metabolism of mammals.

h) Not retained as a COPC because bismuth and most of its compounds are generally less toxic compared to other heavy metals (lead, antimony, etc.) and it is not bioaccumulative.

i) Guideline of 2 mg/L, or 1 mg/L where animal feed contains fluoride.

j) Interim guideline.

k) 500 µg/L for sheep, 1,000 µg/L for cattle, 5,000 µg/L for swine and poultry.

l) Standard is for chromium III and VI.

"-" = no value or not measured, > = greater than, < = less than detection limit, µg/L = micrograms per litre, COPC = constituent of potential concern, mg/L = milligrams per litre, mg-N/L = milligrams nitrogen per litre, mg-P/L = milligrams phosphorus per litre, NG = no guideline.

Table C3.1-2 Water Screening for Ecological Health – Lac de Gras East

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice					Open Water				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions														
Calcium	mg/L	1,000	-	1,000	1.5	2.8	Yes	No	No	1.3	3.0	Yes	No	No
Chloride	mg/L	-	250	600	2.0	6.2	Yes	No	No	1.7	6.9	Yes	No	No
Fluoride	mg/L	2 ^(h)	1.5	2	0.025	0.014	No	No	No	0.025	0.014	No	No	No
Magnesium	mg/L	-	-	-	0.85	1.1	Yes	NG	No ^(f)	0.82	1.1	Yes	NG	No ^(f)
Potassium	mg/L	-	-	-	0.88	1.2	Yes	NG	No ^(f)	0.72	1.1	Yes	NG	No ^(f)
Sodium	mg/L	-	200	200	1.5	2.4	Yes	No	No	1.3	2.5	Yes	No	No
Sulphate	mg/L	1,000	500	1,000	2.7	4.5	Yes	No	No	2.1	4.2	Yes	No	No
Nutrients														
Total nitrogen (calculated)	mg-N/L	100	-	100	0.24	0.32	Yes	No	No	0.19	0.32	Yes	No	No
Total ammonia	mg-N/L	-	-	-	0.026	0.034	Yes	NG	No ^(g)	0.0025	0.030	Yes	NG	No ^(g)
Nitrate	mg-N/L	-	10	100	0.057	0.08	Yes	No	No	0.021	0.082	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-	-	-	0.0032	0.0036	Yes	NG	No ^(f)	0.0029	0.0035	Yes	NG	No ^(f)
Dissolved orthophosphate	mg-P/L	-	-	-	-	0.0022	No	NG	No	-	0.0021	No	NG	No
Phytoplankton (as Chlorophyll a)	µg/L	-	-	-	-	2.0	No	NG	No	-	2.2	No	NG	No
Silica, reactive	mg/L	-	-	-	-	0.14	No	NG	No	-	0.13	No	NG	No
Total Metals														
Aluminum	µg/L	5,000	4,000	5,000	4.1	29	Yes	No	No	5.4	28	Yes	No	No
Arsenic	µg/L	25 ⁽ⁱ⁾	10	25	0.23	0.41	Yes	No	No	0.23	0.39	Yes	No	No
Barium	µg/L	-	1,000	1,000	4.0	7.9	Yes	No	No	3.1	6.7	Yes	No	No
Beryllium	µg/L	100 ⁽ⁱ⁾	12	100	0.10	0.12	Yes	No	No	0.10	0.12	Yes	No	No
Bismuth	µg/L	-	-	-	-	0.013	No	NG	No	-	0.012	No	NG	No
Cadmium	µg/L	80	5	80	0.025	0.036	Yes	No	No	0.025	0.035	Yes	No	No
Chromium	µg/L	50 ⁽ⁱ⁾	50	50	0.030	0.11	Yes	No	No	0.030	0.11	Yes	No	No
Cobalt	µg/L	1,000	1.2	1,000	0.050	0.088	Yes	No	No	0.050	0.086	Yes	No	No
Copper	µg/L	500 ^(j)	2,000	500	0.30	0.42	Yes	No	No	0.30	0.40	Yes	No	No
Iron	µg/L	-	2,800	2,800	2.5	37	Yes	No	No	5.4	38	Yes	No	No
Lead	µg/L	100	10	100	0.025	0.038	Yes	No	No	0.025	0.037	Yes	No	No
Manganese	µg/L	-	86	86	1.1	3.8	Yes	No	No	3.3	5.7	Yes	No	No
Mercury	µg/L	3	1	3	0.010	0.012	Yes	No	No	0.010	0.012	Yes	No	No
Molybdenum	µg/L	500	20	500	0.293	3.4	Yes	No	No	0.301	3.0	Yes	No	No
Nickel	µg/L	1,000	70	1,000	0.8	1.2	Yes	No	No	0.7	1.1	Yes	No	No
Selenium	µg/L	50	50	50	0.050	0.15	Yes	No	No	0.050	0.14	Yes	No	No
Silver	µg/L	-	18.8	18.8	0.050	0.061	Yes	No	No	0.050	0.061	Yes	No	No

Table C3.1-2 Water Screening for Ecological Health – Lac de Gras East

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice					Open Water				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-	2,400	2,400	15.0	105	Yes	No	No	12.5	82	Yes	No	No
Uranium	µg/L	200	20	200	0.089	0.45	Yes	No	No	0.089	0.43	Yes	No	No
Vanadium	µg/L	100	17.2	100	<i>0.025</i>	0.62	Yes	No	No	<i>0.025</i>	0.58	Yes	No	No
Zinc	µg/L	50,000	1,200	50,000	<i>0.4</i>	0.63	Yes	No	No	<i>0.40</i>	0.60	Yes	No	No

Notes:

Italicized values - Indicates concentration presented is half the detection limit.

"Yes"- Indicates parameter is a COPC because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.

a) Guidelines are from Canadian Council of Ministers of the Environment (CCME). 1999. Water Quality Guidelines for the Protection of Agriculture, Livestock.

b) Value selected for water quality screening in the human health risk assessment.

c) If no ecological screening value was available, then the value selected for water quality screening in the human health risk assessment was used.

d) Measured baseline median at Lac de Gras East.

e) Predicted maximum of depth-averaged water quality at P1 in Lac de Gras.

f) Not retained as a COPC because parameter is considered an essential mineral.

g) Not retained as a COPC because ammonia is a major component of the metabolism of mammals.

h) Guideline of 2 mg/L, or 1 mg/L where animal feed contains fluoride.

i) Interim guideline.

j) 500 µg/L for sheep, 1,000 µg/L for cattle, 5,000 µg/L for swine and poultry.

k) Standard is for chromium III and VI.

"-" = no value or not measured, > = greater than, < = less than detection limit, µg/L = microgram per litre, COPC = constituent of potential concern, mg/L = milligrams per litre, mg-N/L = milligrams nitrogen per litre, mg-P/L = milligrams phosphorus per litre, NG = no guideline.

Table C3.1-3 Water Screening for Ecological Health – Lac de Gras West

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice					Open Water				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Major Ions														
Calcium	mg/L	1,000	-	1,000	1.1	2.5	Yes	No	No	1.1	2.4	Yes	No	No
Chloride	mg/L	-	250	600	0.78	5.2	Yes	No	No	0.67	5.0	Yes	No	No
Fluoride	mg/L	2 ^(h)	1.5	2	0.025	0.015	No	No	No	0.025	0.014	No	No	No
Magnesium	mg/L	-	-	-	0.71	1.3	Yes	NG	No ^(f)	0.68	1.1	Yes	NG	No ^(f)
Potassium	mg/L	-	-	-	0.59	1.3	Yes	NG	No ^(f)	0.59	1.1	Yes	NG	No ^(f)
Sodium	mg/L	-	200	200	0.50	2.6	Yes	No	No	0.50	2.2	Yes	No	No
Sulphate	mg/L	1,000	500	1,000	2.2	4.8	Yes	No	No	1.9	4.1	Yes	No	No
Nutrients														
Total nitrogen (calculated)	mg-N/L	100	-	100	0.15	0.31	Yes	No	No	0.14	0.29	Yes	No	No
Total ammonia	mg-N/L	-	-	-	0.017	0.04	Yes	NG	No ^(g)	0.0025	0.029	Yes	NG	No ^(g)
Nitrate	mg-N/L	-	10	100	0.0074	0.062	Yes	No	No	0.0030	0.059	Yes	No	No
Total phosphorus (calculated)	mg-P/L	-	-	-	0.0024	0.0037	Yes	NG	No ^(f)	0.0028	0.0033	Yes	NG	No ^(f)
Dissolved orthophosphate	mg-P/L	-	-	-	-	0.0023	No	NG	No	-	0.0019	No	NG	No
Phytoplankton (as Chlorophyll a)	µg/L	-	-	-	-	2.5	No	NG	No	-	3.4	No	NG	No
Silica, reactive	mg/L	-	-	-	-	0.16	No	NG	No	-	0.14	No	NG	No
Total Metals														
Aluminum	µg/L	5,000	4,000	5,000	3.4	28	Yes	No	No	4.2	25	Yes	No	No
Arsenic	µg/L	25 ⁽ⁱ⁾	10	25	0.18	0.36	Yes	No	No	0.17	0.32	Yes	No	No
Barium	µg/L	-	1,000	1,000	2.0	6.1	Yes	No	No	1.9	5.2	Yes	No	No
Beryllium	µg/L	100 ⁽ⁱ⁾	12	100	0.10	0.12	Yes	No	No	0.10	0.12	Yes	No	No
Bismuth	µg/L	-	-	-	-	0.012	No	NG	No	-	0.011	No	NG	No
Cadmium	µg/L	80	5	80	0.025	0.037	Yes	No	No	0.025	0.034	Yes	No	No
Chromium	µg/L	50 ⁽ⁱ⁾	50	50	0.030	0.12	Yes	No	No	0.030	0.10	Yes	No	No
Cobalt	µg/L	1,000	1.2	1,000	0.050	0.083	Yes	No	No	0.050	0.078	Yes	No	No
Copper	µg/L	500 ⁽ⁱ⁾	2,000	500	0.30	0.44	Yes	No	No	0.30	0.40	Yes	No	No
Iron	µg/L	-	2,800	2,800	2.5	36	Yes	No	No	5.35	35	Yes	No	No
Lead	µg/L	100	10	100	0.025	0.038	Yes	No	No	0.025	0.036	Yes	No	No
Manganese	µg/L	-	86	86	1.4	4.2	Yes	No	No	3.5	5.7	Yes	No	No
Mercury	µg/L	3	1	3	0.010	0.012	Yes	No	No	0.010	0.012	Yes	No	No
Molybdenum	µg/L	500	20	500	0.08	3.8	Yes	No	No	0.092	2.8	Yes	No	No
Nickel	µg/L	1,000	70	1,000	1.02	1.4	Yes	No	No	1.03	1.3	Yes	No	No
Selenium	µg/L	50	50	50	0.050	0.15	Yes	No	No	0.050	0.13	Yes	No	No
Silver	µg/L	-	18.8	18.8	0.050	0.061	Yes	No	No	0.050	0.060	Yes	No	No

Table C3.1-3 Water Screening for Ecological Health – Lac de Gras West

Parameter	Unit	CCME Water Quality Guideline for Protection of Agriculture (Livestock) ^(a)	Selected Human Health Screening Value ^(b)	Chosen Screening Value ^(c)	Under Ice					Open Water				
					Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?	Baseline Concentration ^(d)	Maximum Application Case Concentration ^(e)	>10% Increase?	Application Case Exceeds Guideline?	COPC?
Strontium	µg/L	-	2,400	2,400	8	93	Yes	No	No	8	62	Yes	No	No
Uranium	µg/L	200	20	200	0.025	0.36	Yes	No	No	0.025	0.33	Yes	No	No
Vanadium	µg/L	100	17.2	100	0.025	0.62	Yes	No	No	0.025	0.53	Yes	No	No
Zinc	µg/L	50,000	1,200	50,000	1.25	1.4	Yes	No	No	0.61	0.78	Yes	No	No

Notes:

Italicized values - Indicates concentration presented is half the detection limit.
"Yes"- Indicates parameter is a COPC because the maximum predicted Application Case concentration exceeds both the selected guideline and increases more than 10% compared to the baseline concentration.
a) Guidelines are from Canadian Council of Ministers of the Environment (CCME). 1999. Water Quality Guidelines for the Protection of Agriculture, Livestock.
b) Value selected for water quality screening in the human health risk assessment.
c) If no ecological screening value was available, then the value selected for water quality screening in the human health risk assessment was used.
d) Measured baseline median at Lac de Gras West.
e) Predicted maximum of depth-averaged water quality at P2, P3, P4, P5, and P6 in Lac de Gras.
f) Not retained as a COPC because parameter is considered an essential mineral.
g) Not retained as a COPC because ammonia is a major component of the metabolism of mammals.
h) Guideline of 2 mg/L, or 1 mg/L where animal feed contains fluoride.
i) Interim guideline.
j) 500 µg/L for sheep, 1,000 µg/L for cattle, 5,000 µg/L for swine and poultry.
k) Standard is for chromium III and VI.
"- " = no value or not measured, > = greater than, < = less than detection limit, µg/L = micrograms per litre, COPC = constituent of potential concern, mg/L = milligrams per litre, mg-N/L = milligrams nitrogen per litre, mg-P/L = milligrams phosphorus per litre, NG = no guideline.



C3.1.2 Soil

Predicted soil quality concentrations were screened against the soil quality guidelines listed below for selection of COPCs (Table C3.1-4).

The guidelines applied for the soil screening process included:

- CCME Canadian soil quality guidelines for protection of environmental health (CCME 1999). Where available, pathway-specific guidelines were used (i.e., soil contact, soil, and food ingestion).
- In the absence of CCME guidelines, USEPA Ecological Soil Screening Levels (Eco-SSL) (USEPA 2010) protective of ecological receptors were used.
- In the absence of a CCME guideline or Eco-SSL, the selected human health soil screening value was applied.

C3.1.3 Fish

No wildlife-based guidelines were available for screening fish tissue. Therefore, the predicted fish tissue concentrations were screened using the USEPA RSLs for fish ingestion (USEPA 2014), using the same methodology as for the human health screening (Section C2.1.3). The baseline and predicted fish tissue screening are provided in Tables C2.1-5 to C2.1-7.

C3.2 Elimination of Non-Toxic Constituents

Some metals and essential minerals are commonly analyzed in environmental samples (as part of the standard suite of metals treated by the analytical method) but generally have low toxicity at concentrations that typically occur in the environment, even at industrial sites such as a mine. Many of these substances are present in parent rock and soil materials and are present in a toxicologically inert form, and some are essential micro- and macro-nutrients.

Although essential minerals (i.e., calcium, magnesium, phosphorus [including orthophosphate], potassium, and sodium) may be present in media in the effects study area, they were excluded from further consideration in the COPC screening process based on their expected low toxicological hazard. These essential minerals serve a variety of biochemical, intracellular, and ion balance purposes in animal tissues, and are naturally abundant. Regulatory (compensatory) mechanisms within birds and mammals prevent toxic responses from dietary exposure to these minerals, except in extreme cases that are not representative of possible environmental exposure (Puls 1994).

Bismuth and ammonia were predicted to increase more than 10% in Lac du Sauvage, Lac de Gras East, and Lac de Gras West, but there are screening guidelines for these constituents. Inorganic bismuth salts have a long history of use in the pharmaceutical industry as a treatment for diarrhea and other gastrointestinal ailments. Because bismuth is poorly absorbed by the gastrointestinal tract and has been used historically as a pharmaceutical agent, adverse health effects are not likely at concentrations typically found in the environment. Therefore, bismuth was not retained as a COPC.

Table C3.1-4 Soil Screening of Predicted Base Case and Application Case Concentrations for Wildlife Health

Parameter	CCME Agricultural Guidelines ^(a)	Notes	USEPA Eco-SSL ^(b)		Selected Human Health Screening Value ^(c)	Selected Ecological Health Screening Value ^(d)	Maximum Predicted Base Case Soil Concentration (mg/kg dry weight)	Maximum Case Predicted Soil Concentration (mg/kg dry weight)	Location of Maximum Soil Concentration	Is Predicted Soil Concentration >Base Case + 10%?	Is Predicted Soil Concentration >Selected Ecological Health Screening Value?	Is Parameter a COPC?
			Avian	Mammals								
Aluminum	-		-	-	15,400	15,400	22,055	22,833	MPOI	No	Yes	No
Antimony	20	G			20	20	0.12	0.14	MPOI	Yes	No	No
Arsenic	17	SC			12	17	13.8878	13.9781	MPOI	No	No	No
Barium	750	G			6,800	750	180	187	MPOI	No	No	No
Beryllium	4	G			4	4	0.9	0.9	MPOI	No	No	No
Cadmium	3.8	SFI			14	3.8	1.0	1.0	Jay Fenceline	No	No	No
Chromium	64	SC			220	64	84	86	MPOI	No	Yes	No
Cobalt	40	G			50	40	15	15	MPOI	No	No	No
Copper	63	SC			1,100	63	119	119	MPOI	No	Yes	No
Iron	-		-	-	11,000	11,000	30,779	30,963	MPOI	No	Yes	No
Lead	70	SFI			140	70	9	9	MPOI	No	No	No
Manganese	-		4,300	4,000	360	4,000	349	352	MPOI	No	No	No
Mercury	12	SC			6.6	12	0.27	0.3	MPOI	Yes	No	No
Molybdenum	5	G			10	5	1.3	1.3	MPOI	No	No	No
Nickel	50	SC			50	50	48	49	MPOI	No	No	No
Selenium	1	SC			80	1	0.58	0.59	MPOI	No	No	No
Silver	20	G			20	20	0.27	0.28	Jay Fenceline	No	No	No
Strontium	-		-	-	9,400	9,400	38	42	MPOI	Yes	No	No
Tellurium	-						-	-	-	-	NG	No
Thallium	1	SFI			1	1	0.47	0.49	MPOI	No	No	No
Titanium	-		-	-	28,000	28,000	1,576	1,593	MPOI	No	No	No
Tungsten	-						-	-	-	-	NG	No
Uranium	33	SFI			23	33	11	12	MPOI	No	No	No
Vanadium	130	SC			130	130	66	67	MPOI	No	No	No
Zinc (Zn)	200	SC			200	200	81	82	MPOI	No	No	No
1-methylnaphthalene (surrogate: 2-methylnaphthalene)	LMW PAHs				46	LMW PAHs	0.012	0.03	MPOI	Yes	No	No
1-Methylphenanthrene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.011	MPOI	No	No	No
2-Methylanthracene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.010	MPOI	No	No	No
2-Methylfluorene (surrogate: fluorene)	15.4	SFI			460	15.4	0.010	0.010	MPOI	No	No	No
2-methylnaphthalene	LMW PAHs				46	LMW PAHs	0.034	0.06	MPOI	Yes	No	No
2-Methylphenanthrene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.012	MPOI	Yes	No	No
2-Methylpyrene (surrogate: pyrene)	7.7	SFI			340	7.7	0.010	0.010	MPOI	No	No	No
3-Methyldibenzothiophene (surrogate: dibenzothiophene)	-				156	156	0.010	0.010	MPOI	No	No	No
3-Methylphenanthrene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.011	MPOI	Yes	No	No
4+9-Methylphenanthrene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.011	MPOI	No	No	No
4-Methyldibenzothiophene (surrogate: dibenzothiophene)	-				156	156	0.010	0.010	MPOI	No	No	No
9-Methylphenanthrene (surrogate: anthracene)	2.5	SC			3,400	2.5	0.010	0.010	MPOI	No	No	No
Acenaphthene	21.5	SFI			700	21.5	0.021	0.021	MPOI	No	No	No
Acenaphthylene	LMW PAHs		-	-	700 ^(g)	LMW PAHs	0.041	0.043	MPOI	No	No	No
Acephenanthrylene (surrogate: benzo(b)fluoranthene)	6.2	SFI			B(a)P TPE	6.2	0.010	0.011	MPOI	No	No	No
Anthracene	2.5	SC			3,400	2.5	0.020	0.021	MPOI	No	No	No
Benz(a)anthracene	6.2	SFI			B(a)P TPE	6.2	0.09	0.09	MPOI	No	No	No
Benzo(a)fluorene (surrogate: chrysene)	6.2	SFI			B(a)P TPE	6.2	0.010	0.010	MPOI	No	No	No
Benzo(a)pyrene	0.6	SFI			B(a)P TPE	0.6	0.80	0.80	Diavik_Camp	No	Yes	No

Table C3.1-4 Soil Screening of Predicted Base Case and Application Case Concentrations for Wildlife Health

Parameter	CCME Agricultural Guidelines ^(a)	Notes	USEPA Eco-SSL ^(b)		Selected Human Health Screening Value ^(c)	Selected Ecological Health Screening Value ^(d)	Maximum Predicted Base Case Soil Concentration (mg/kg dry weight)	Maximum Case Predicted Soil Concentration (mg/kg dry weight)	Location of Maximum Soil Concentration	Is Predicted Soil Concentration >Base Case + 10%?	Is Predicted Soil Concentration >Selected Ecological Health Screening Value?	Is Parameter a COPC?
			Avian	Mammals								
Benzo(b)fluoranthene	6.2	SFI			B(a)P TPE	6.2	0.30	0.30	MPOI	No	No	No
Benzo(e)pyrene (surrogate: benzo(a)pyrene)	0.6	SFI			B(a)P TPE	0.6	0.010	0.010	Misery_Camp	No	No	No
Benzo(g,h,i)fluoranthene (surrogate: benzo(g,h,i)perylene)	HMW PAHs		-	-	B(a)P TPE	HMW PAHs	0.010	0.010	MPOI	No	Yes	No
Benzo(g,h,i)perylene	HMW PAHs		-	-	B(a)P TPE	HMW PAHs	0.40	0.40	MPOI	No	Yes	No
Benzo(k)fluoranthene	6.2	SFI			B(a)P TPE	6.2	2.0	2.0	MPOI	No	No	No
Biphenyl (surrogate: naphthalene)	8.8	SFI			38	8.8	0.010	0.010	Diavik_Camp	No	No	No
Chrysene	6.2	SFI			B(a)P TPE	6.2	0.20	0.20	Diavik_Camp	No	No	No
Coronene (surrogate: benzo(g,h,i)perylene)	HMW PAHs		-	-	B(a)P TPE	HMW PAHs	0.010	0.010	MPOI	No	Yes	No
Cyclopenta(c,d)pyrene (surrogate: benzo(a)pyrene)	0.6	SFI			B(a)P TPE	0.6	0.010	0.010	MPOI	No	No	No
Dibenzo(a,h)anthracene	0.1	I			B(a)P TPE	0.1	0.020	0.020	Misery_Camp	No	No	No
Dibenzothiophene	-				156	156	0.010	0.010	MPOI	No	No	No
Fluoranthene	15.4	SFI			460	15.4	0.030	0.030	MPOI	No	No	No
Fluorene	15.4	SFI			460	15.4	0.40	0.40	MPOI	No	No	No
Indeno(1,2,3-cd)fluoranthene (surrogate: indeno(1,2,3-cd)pyrene)	0.1	I			B(a)P TPE	0.1	0.010	0.010	MPOI	No	No	No
Indeno(1,2,3-cd)pyrene	0.1	I			B(a)P TPE	0.1	0.20	0.20	MPOI	No	Yes	No
Indeno(1,2,3-W)pyrene (surrogate: indeno(1,2,3-cd)pyrene)	0.1	I			B(a)P TPE	0.1	0.010	0.010	Diavik_Camp	No	No	No
Naphthalene	8.8	SFI			38	8.8	0.021	0.022	MPOI	No	No	No
Nitro-pyrene (surrogate: nitro-benzene)	-				26	26	0.011	0.012	MPOI	Yes	No	No
Perylene (surrogate: pyrene)	7.7	SFI			340	7.7	0.012	0.014	MPOI	Yes	No	No
Phenanthrene	43	SFI			3,400 ^(h)	43	0.022	0.025	MPOI	Yes	No	No
Picene (surrogate: dibenzo(a,h)anthracene)	0.1	I			B(a)P TPE	0.1	0.011	0.011	MPOI	No	No	No
Pyrene	7.7	SFI			340	7.7	0.040	0.040	Diavik_Camp	No	No	No
LMW PAHs ^(e)	-		-	100	-	100	0.681	0.733	MPOI	No	No	No
HMW PAHs ^(g)	-		-	1.1	-	1.1	4.204	4.211	MPOI	No	Yes	No

Notes:
All units are in mg/kg dry weight.
Red font - Indicates that the parameter was not actually measured so the max was assumed to be the full standard detection limit of PAHs (i.e. 0.01 mg/kg).
Bold values - Indicates concentration exceeds selected ecological health screening value.
a) CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Environmental Quality Guidelines; includes updates to 2014. Soil quality guidelines are based on an HQ = 0.2.
b) USEPA (United States Environmental Protection Agency). 2010. Eco-SSL (Ecological Soil Screening Levels).
c) Value selected for water quality screening in the human health risk assessment.
d) CCME guideline was used as screening value. If no CCME guideline was available, USEPA SSL value was used. If no ecological screening value was available, then the value selected for soil quality screening in the human health risk assessment was used.
e) Low molecular weight PAHs were summed and screened against the USEPA ecological soil screening level (ECO SSL) for soil invertebrates. Low Molecular Weight PAHs include those with less than four rings i.e., 1-methylnaphthalene, 1-methylphenanthrene, 2-methylantracene, 2-methylfluorene, 2-methylnaphthalene, 2-methylphenanthrenen, 3-methyldibenzothiophene, 3-methylphenanthrene, 4- and 9-methylphenanthrene,acenaphthene, acenaphthylene, anthracene, biphenyl, dibenzothiophene, fluorene, naphthalene and phenanthrene. For non-detect PAHs, the full detection limit was used in the sum.
f) High molecular weight PAHs were summed and screened against the USEPA ecological soil screening level (ECO SSL) for soil invertebrates. High Molecular Weight PAHs include those with four or more rings i.e., 2-methylpyrene, acephenanthrylene, benzo(a)anthracene, benzo(a)fluorene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(e)pyrene, benzo(g,h,i)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, coronene, cyclopenta(c,d)pyrene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)fluoranthene, indeno(1,2,3-cd)pyrene, indeno(1,2,3-W)pyrene, nitro-pyrene, perylene, picene and pyrene. For non-detect PAHs, the full detection limit was used in the sum.
g) Guideline values refers to acenaphthene as a human health surrogate.
h) Guideline values refers to anthracene as a human health surrogate.
MPOI = maximum point of impingement; LMW PAHs = low molecular weight polycyclic aromatic hydrocarbons; HMW PAHs = high molecular weight polycyclic aromatic hydrocarbons; < = below laboratory detection limit; % = percent; Cr3 = trivalent chromium Cr6 = hexavalent chromium; G = Generic; I - Interim; SC = Soil contact; SFI = Soil and food ingestion.



Ammonia is a major component of the metabolism of animals and based on information for humans (Health Canada 2014), it would be readily eliminated by healthy individuals. Ammonia is produced in the body and is readily metabolized by healthy individuals (Health Canada 2014). At 1.5 mg/L, ammonia may pose odour issues and at 35 mg/L, ammonia in water may have a distinct taste. However, ammonia is not of concern to human health at these concentrations (WHO 2011). Although information directly pertaining to wildlife is lacking, it is reasonable to conclude that ammonia concentrations in water that are well below these levels would also pose no risk to wildlife. The predicted Application Case concentrations of ammonia are well below these levels (maximum predicted concentration = 0.18 mg/L); therefore, ammonia was not retained as a COPC.

C3.3 Summary of Constituent of Potential Concern Screening for the Wildlife Health Multimedia Risk Assessment

The results of the COPC screening for the wildlife health multimedia assessment are summarized in Tables C3.1-1 to C3.1-4 and Tables C2.1-5 to C2.1-7.

Based on the screening process outlined in Section 4.5.1.2 of the main report the following COPCs for the multimedia assessment were identified for fish tissue only:

- arsenic;
- chromium;
- mercury; and,
- selenium.

Constituents of potential concern (COPCs) were identified for aquatic habitats only. The screening process for wildlife health did not identify COPCs for the environmental media (soils and surface water) that would come in contact with wildlife receptors feeding only in terrestrial environments. This finding was considered in the Final Receptor Screening (refer to Section 4.3.1.3 of the main report).



C4 REFERENCES

- CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Environmental quality guidelines. Available at: <http://st-ts.ccme.ca/>. Accessed: November 2014.
- Golder (Golder Associates Ltd.). 2015. Jay Project - Lac De Gras Hydrodynamic Model Updates. Technical Memorandum from Michael Herrell, Jerry Vandenberg, and John Faithful to Rick Bargery, Dominion Diamond Ekati Corporation. January 19, 2015.
- Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part V: Guidance on Human Health Detailed Quantitative Risk Assessment for Chemicals (DQRACChem). Contaminated Sites Division, Safe Environments Directorate, Ottawa, ON, Canada.
- Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch. Ottawa, ON, Canada.
- Puls R. 1994. Mineral Levels in Animal Health, Second Ed. Diagnostic data. Sherpa International, Clearbrook, BC, Canada.
- USEPA (United States Environmental Protection Agency). 2010. Ecological Soil Screening Levels. Available at: <http://www.epa.gov/ecotox/ecossl/>. Accessed: November 2014.
- USEPA. 2014. Regional Screening Levels for Chemical Contaminants. Available at: <http://www.epa.gov/region9/superfund/prg/>. Accessed: November 2014.
- WHO (World Health Organization). 2011. Guidelines for Drinking Water Quality, Fourth Ed. WHO Press, Geneva, Switzerland.



APPENDIX D

EXPOSURE PARAMETERS

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Attachments

Attachment D1 Metal Deposition Data



Abbreviations

Abbreviation	Definition
BAF	Bioaccumulation Factor
BCA	bias-corrected and accelerated
COPC	contaminants of potentials concern
DAR	Director's Assessment Report
e.g.	for example
EDI	estimated daily intake
ESA	effect study area
i.e.	that is
TRV	toxicological reference value
UCLM	upper confidence limit of the mean
US EPA	United States Environmental Protection Agency

Units of Measure

Unit	Definition
%	percent
cm/hour	centimetres per hour
cm ²	square centimetres
g/day	grams per day
kg	kilogram
kg/cm ² -event	kilograms per square centimetre per event
kg/d	kilograms per day
kg/m ³	kilograms per cubic metre
L/cm ³	litres per cubic centimetre
L/d	litres per day
mg/kg	milligrams per kilogram
mg/L	milligrams per litre

D1 INTRODUCTION

Exposure assessment is the process of estimating the exposure of a receptor to a substance under a given exposure scenario. The exposure assessment involves estimating the exposure dose of the constituents of potential concern (COPCs) received by the human or wildlife receptors for each operable pathway identified in the problem formulation. Exposure dose is typically expressed as an amount of chemical (in milligrams) per kilogram of body weight per day (mg/kg BW/day). Concentrations in relevant environmental media (e.g., soil, diet), as well as receptor characteristics (e.g., body weight, ingestion rate) are required to estimate exposure doses.

This appendix provides a description of the exposure assumptions, concentrations in environmental media, receptor parameters, and equations used in the multimedia risk assessment in support of the human and wildlife health risk assessment being completed as part of the overall Developer's Assessment Report for the Dominion Diamond Jay Project (the Project).

D2 CONCENTRATIONS IN ENVIRONMENTAL MEDIA

Exposure concentrations in relevant environmental media were estimated for each COPC identified in the problem formulation. Arsenic, chromium, mercury, and selenium were identified as COPCs for both the human and wildlife health multimedia risk assessments. Additional detail regarding the COPC screening process is presented in Appendix C. Both the inorganic and organic forms of mercury were considered in the exposure assessment where possible (see Section D2.2.1), given that these two chemical forms behave differently in terms of bioaccumulation and toxicity.

D2.1 Measured Baseline Concentrations

Measured COPC concentrations are available for soil, sediment, vegetation, and surface water and are provided below. The following hierarchy was used to select the baseline concentrations in the risk assessment:

- If there were five or more samples with detected concentrations, a 95 percent (%) upper confidence limit of the mean (UCLM) concentration was calculated using the ProUCL software (US EPA 2013 version 5.0). For datasets with no non-detected values, the 95% bias-corrected and accelerated (BCA) bootstrap method was selected to compute the upper confidence limits. For datasets with non-detected values, the 95% Kaplan-Meier BCA bootstrap method was selected when there were less than 40% non-detected values, and the 95% Kaplan Meier percentile bootstrap method was selected when there were greater than 40% non-detected values.
- If there were ten or more samples and four or more of these samples had detected concentrations, a 90th percentile concentration was calculated.
- If the above criteria were not met, the maximum was selected.

In estimating the 90th percentile and maximum, if the concentration was below the detection limit, then the full detection limit value was assumed to be the baseline concentration.

D2.1.1 Soil

Summary statistics are provided in Table D-1 for COPC concentrations in soil that were used as the starting point for deposition modelling to predict Base Case and Application Case soil concentrations for the Project.

Measured metals concentrations in soil are presented in Appendix A.

Table D-1 Summary of Baseline Soil Concentration Statistics for COPCs

COPC	Soil Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	5.9	100	95% UCLM
Chromium	35	100	95% UCLM
Mercury	0.092	76	95% UCLM
Selenium	0.30	16	90 th percentile

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

D2.1.2 Sediment

The 95% UCLM sediment concentration for the effect study area (ESA) was calculated and used in the Base Case and Application Case. If the concentration was below the detection limit, then the full detection limit value was assumed to be the concentration. The 95% UCLM values for the COPCs are provided in Table D-2. Because there was no predicted change in sediment metals concentrations as a result of the Project, the same concentration was used for the Base Case and Application Case. Measured metal concentrations in sediment are presented in the DAR, Section 8.2.5.3.

Table D-2 Summary of COPC Sediment Concentrations

COPC	Sediment Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	46	100	95% UCLM
Chromium	61	100	95% UCLM
Mercury	0.021	95	95% UCLM
Selenium	0.22	35	95% UCLM

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

D2.1.3 Plant Tissues

Plant tissues collected in the ESA included berries, willow leaves, dwarf birch leaves, Labrador tea, lichen, and grass. Of the vegetation collected, berries, Labrador tea, and lichen concentrations were included in the human health multimedia risk assessment as food items consumed by people. Berries, willow, birch, lichen, and grass were included in the wildlife health risk assessment as food items for the

wildlife receptors. As vegetation was collected from within the ESA with no particular bias towards a specific area, the 95% UCLM concentration provides a conservative estimate of the average chemical concentrations in plant tissue in the ESA. Willow and birch leaves were grouped together in the calculation of 95% UCLMs. Measured vegetation tissue concentrations are presented in Appendix A.

The measured COPC concentrations in plant tissues were used as the starting point to predict Base Case and Application Case vegetation concentrations for the human and wildlife health assessments, and are provided in Table D-3 to Table D-7. The median moisture content in plant tissues is also provided in Table D-3 to Table D-7.

Table D-3 Summary of COPC Concentrations for Berries

COPC	Berry Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	0.04	6	Maximum
Chromium	0.083	28	95% UCLM
Mercury	0.005	0	detection limit
Selenium	0.1	0	detection limit

Note:

Median moisture content of berries was 85%.

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

Table D-4 Summary of COPC Concentrations for Willow and Birch

COPC	Willow and Birch Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	0.030	52	95% UCLM
Chromium	0.13	76	95% UCLM
Mercury	0.0098	100	95% UCLM
Selenium	0.065	12	maximum

Note:

Median moisture content of willow and birch was 60%.

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

Table D-5 Summary of COPC Concentrations for Labrador Tea

COPC	Labrador Tea Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	0.022	22	maximum
Chromium	0.10	78	95% UCLM
Mercury	0.014	100	95% UCLM
Selenium	0.05	0	detection limit

Note:

Median moisture content of Labrador tea is 49%.

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

Table D-6 Summary of COPC Concentrations for Lichen

COPC	Lichen Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	0.62	100	95% UCLM
Chromium	2.0	100	95% UCLM
Mercury	0.076	100	95% UCLM
Selenium	0.057	41	95% UCLM

Note:

Median moisture content of lichen is 16%.

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

Table D-7 Summary of COPC Concentrations for Grass

COPC	Grass Concentration [mg/kg dw]	Percent of Results Above Detection Limit [%]	Statistical Endpoint
Arsenic	0.062	88	95% UCLM
Chromium	0.11	41	95% UCLM
Mercury	0.0063	65	95% UCLM
Selenium	0.05	0	detection limit

Note:

Median moisture content of grass is 61%.

COPC = constituents of potential concern; UCLM = upper confidence limit of the mean; mg/kg = milligrams per kilogram; dw = dry weight; % = percent.

D2.2 Base Case and Application Case Exposure Concentrations

Activities in the two assessment cases (Base Case and Application Case) have the potential to change the concentrations of metals in air, soil, vegetation, water, aquatic prey and fish, terrestrial prey and wild

game. Consequently, exposure to humans and wildlife also has the potential to change. Therefore, future concentrations in environmental media and wildlife were predicted using exposure models.

For the human health assessment, the air, soil, vegetation, and game meat (caribou and small mammal) concentrations selected were the maximum predicted concentration occurred (either the Lac de Gras (LDG) Hunting Camp, the Diavik TK Camp, or the LDG Winter Road rest stop receptor locations). These receptor locations were considered to have the highest COPC concentrations outside of the active mine sites, and thus, were considered protective of the other receptor locations in the ESA. In addition, these locations were in close proximity to both Lac de Gras and Lac du Sauvage (fishing locations) and to popular hunting locations (e.g., the narrows between the two lakes was reported as an important caribou hunting location in the traditional land use assessment). The water and fish concentrations selected for the human health assessment were the maximum concentrations (open water and under ice) predicted in Lac de Gras and Lac du Sauvage. Total mercury concentrations in fish and game were partitioned into inorganic and organic fractions, and risks were assessed individually for these chemical forms (further details are presented in Section D2.2.1).

For the wildlife health assessment, soil and vegetation concentrations were predicted using the measured baseline concentrations and the maximum predicted deposition rates for the maximum point of impingement (MPOI). The maximum depth-averaged concentrations (open water and under ice) were selected as drinking water concentrations for wildlife. Concentrations in aquatic prey (plants, invertebrates, and fish) were predicted using the selected water concentrations and appropriate bioaccumulation factors (BAFs).

A description of the methods used to predict concentrations in air, soil, water, plants, and meat are presented below, along with data for the COPCs retained for the human and wildlife health risk assessment. The deposition rates used to predict soil and vegetation concentrations are included in Attachment D1.

D2.2.1 Special Consideration: Mercury Speciation

Mercury can exist in different chemical forms that influence its chemical fate and bioavailability. Organic mercury (e.g., methyl mercury) is more readily absorbed in the body than inorganic forms of mercury, and is associated with higher degrees of bioaccumulation in food webs.

Mercury can occur in both inorganic and organic forms in the environment, with increased methylation occurring progressively through aquatic food webs. The proportion of methyl mercury typically increases through the food web (i.e., from plants to invertebrates to fish) such that mercury in fish is typically almost entirely methyl mercury (CCME 2000; United Nations Environment Programme 2014). In contrast, only small fractions of methyl mercury are expected in aquatic and terrestrial plants (CCME 2000; Regier et al. 2013; Tong et al. 2013).

D2.2.1.1 Human Health Multimedia Assessment

For the human health assessment, inorganic and organic forms of mercury were evaluated separately, where feasible. The greatest potential exposure to methyl mercury is typically through consumption of fish, where the proportion of methyl mercury can be elevated, particularly in piscivorous fish near the top of the food chain. Terrestrial environments are typically associated with lower ratios of methyl mercury as they generally lack the bacteria and conditions necessary to methylate accumulated mercury (Hintelmann

2010). Mercury enters the Arctic terrestrial environment mainly through atmospheric deposition and geological weathering, and is predominantly in the divalent (inorganic) form (AANDC 2012). Pathways of mercury methylation in Arctic terrestrial systems are poorly characterized, and some elevated concentrations of methyl mercury have been observed in Arctic snowpacks (Barkay and Poulain 2007, as cited in AANDC 2012), indicating that different methylation processes may occur in these environments relative to more southern environments. Furthermore, methyl mercury concentrations can be lower in clear oligotrophic Arctic lakes relative to other waterbodies due to decreased microbial activity and increased photodecomposition (Hammerschmidt et al. 2006).

Methyl mercury and total mercury analysis was conducted on 18 Lake Trout muscle samples collected from Lac du Sauvage in 2014 (memorandum in progress at the time of submission for this report). Results indicate that methyl mercury makes up 13 to 19% (median of 13%; 95% UCLM of 19%) of total mercury in fish muscle tissue. Lake Trout are expected to be high accumulators of methyl mercury, given that they are piscivorous, long-lived, and large-bodied. Therefore, to estimate exposure concentrations in fish, a factor of 0.19 (the UCLM) was applied to approximate methyl mercury content, and a factor of 0.81 was used to approximate inorganic mercury.

Tissue samples were not available for terrestrial mammals (i.e., caribou and hare). An assessment of mercury in Canada's North, conducted as part of the Northern Contaminants Program (AANDC 2012), reported that fraction of methyl mercury in caribou muscle is approximately 75%. However, the original data were not available to confirm where the caribou samples were obtained, and whether the samples were reflective of barren-ground or woodland herds. The United States Environmental Protection Agency (US EPA 1997) assumes that methyl mercury makes up 13% of total mercury in herbivorous mammals for the purpose of calculating exposure parameters for mercury in beef. No information on methyl to total mercury ratios for small Arctic game was found. For the human health assessment, it was conservatively assumed that methyl mercury content in small and large game was 75% of the total mercury concentration, and inorganic mercury was 25% of the total mercury concentration.

The fraction of methyl mercury in terrestrial plants and abiotic media (soil, water, sediment, and air) was assumed to be negligible in comparison to that of fish and game. For example, Hammerschmidt et al. (2006) found that the average fraction of methyl mercury in surface sediment ranged from 0.2% to 1.0% of total mercury in four Alaskan oligotrophic lakes, and Chételat et al. (2013) found similar methyl mercury fractions (0.7% to 1.7%) in four lakes on Cornwallis Island, in Canada's high Arctic. Hammerschmidt et al. (2006) reported methyl mercury fractions of 2.5% to 4.2% of total mercury in the upper layer of the surface water in four Alaskan oligotrophic lakes. Methyl mercury was found to make up less than 1% of total mercury in soils of Devon Island in Canada's high Arctic (Oiffer and Siciliano 2009, cited in AANDC 2012). Mailman and Bodaly (2005) reported a methyl mercury content of 1.9% in Labrador tea, and 3.6% in wild blueberry plants collected in northwestern Ontario. Therefore, in the current assessment, it was assumed that total mercury was entirely in the form of inorganic mercury in Labrador tea, berries, and abiotic media.

D2.2.1.2 Wildlife Health Multimedia Assessment

Methyl mercury is known to be more toxic to birds and mammals than inorganic mercury, resulting in toxicological reference values (TRVs) for methyl mercury that are considerably lower than those for total mercury. The wildlife health risk assessment focused on aquatic-feeding and omnivorous wildlife

receptors; therefore, the potential presence of mercury as methyl mercury was an important consideration.

Based on this knowledge, as an initial screening step, wildlife receptors evaluated in the multimedia assessment were assumed to be consuming 100% methyl mercury (i.e., TRVs for methyl mercury were applied). Given that methyl mercury is more toxic than inorganic mercury (i.e., has lower TRVs), this assumption is conservative for wildlife feeding on prey for which the proportion of methyl mercury in tissues is likely to range up to 100%.

If risks were predicted to be unacceptable (i.e., hazard quotient greater than 1) based on this conservative assumption, a more detailed apportionment of mercury speciation could be applied to the exposure and toxicity assessments. Based on the results of the initial screening approach, a more detailed apportionment of mercury was not needed.

D2.2.2 Air

The modelled site-specific Base Case and Application Case air concentrations and deposition rates were provided by the Air Quality discipline and are presented in Appendix B (air concentrations) and Attachment D1 (deposition rates). The air deposition rates were used to predict the site-specific soil and vegetation concentrations used in the human and wildlife health risk assessment. The Base Case and Application Case air concentration data for the COPCs are provided in Table D-8.

Table D-8 Base Case and Application Case Air Concentrations

COPC	Human Health	
	Base Case Concentration ^(a) [µg/m ³]	Application Case Concentration ^(a) [µg/m ³]
Arsenic	0.000016	0.000017
Chromium	0.00021	0.00024
Mercury	0.000011	0.000012
Selenium	0.000040	0.000040

a) The selected air concentrations for the human health assessment were the maximum concentration at either the LDG Hunting Camp, LDG Winter Road rest stop, or the Diavik TK Camp.

COPC = contaminants of potentials concern; LDG = Lac de Gras; TK = Traditional Knowledge; µg/m³ = micrograms per cubic metre.

D2.2.3 Soil

The incremental concentrations in soil that are contributed by activities in the region were calculated using the modelling methods developed by the US EPA (2005a). Deposition onto soil was assumed to occur throughout the lifetime of the Project (i.e., from construction to closure, 13 years). Constituents deposited onto soil were assumed to mix within the top 0.2 m of soil (US EPA 2005a). Soil was assumed to have a bulk density of 1,500 kilograms per cubic metre (kg/m³) (US EPA 2005a). The incremental increase in soil concentrations from the Base Case to Application Case was determined using equations presented in Table D-9.

Loss mechanisms (i.e., volatilization, degradation, erosion, leaching) were not included in the calculations. Modelling without environmental losses is a conservative approach to deriving exposure estimates. The methods used to derive incremental COPC concentrations in soil and vegetation are based on reasonable, protective assumptions about how substances emitted from combustion sources can be taken up into soil and plants, and then by wildlife.

Table D-9 Equations for Predicting Incremental Concentrations in Soil

Media	Equation
Soil	Inorganic chemicals: $SC = (Dep \times tD) / (Z_s \times BD)$
	Organic chemicals: $SC = (Dep \times tD) / (Z_s \times BD)$
	SC = soil concentration (mg/kg dw)
	Dep = total wet and dry deposition rate ($g/m^2/y$); project-specific (Attachment D1)
	tD = deposition time (13 years)
	Z_s = soil mixing depth; 0.2 m untilled land
	BD = bulk density; $1,500 \text{ kg/m}^3$

Source: US EPA (2005a).

mg/kg dw= milligrams per kilogram dry weight; $g/m^2/y$ = grams per square metre per year; kg/m^3 = kilograms per cubic metre.

Table D-10 provides the predicted Base Case and Application Case soil concentrations for the COPCs.

Table D-10 Base Case and Application Case Soil Concentrations

COPC	Human Health		Wildlife Health	
	Base Case Concentration ^(a) [mg/kg dw]	Application Case Concentration ^(a) [mg/kg dw]	Base Case Concentration ^(b) [mg/kg dw]	Application Case Concentration ^(b) [mg/kg dw]
Arsenic	5.9	5.9	6.0	6.1
Chromium	35	35	37	39
Mercury	0.092	0.093	0.13	0.18
Selenium	0.30	0.30	0.30	0.31

a) The selected soil concentrations for the human health assessment were the maximum predicted concentration at either the LDG Hunting Camp, LDG Winter Road Rest Stop, or the Diavik TK Camp. These soil concentrations were also used to predict hare and caribou tissue concentrations.

b) The selected soil concentrations for the wildlife health assessment were at the MPOI.

COPC = constituent of potential concern; LDG = Lac de Gras; TK = Traditional Knowledge; MPOI = maximum point of impingement; mg/kg dw = milligrams per kilogram dry weight.

D2.2.4 Water

Base Case and Application Case depth-averaged water concentrations for the COPCs are shown in Table D-11. The Application Case water concentrations are the maximum depth-averaged open-water and under-ice concentrations amongst Lac de Sauvage, Lac de Gras West, and Lac de Gras East under the scenarios assessed (pre-operations, operations, closure, and post-closure). Median measured

baseline water concentrations were adopted for the Base Case because Base Case water concentrations were not predicted¹. The Base Case concentration was selected to match the waterbody and location where the maximum Application Case concentration is expected to occur.

Table D-11 Base Case and Application Case Water Concentrations

COPC	Base Case Water Concentration ^(a) [mg/L]	Application Case Water Concentration ^(b) [mg/L]
Arsenic	0.00035	0.00042
Chromium	0.00017	0.00026
Mercury	0.00001 ^(c)	0.000012
Selenium	0.00005 ^(c)	0.00015

a) The selected Base Case concentration is the measured median baseline concentration corresponding to the location where the maximum Application Case concentration is expected to occur.

b) The Application Case water concentration is the maximum open-water or under-ice concentration of Lac de Sauvage, Lac de Gras West, and Lac de Gras East.

c) Value is half of the detection limit, consistent with the baseline concentrations reported in the Water Quality Assessment (DAR Section 8).

COPC = constituent of potential concern; mg/L = milligrams per litre.

D2.2.5 Terrestrial Plant Tissue

The incremental concentrations in plants that are contributed by activities in the region were calculated using the modelling methods developed by the US EPA (2005a). Predicted plant tissue concentrations were calculated according to the equations presented Table D-12. These equations were used to calculate predicted Base Case and Application Case berry and Labrador tea concentrations for the human health multimedia risk assessment and berry, willow and birch (as leaves), grass, and lichen concentrations for the wildlife health multimedia risk assessment. The median BAF value was used in the prediction of tissue concentrations.

Loss mechanisms (i.e., volatilization, degradation) were not included in the calculations. Modelling without environmental losses is a conservative approach to derive exposure estimates.

Table D-12 Equations for Predicting Incremental Concentrations in Plants

Media	Equation
Total plant concentration	PC = Pd + Pr
	PC = incremental concentration (mg/kg dw)
	Pd = incremental concentrations due to air deposition (mg/kg dw)
	Pr = incremental concentration due to root uptake (mg/kg dw)

¹ Median baseline concentrations were used as a starting point for predicting Application Case concentrations in the water quality assessment (Section 8 of the DAR).

Table D-12 Equations for Predicting Incremental Concentrations in Plants

Media	Equation
Plant concentration due to air deposition	$P_d = 1,000 \times [D_{yd} + (Fw \times D_{wyd})] \times R_p [1 - \exp(-k_p \times T_p)] / (Y_p \times k_p)$
	1,000 = unit conversion factor (kg/1,000 g)
	P_d = incremental concentration due to air deposition (mg/kg dw)
	D_{yd} = dry particle deposition rate (g/m ² /y); project-specific
	Fw = fraction of COPC wet deposition that adheres to plant surface; unitless (0.6)
	D_{wyd} = wet deposition rate (g/m ² /y); project-specific
	R_p = interception fraction; represents portion of chemical deposition intercepted by plants; default value of 0.39
	Y_p = crop yield (kg dw/m ²); 0.246 for berries and 0.252 for other vegetation
Plant concentration due to root uptake	T_p = length of plant exposure to deposition per harvest; 0.25 year
	k_p = chemical removal from the plant surface by weathering (yr ⁻¹); 18 for plants
	$Pr = SC \times BAF$
	Pr = incremental concentration due to root uptake (mg/kg dw)
	SC = predicted incremental soil concentration (mg/kg dw)
	BAF = bioaccumulation factor (unitless); project-specific presented in Table D-13

Source: US EPA (2005a, 2005b).

COPC = constituent of potential concern; mg/kg dw = milligrams per kilogram dry weight; kg = kilogram; µg/g = micrograms per gram; g/m²/y = grams per square metre per year; kg dw/m² = kilograms dry weight per square metre; yr⁻¹ = per year.

Plant concentrations were calculated based on the total exposure from direct deposition onto berries, leaves, fruit, grass, Labrador tea, or lichen and uptake from soil. Crop yields (Y_p) of 0.246 for berries and 0.252 for all other vegetation were used in to predict future plant concentrations for the Project (US EPA 2005a). An interception fraction (R_p) of 0.39 (US EPA 2005b) was determined to be sufficiently conservative for wild plants because the surface areas of fruits (e.g., berries) and leaves (e.g., willow and birch) are much greater than for grass. The length of plant exposure (T_p) was estimated to be three months (0.25 of a year) for vegetation to reflect the length of the growing season in the ESA (July, August, and September; Reid and Naeth 2002).

Site-specific bioaccumulation factors (BAFs) (Table D-13) were calculated using co-located soil and plant tissue samples collected within the ESA. Specifically, BAF was calculated as the ratio of the concentration of the COPC in the plant tissue (C_{plant}) to the concentration of the COPC in the soil (C_{soil}). Bioaccumulation factors were calculated when the COPC was detected in both media or if it was detected in the plant tissues; in that case, the full detection limit was used in the calculation. Willow and birch BAFs were combined to yield a median BAF. The median BAF was used to predict vegetation tissue concentrations from to root uptake.

Table D-13 Median Soil to Plant BAFs Used in the Incremental Plant Concentration Model

COPC	Berry [kg/kg dw]	Willow and Birch [kg/kg dw]	Grass [kg/kg dw]	Labrador Tea [kg/kg dw]	Lichen [kg/kg dw]
Arsenic	0.0074	0.0063	0.012	0.0040	0.10
Chromium	0.0028	0.0035	0.0040	0.0015	0.050
Mercury	0.045	0.088	0.048	2.2	3.6
Selenium	0.23	0.12	0.14	0.23 ^(a)	0.12

a) A BAF could not be calculated for Labrador tea because the co-located soil samples were below the detection limit. Therefore, the BAF for berries (maximum for all plants assessed) was applied to calculate predicted selenium concentrations in Labrador tea. COPC = constituent of potential concern; kg/kg dw = kilogram per kilogram dry weight.

The predicted Base Case and Application Case vegetation concentrations are provided in Table D-14 for the human health multimedia model and Table D-15 for wildlife health multimedia model.

Table D-14 Predicted Vegetation Concentrations Used in the Human Health Multimedia Model

COPC	Berry ^(a)	Willow and Birch ^(b)	Grass ^(a)	Labrador Tea ^(a)	Lichen ^(a)
Predicted dry weight concentrations (mg/kg dw)					
Base Case					
Arsenic	0.40	0.030	0.063	0.023	0.62
Chromium	0.10	0.14	0.12	0.12	2.0
Mercury	0.0060	0.011	0.0073	0.017	0.079
Selenium	0.10	0.066	0.051	0.051	0.058
Application Case (Operations+Construction)					
Arsenic	0.043	0.033	0.066	0.025	0.62
Chromium	0.16	0.20	0.18	0.18	2.1
Mercury	0.0098	0.015	0.011	0.024	0.087
Selenium	0.10	0.066	0.051	0.051	0.058
Predicted wet weight concentrations (mg/kg ww)^(c)					
Moisture Content	85%	60%	61%	49%	16%
Base Case					
Arsenic	0.0061	0.012	0.024	0.011	0.52
Chromium	0.015	0.058	0.048	0.060	1.7
Mercury	0.00090	0.0044	0.0029	0.0087	0.067
Selenium	0.015	0.026	0.020	0.026	0.048
Application Case (Operations+Construction)					
Arsenic	0.0065	0.013	0.026	0.013	0.52
Chromium	0.023	0.082	0.072	0.091	1.8
Mercury	0.0015	0.0059	0.0044	0.012	0.073
Selenium	0.015	0.027	0.020	0.026	0.049

a) The selected Application Case soil and vegetation concentrations for human health assessment were the maximum concentration at either the LDG Hunting Camp, LDG Winter Road Rest Stop, or the Diavik TK Camp.

b) Willow and birch leaves were not included in the human health assessment but were used as food items for caribou, which serve as food items for human receptors.

c) Wet weight concentrations were calculated using the median moisture content.

COPC = constituent of potential concern; LDG = Lac de Gras; TK = Traditional Knowledge; mg/kg = milligrams per kilogram; dw = dry weight; ww = wet weight.

Table D-15 Vegetation Concentrations Used in the Wildlife Health Multimedia Model

COPC	Berry ^(a)	Willow and Birch ^(a)	Grass ^(a)	Lichen ^(a)
Predicted dry weight concentrations (mg/kg dw)				
Base Case				
Arsenic	0.21	0.21	0.24	0.80
Chromium	3.8	4.0	4.0	6.0
Mercury	0.087	0.10	0.090	0.31
Selenium	0.11	0.072	0.057	0.064
Application Case (Operations+Construction)				
Arsenic	0.72	0.72	0.76	1.3
Chromium	15	15	15	17
Mercury	0.32	0.34	0.33	0.70
Selenium	0.13	0.093	0.078	0.085
Predicted wet weight concentrations (mg/kg ww) ^(b)				
Moisture Content	85%	60%	61%	16%
Base Case				
Arsenic	0.032	0.082	0.093	0.68
Chromium	0.57	1.6	1.5	5.0
Mercury	0.013	0.038	0.035	0.26
Selenium	0.016	0.029	0.022	0.054
Application Case (Operations+Construction)				
Arsenic	0.11	0.29	0.30	1.1
Chromium	2.2	6.1	6.0	15
Mercury	0.049	0.14	0.13	0.59
Selenium	0.019	0.037	0.030	0.071

Note:

a) The selected Application Case soil and vegetation concentrations for the wildlife health assessment were the MPOI concentrations.

b) Dry weight predictions were converted within the model to wet weight according to the plant specific moisture contents.

COPC = constituent of potential concern; MPOI = maximum point of impingement; mg/kg = milligrams per kilogram; dw = dry weight; ww = wet weight.

D2.2.6 Aquatic Plant Tissue

Wildlife (e.g., birds, small mammals, and ungulates) may consume aquatic plants from the ESA.

Concentrations of metals in aquatic plants due to uptake from water were estimated using the BAFs presented in Table D-16. Predicted aquatic plant tissue concentrations for the Base Case and Application Case are also provided in Table D-16.

Table D-16 Bioaccumulation Factors Water to Aquatic Plants

COPC	Reported BAF (L/kg ww) ^(a)	Predicted Concentrations (mg/kg ww)	
		Base Case	Application Case
Arsenic	293	0.10	0.12
Chromium	4,406	0.75	1.15
Mercury	24,762 ^(b)	0.25	0.30
Selenium	1,845	0.092	0.28

a) BAFs are for water to algae/macrophytes and were selected from US EPA (1999).

b) BAF value is for mercuric chloride.

COPC = constituent of potential concern; BAF = bioaccumulation factor; L/kg = litre per kilogram; mg/kg = milligram per kilogram; ww = wet weight.

D2.2.7 Terrestrial Invertebrate Tissue

Wildlife (e.g., birds, small mammals, and ungulates) may consume terrestrial invertebrate tissue from the ESA. Concentrations of metals in terrestrial invertebrates due to uptake from soil were estimated using the BAFs presented in Table D-17. Predicted terrestrial invertebrate tissue concentrations for the Base Case and Application Case are also provided in Table D-17.

Table D-17 Estimation Methods for Soil to Terrestrial Invertebrate Accumulation Used in the Terrestrial Wildlife Risk Assessment

COPC	US EPA (2007)	Sample et al. (1998) ^(a)	Predicted Concentration (mg/kg ww)	
	Uptake Equation (dry weight)	BAF (dry weight)	Base Case	Application Case
Arsenic	$\ln(C_e) = 0.706 * \ln(C_s) - 1.421$	-	0.14	0.14
Chromium	$C_e = 0.306 * C_s$	-	1.8	1.9
Mercury	-	$\ln(C_e) = -0.684 + 0.118 * \ln(C_s)$	0.064	0.066
Selenium	$\ln(C_e) = 0.733 * \ln(C_s) - 0.075$	-	0.062	0.062

a) Sample et. al., 1998a.

COPC = constituent of potential concern; BAF = bioaccumulation factor; C_e = concentration in earthworm (mg/kg dw); C_s = concentration in soil (mg/kg dw); - = no value was available; mg/kg ww = milligrams per kilogram wet weight; mg/kg dw = milligrams per kilogram dry weight.

D2.2.8 Aquatic Invertebrate Tissue

Wildlife (e.g., birds, fish, and small mammals) may consume aquatic invertebrate tissue from the ESA. Concentrations of metals in aquatic invertebrates due to uptake from water were estimated using the BAFs presented in Table D-18. Predicted aquatic invertebrate tissue concentrations for the Base Case and Application Case are also provided in Table D-18.

Table D-18 Bioaccumulation Factors for Water to Aquatic Invertebrates

COPC	DeForest et al. (2007)	US EPA (1999)	Predicted Concentration (mg/kg ww)	
	BAF (L/kg dw) ^(a)	Reported BCF (L/kg ww)	Base Case	Application Case
Arsenic	-	73	0.026	0.030
Chromium	$\log \text{BAF} = -0.386 \times \log C_w + 3.525$	3,000	0.19	0.25
Mercury	$\log \text{BAF} = -0.985 \times \log C_w + 2.532$	-	0.054	0.054
Selenium	$\log \text{BAF} = -0.443 \times \log C_w + 3.384$	1,262	0.078	0.14

a) BAFs were converted to wet weight assuming a percent moisture of 83% (mean for cladocerans, Sample et al. 1997).

COPC = constituent of potential concern; BAF = bioaccumulation factor; C_w = concentration in water in $\mu\text{g/L}$; $\mu\text{g/L}$ = micrograms per litre; mg/kg ww = milligrams per kilogram L/kg = litres per kilogram; dw = dry weight; ww = wet weight; - = no value was available or value was not used in calculations.

D2.2.9 Animal Tissue

The incremental concentrations in small mammals and caribou contributed by activities in the region were calculated using the modelling methods developed by the US EPA (2005a). As part of the human health multimedia risk assessment, Aboriginals were assumed to hunt within the ESA for caribou and small game. Wildlife (e.g., small mammals and ungulates) may ingest soil, plants, and water from the ESA and accumulate metals into their tissues.

Uptake of metals into ungulates (e.g., caribou) consumed by people were estimated using the biota transfer factors (BTFs) presented in Table D-19.

Muscle tissue (i.e., game meat) concentrations were calculated using the predicted exposure of caribou to COPCs and the equation presented in Table D-20. The game meat concentrations were calculated based on consumption of plants, soil, and water by caribou. Chemical-specific BAFs for predicting tissue concentrations in small mammals that are consumed by predators are presented in Table D-21.

The 95% UCLM measured baseline concentrations and predicted Base Case and Application Case concentrations in small mammals and caribou are provided in Table D-22. For the human health assessment, total mercury was partitioned into inorganic and organic fractions (see Section D2.2.1).

Table D-19 Biotransfer Factors for Feed to Ungulates

COPC	RAIS (2014) [day/kg ww]	US EPA (2005c) [day/kg ww]	Chosen Biotransfer Factor [day/kg ww]
Arsenic	0.0020	0.0020	0.0020
Chromium	0.0055 ^(a)	0.0055 ^(b)	0.0055
Mercury	0.25	0.006 ^(c)	0.006 ^(d)
Selenium	0.015	0.002265	0.015

Note:

BTF exceeded the theoretical maximum (i.e., dry weight BTF greater than 1). The US EPA (2005c) adopted a BTF derived more recently by the US EPA (1997). The US EPA (1997) value of 0.02 kg/bw (dry weight) was converted to a wet weight value using an assumed 70% moisture content in beef (US EPA 2005b).

a) Applicable to total chromium, chromium salts, chromium (III) soil particulates, chromium insoluble salts, chromium (VI).

b) Applicable to chromium and chromium (VI).

c) Based on US EPA (1997) for total mercury.

d) The RAIS (2014) BTF for mercury was based on an old data source (Ng et al. 1968, cited in Baes et al. 1984) and the original

COPC = constituent of potential concern; BTF = biota transfer factor; day/kg ww = days per kilogram of body weight in wet weight; kg/bw = kilogram per body weight.

Table D-20 Equation for Prediction Meat Concentrations

Medium	Equation
Muscle concentration in ungulates	$T_c = \sum EDI \times BW \times BTF$
	T_c = incremental chemical concentration in herbivorous mammal (mg/kg wet wt)
	$\sum EDI$ = sum of chemical ingestion from the oral pathways (mg/kg/day)
	BW = animals body weight (kg)
	BTF = biotransfer factor (day/kg ww)

Source: US EPA (2005a).

Note: Plant, soil and water ingestion rates for wildlife are presented in Section D3.2.

mg/kg wet wt = milligrams per kilogram wet weight; kg = kilogram; mg/kg/day = milligrams per kilogram per day; day/kg ww = days per kilogram wet weight.

Table D-21 Estimation Approaches for Soil to Small Mammal Accumulation Used in the Terrestrial Wildlife Risk Assessment

COPC	US EPA (2007)	Sample et al. (1998) ^(a)	Predicted Concentration ^(b)	
	Estimation Method [mg/kg dw]	BAF [mg/kg dw]	Base Case [mg/kg ww]	Application Case [mg/kg ww]
Arsenic	$\ln(C_m) = 0.8188 \cdot \ln(C_s) - 4.8471$	-	0.011	0.011
Chromium	$\ln(C_m) = 0.7338 \cdot \ln(C_s) - 1.4599$	-	1.1	1.1
Mercury	-	1.0457 ^(a)	0.051	0.067
Selenium	$\ln(C_m) = 0.3764 \cdot \ln(C_s) - 0.4158$	-	0.14	0.14

a) Sample et. al., 1998b.

b) BAFs were converted to wet weight using a percent moisture for small mammals of 68% (US EPA 1993).

COPC = constituent of potential concern ; BAF = bioaccumulation factor; C_b = concentration in small mammal (mg/kg dw); C_s = concentration in soil (mg/kg dw); mg/kg = milligrams per kilogram; dw = dry weight; ww = wet weight; - = no value was available or value was not used in calculations.

Table D-22 Wet Weight Concentrations of Small Mammals and Caribou Used in the Human Health Model

COPC	Small Mammals		Caribou	
	Predicted Base Case [mg/kg ww]	Predicted Application Case [mg/kg ww]	Predicted Base Case [mg/kg ww]	Predicted Application Case [mg/kg ww]
Arsenic	0.011	0.011	0.0043	0.0043
Chromium	1.1	1.1	0.048	0.052
Mercury (total) ^(a)	0.045	0.059	0.0029	0.0034
Inorganic mercury	0.011	0.015	0.00073	0.00085
Methyl mercury	0.034	0.044	0.0022	0.0026
Selenium	0.13	0.14	0.0047	0.0079

a) Total mercury was partitioned into inorganic and methyl mercury fractions assuming a methyl mercury content of 75%.

COPC = constituent of potential concern; mg/kg ww = milligrams per kilogram wet weight.

D2.2.10 Fish

Fish bioaccumulation factors were derived based on concentrations of substances measured in muscle tissue of Lake Trout and Round Whitefish (see the DAR, Section 8.5.5). Only whole-body concentration data were available for Slimy Sculpin, and these data were not included in BAF derivation (see Section 8.5.5 of the DAR for more information on the fish BAF derivation). The fish BAFs used in the human and wildlife health and risk assessment are provided in Table D-23. The BAFs were multiplied by the measured baseline concentrations and predicted Application Case water concentrations to predict fish tissue concentrations. Because the Base Case water concentrations were not predicted, fish tissue concentrations predicted from the measured baseline water concentrations were used for the Base Case. The predicted fish tissue concentrations used in the human and wildlife health risk assessment are provided in Table D-23.

Table D-23 Site-Specific Bioaccumulation Factors for Fish

COPC	BAF (L/kg ww) ^(a)	Predicted Concentration (mg/kg ww)	
		Base Case	Application Case
Arsenic	393	0.14	0.16
Chromium	1429	0.24	0.37
Total mercury	30,000 ^(b)	0.30	0.37
Inorganic mercury ^(c)	-	0.24	0.30
Methyl mercury ^(c)	-	0.057	0.070
Selenium	10,925	0.55	1.6

a) Site-specific BAFs were selected from Section 8.5.5 of the DAR.

b) BAFs were calculated based on total mercury concentration only.

c) For the human health assessment, total mercury was partitioned into inorganic and organic fractions (see Section D2.2.1). Total mercury in fish was assumed to comprise 19% methyl mercury and 81% inorganic mercury.

COPC = constituent of potential concern; BAF = bioaccumulation factor; L/kg = litres per kilogram; ww = wet weight; - = no value was available or value was not used in calculations.

D3 RECEPTOR ASSUMPTIONS

D3.1 Human Health

Based on the results of the problem formulation, the following human receptors were retained for the multimedia risk assessment:

- seasonal receptor (Aboriginal); and,
- seasonal receptor (non-Aboriginal).

The traditional land use assessment (DAR, Section 15) indicates that the area surrounding Lac de Gras and Lac du Sauvage is an important hunting and fishing location for local Aboriginals. In particular, the narrows between the two lakes is a popular location for caribou hunting. Several camps are also present within the ESA that have been used for commercial guided hunting fishing trips (e.g., Lac de Gras camp) or as gathering places for community meetings. Although there is currently a moratorium on the commercial, resident, and non-resident (non-Aboriginal) hunting of barren-ground caribou in the region, it was assumed that moratorium may be lifted in the future.

The seasonal receptors were assumed to access the ESA for hunting and/or fishing for three months of the year (assumed to be the hunting season in late summer to fall). Although many visiting hunters and fishers and community members are only in the area for a short time (e.g., 1 to 2 weeks), it was assumed that a guide could remain at the camp and engage in hunting and fishing activities throughout the three-month season.

The scenarios for the two seasonal receptors were the same in terms of exposure duration and contact with abiotic environmental media (e.g., soil, water, air), and differed only in the assumptions regarding consumption of country foods. The Aboriginal receptor was considered a high consumer of country foods, whereas the non-Aboriginal receptor was considered an average consumer of country foods. For example, it was assumed that Aboriginal receptors obtained 100% of their game meat (large and small game) and fish from the ESA, whereas the non-Aboriginal receptor obtained half of their meat and fish from the ESA. In addition, it was assumed that the non-Aboriginal receptors did not consume traditional plants (e.g., Labrador tea).

D3.1.1 Exposure Pathways

Exposure pathways applicable to each receptor are presented in Table D-24.

Table D-24 Exposure Pathways Evaluated in the Human Health Multimedia Risk Assessment Based on Receptor Type

Medium		Exposure Pathway	Receptor – Seasonal Users (Aboriginal)	Receptor – Seasonal Users (Non-Aboriginal)
Water	Surface water (used as potable water)	Ingestion ^(a)	✓	✓
		Incidental ingestion ^(b)		
		Dermal contact ^(c) (whole body)	✓	✓
Sediment	Sediment	Dermal contact ^(d) (hands only)	✓	✓
Soil	Soil	Incidental ingestion	✓	✓
		Dermal contact (hands, lower legs, and feet)	✓	✓
		Inhalation of dust	✓	✓
Air	Air	Inhalation	✓	✓
Fish	Fish	Ingestion	✓	✓
Meat	Small game (snowshoe hare)	Ingestion	✓	✓
	Large game (caribou)	Ingestion	✓	✓
Traditional plants	Labrador tea ^(e)	Ingestion	✓	x

a) Seasonal users were assumed to obtain their drinking water from Lac de Gras and/or Lac du Sauvage.

b) Incidental ingestion of surface water while swimming was not considered a significant pathway, given that swimming does not occur with great frequency or duration (cold lakes), and that the volume of water ingested incidentally is only approximately 1% of the ingestion rate for drinking water.

c) Dermal contact with surface water while showering/bathing. Although short duration (less than 0.5 hours) submersion in nearby lakes may occur, based on local knowledge, it was assumed that the lakes were too cold for regular recreational swimming. Dermal contact with surface water while showering/bathing was assumed to occur more frequently and was retained as the more significant dermal exposure pathway for surface water.

d) Exposure to sediment was assumed to be limited to occasional contact by teens or adults while engaging in fishing activities or while collecting surface water from lakes for use as potable water. Exposure was limited to hands.

e) Labrador tea was used as a surrogate for traditional plants. Lichen may also be consumed by Aboriginals; however, intake rates were not available, and were assumed to be low. Therefore, intake of Labrador tea was used to represent both traditional plants and lichen. Lichen is indirectly included in the human health assessment through the consumption of caribou meat (caribou diet is 50% lichen).

✓ = complete pathway, pathway evaluated.

D3.1.2 Model Equations

For human health multimedia risk assessments, exposure via the oral and dermal pathways is determined as a dose; this value is called the estimated daily intake (EDI) and is typically expressed as milligrams of a chemical per kilogram of body weight per day. For the inhalation pathway, exposure is determined as a concentration; this value is called the estimated concentration and is expressed as milligrams of a chemical per cubic metre of air.

The estimated dose or concentration was calculated from site-specific concentrations of substances in each environmental medium (e.g., air, water, soil, sediment, and food), the amount of time a receptor spends at a location, and receptor-specific parameters, such as body weight, ingestion rates, and dietary preferences.

The following exposure equations from Health Canada (2012) were used to quantify the EDI that each human receptor may receive through direct or indirect contact with each COPC via each complete exposure pathway indicated in Table D-24. Environmental concentrations used in the equations are summarized in Section D2 and receptor characteristics, including ingestion rates and exposure durations, are summarized in Table D-25. Chemical-specific bioavailability factors (e.g., relative absorption factors) are provided in Table D-26.

Incidental Ingestion of Soil or Sediment

$$Dose(mg/kg\ bw/day) = \frac{C_S \times IR_S \times RAF_{Oral} \times D_2 \times D_3 \times D_4}{BW \times LE}$$

Where:

C_S	= concentration of chemical in soil or sediment (milligrams per kilogram [mg/kg])
IR_S	= receptor soil or sediment ingestion rate (kilograms per day [kg/d])
RAF_{Oral}	= relative absorption factor from the gastrointestinal tract (unitless)
D_2	= days per week exposed/7 days
D_3	= weeks per year exposed/52 weeks
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kilograms [kg])
LE	= life expectancy (years) (for assessment of carcinogens only)

Inhalation of Soil Dust Particles

$$Dose(mg/kg\ bw/day) = \frac{C_S \times P_{Air} \times IR_A \times RAF_{Inh} \times D_1 \times D_2 \times D_3 \times D_4}{BW \times LE}$$

Where:

C_S	= concentration of chemical in soil (mg/kg)
P_{Air}	= particulate concentration in air (kg/m ³)
IR_A	= receptor air intake (inhalation) rate (cubic metres per day [m ³ /day])
RAF_{Inh}	= relative absorption factor by inhalation (unitless)
D_1	= hours per day exposed/24 hours

D_2	= days per week exposed/7 days
D_3	= weeks per year exposed/52 weeks
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kg)
LE	= life expectancy (years) (for assessment of carcinogens only)

Dermal Contact with Soil or Sediment

$$Dose(mg/kg\ bw/day) = \frac{[(C_S \times SA_H \times SL_H)(C_S \times SA_O \times SL_O)] \times RAF_{Derm} \times D_2 \times D_3 \times D_4}{BW \times LE}$$

Where:

C_S	= concentration of chemical in soil or sediment (mg/kg)
SA_H	= surface area of hands exposed for soil loading (square centimetres [cm^2])
SA_O	= surface area exposed other than hands (cm^2)
SL_H	= soil loading rate to exposed skin of hands (kilograms per square centimetre per event [kg/cm^2 -event])
SL_O	= soil loading rate to exposed skin other than hands (kg/cm^2 -event)
RAF_{Derm}	= relative absorption factor for skin (unitless)
D_2	= days per week exposed/7 days
D_3	= weeks per year exposed/52 weeks
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kg)
LE	= life expectancy (years) (for assessment of carcinogens only)

Ingestion of Drinking Water

$$Dose(mg/kg\ bw/day) = \frac{C_W \times IR_W \times RAF_{Oral} \times D_2 \times D_3 \times D_4}{BW \times LE}$$

Where:

C_W	= concentration of chemical in water (milligrams per litre [mg/L])
IR_W	= receptor water intake rate (litres per day [L/day])
RAF_{Oral}	= relative absorption factor from the gastrointestinal tract (unitless)
D_2	= days per week exposed/7 days
D_3	= weeks per year exposed/52 weeks
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kg)
LE	= life expectancy (years) (for assessment of carcinogens only)

Dermal Contact with Water

$$Dose(mg/kg\ bw/day) = \frac{C_W \times RAF_{Derm} \times Kp \times 24 \times (\sum SA) \times 0.001 \times D_1 \times D_2 \times D_3 \times D_4}{BW \times LE}$$

Where:

C_W	= concentration of chemical in surface water (mg/L)
RAF_{Derm}	= relative absorption factor for skin (unitless)
K_p	= dermal permeability coefficient (centimetres per hour [cm/hour])
24	= unit correction factor (constant) (hours per day [hr/d])
SA	= surface area of exposed skin (cm ²)
0.001	= unit correction factor (constant) (litres per cubic centimetre [L/cm ³])
D_1	= hours per day exposed/24 hours
D_2	= days per week exposed/7 days
D_3	= weeks per year exposed/52 weeks
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kg)
LE	= life expectancy (years) (for assessment of carcinogens only)

Ingestion of Fish, Meat, Berries or Dietary Intake

$$Dose(mg/kg\ bw/day) = \frac{[\sum [C_{Foodi} \times IR_{Foodi} \times RAF_{Oral} \times D_i]] \times D_4}{BW \times 365 \times LE}$$

Where:

C_{Foodi}	= concentration of chemical in food "i" (mg/kg)
IR_{Foodi}	= receptor ingestion rate for food "i" (kg/d)
RAF_{Oral}	= relative absorption factor from the gastrointestinal tract (unitless)
D_i	= days per year which consumption of food "i" will occur
D_4	= total years exposed to ESA (for assessment of carcinogens only)
BW	= body weight (kg)
365	= total days per year (constant)
LE	= life expectancy (years) (for assessment of carcinogens only)

Table D-25 Exposure Parameters Used in the Multimedia Risk Assessment

Parameters	Seasonal User (Aboriginal)					Seasonal User (Non-Aboriginal)		Reference
	Infant	Toddler	Child	Adolescent	Adult	Adolescent	Adult	
	0 to 6 months	>6 months to <5 years	5 to 11 years	12 to 19 years	20+ years	12 to 19 years	20+ years	
Body weight (kg)	8.2	16.5	32.9	59.7	70.7	59.7	70.7	1
A. Surface Water								
1) Ingestion of chemicals in drinking water								
Ingestion rate (litres/day)	0.3	0.6	0.8	1	1.5	1	1.5	1
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2
2) Dermal contact with drinking water (showering)								
Conversion factor (L/cm ³)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Skin surface area available for contact (cm ²)	3620	6130	10,140	15,470	17,640	15,470	17,640	1
Event duration (hours/event)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	2
Events per day	1	1	1	1	1	1	1	2
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2
B. Sediment								
1) Incidental ingestion of chemicals in sediment								
Ingestion rate (kg/day) ^(a)	0.00002	0.00008	0.00002	0.00002	0.00002	0.00002	0.00002	1,2
Days per week exposed (days/7days) ^(b)	0/7	0/7	0/7	7/7	7/7	7/7	7/7	2
2) Dermal contact with sediment								
Conversion factor (kg/mg)	1.0E-6	1.0E-6	1.0E-6	1.0E-6	1.0E-6	1.0E-6	1.0E-6	
Skin surface area available for contact (cm ²)	320	430	590	800	890	800	890	1,2
Sediment to skin adherence factor (hands) (mg/cm ² /event)	0.49	0.49	0.49	0.49	0.49	0.49	0.49	3
Events per day	0	0	0	1	1	1	1	2
Days per week exposed (days/7days)	0/7	0/7	0/7	7/7	7/7	7/7	7/7	2

Table D-25 Exposure Parameters Used in the Multimedia Risk Assessment

Parameters	Seasonal User (Aboriginal)					Seasonal User (Non-Aboriginal)		Reference
	Infant	Toddler	Child	Adolescent	Adult	Adolescent	Adult	
	0 to 6 months	>6 months to <5 years	5 to 11 years	12 to 19 years	20+ years	12 to 19 years	20+ years	
C. Country Foods								
1) Ingestion of chemicals in fish								
Ingestion rate (kg fish /day)	0	0.02	0.033	0.04	0.04	0.022	0.022	4
Fraction of fish consumed from the ESA (unitless)	1	1	1	1	1	0.5	0.5	2
Days per year (days/365 days)	0/365	365/365	365/365	365/365	365/365	365/365	365/365	2
2) Ingestion of chemicals in produce (berries)								
Ingestion rate (kg berries/day)	0.004	0.004	0.004	0.004	0.015	0.004	0.015	5
Fraction of berries consumed from the ESA (unitless)	1	1	1	1	1	0.5	0.5	2
Days per year (days/365 days)	365/365	365/365	365/365	365/365	365/365	365/365	365/365	2
3) Ingestion of chemicals in traditional plants (Labrador tea leaves)								
Ingestion rate (kg produce/day)	0	0.001	0.001	0.003	0.003	0	0	6
Fraction of Labrador tea leaves consumed from the ESA (unitless)	1	1	1	1	1	0	0	2
Days per year (days/365 days)	0/365	365/365	365/365	365/365	365/365	0	0	2
4) Ingestion of chemicals in small game (snowshoe hare) ^(c)								
Ingestion rate (kg snowshoe hare/day)	0	0.0085	0.0125	0.0175	0.027	0.0175	0.027	1,2
Fraction of snowshoe hare consumed from the ESA (unitless)	1	1	1	1	1	0.5	0.5	2
Days per year (days/365 days)	0/365	365/365	365/365	365/365	365/365	365/365	365/365	2
5) Ingestion of chemicals in large game (caribou) ^(c)								
Ingestion rate (kg game/day)	0	0.0765	0.1125	0.1575	0.243	0.1575	0.243	1,2
Fraction of caribou consumed from the ESA (unitless)	1	1	1	1	1	0.5	0.5	2
Days per year (days/365 days)	0/365	365/365	365/365	365/365	365/365	365/365	365/365	2

Table D-25 Exposure Parameters Used in the Multimedia Risk Assessment

Parameters	Seasonal User (Aboriginal)					Seasonal User (Non-Aboriginal)		Reference
	Infant	Toddler	Child	Adolescent	Adult	Adolescent	Adult	
	0 to 6 months	>6 months to <5 years	5 to 11 years	12 to 19 years	20+ years	12 to 19 years	20+ years	
D. Soil								
1) Incidental ingestion of chemicals in soil								
Ingestion rate (kg/day)	0.00002	0.00008	0.00002	0.00002	0.00002	0.00002	0.00002	1
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2
2) Dermal contact with chemicals in soil ^(d)								
Conversion factor (kg/mg)	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1
Skin surface area available for contact (hands) (cm ²)	320	430	590	800	890	800	890	1
Soil to skin adherence factor (hands) (kg/cm ² /event)	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	0.0000001	1
Skin surface area available for contact (other, i.e., arms and legs) (cm ²)	550	890	1480	2230	2500	2230	2500	1
Soil to skin adherence factor (other) (kg/cm ² /event)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	1
Events per day	1	1	1	1	1	1	1	2
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2
3) Inhalation of chemicals in dust/particulate matter from soil								
Inhalation rate (m³/day)	2.2	8.3	14.5	15.6	16.6	15.6	16.6	1
Particulate emission factor (kg/m³)	7.60E-10	7.60E-10	7.60E-10	7.60E-10	7.60E-10	7.60E-10	7.60E-10	1
Event duration (hour/24 hours)	10/24	10/24	10/24	10/24	10/24	10/24	12/24	2
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2
E. Air								
Inhalation rate (m³/hour)	2.2	8.3	14.5	15.6	16.6	15.6	16.6	1
Event Duration (hours/24 hours)	10/24	10/24	10/24	10/24	10/24	10/24	12/24	2
Days per week exposed (days/7days)	7/7	7/7	7/7	7/7	7/7	7/7	7/7	2

Table D-25 Exposure Parameters Used in the Multimedia Risk Assessment

Parameters	Seasonal User (Aboriginal)					Seasonal User (Non-Aboriginal)		Reference
	Infant	Toddler	Child	Adolescent	Adult	Adolescent	Adult	
	0 to 6 months	>6 months to <5 years	5 to 11 years	12 to 19 years	20+ years	12 to 19 years	20+ years	
DOSE AMORTIZATION FOR CARCINOGENS								
Weeks per year for sediment, soil and air exposure (weeks/52 weeks)	13/52	13/52	13/52	13/52	13/52	13/52	13/52	2
Life stage duration (years)	0.5	4.5	7	8	60	8	60	1
Averaging time for carcinogens (years over which exposure is averaged)	80	80	80	80	80	80	80	1

Sources:

- 1) Health Canada (2012).
- 2) Site-specific assumption – professional judgment.
- 3) Intrinsik (2011).
- 4) Health Canada (2007).
- 5) Wein et al. (1991)
- 6) Alberta Health and Wellness (2007)

Note:

- a) Based on soil ingestion rates from Health Canada (2012).
 - b) Contact with sediment was assumed to potentially occur while fishing or collecting potable water from the lakes. It was assumed that teenagers and adults would be engaging in these activities.
 - c) Health Canada (2012) wild game consumption for aboriginal populations – assumed 10% was from small game (hare) and 90% of intake was from large game (caribou).
 - d) Soil contact was assumed to occur with hands and arms (upper and lower)
- > = great than; < = less than; kg = kilogram; L/cm³ = litre per cubic centimetre; cm² = square centimetre; kg/mg = kilograms per milligram; mg/cm²/event = milligrams per square centimetre; kg/mg = kilograms per milligram; m³ = cubic metre; kg/m³ = kilograms per cubic metre.

Table D-26 Chemical Specific Properties Used in the Risk Assessment

Parameter	Soil dermal RAF ^(a) [unitless]	Water Dermal Permeability Coefficient ^(b) [cm/hour]
Arsenic	0.03	1.00E-03
Chromium	0.1	2.00E-03
Mercury	1	1.00E-03 ^(c)
Methyl mercury	0.06	1.00E-03
Selenium	0.01	1.00E-03

a) Health Canada (2010).

b) US EPA (2004).

c) Applies to inorganic and organic mercury.

RAF = absorption factor; cm/hour = centimetres per hour.

D3.1.3 Sub-chronic Evaluation

Existing risk assessment guidance tends to focus on evaluation of long-term (chronic) exposure. However, exposure in the multimedia assessment was assumed to be seasonal (i.e., for up to three months of the year). Although amortization (or dose-averaging) over short periods (e.g., days per week) is appropriate, amortizing seasonal exposure over the year (e.g., weeks per year) can underestimate the true shorter term dose.

Haber and Meek (2013) have developed a framework for evaluating less-than-chronic or intermittent exposures. The framework uses a tiered approach, whereby increasing levels of toxicological understanding and analysis are required at each stage. The approach relies on the use of TRVs based on exposure periods as similar as possible to the actual exposure period. Under the framework, dose-averaging (or amortization) is to be used only under limited, specified conditions.

Health Canada (2010) lists the following definitions of exposure durations:

- Acute – less than 14 days, often involving a single high-intensity exposure;
- Sub-chronic – greater than 14 days and less than 90 days; and,
- Chronic – greater than 90 days.

The evaluation of chronic exposure relies on amortization and use of chronic TRVs. For sub-chronic exposure, the tiered approach suggested by Haber and Meek (2013) was applied, as described below:

- Tier 0: A screening level risk estimate is carried out, without dose-averaging, with the most conservative relevant TRV (e.g., a chronic value). If risks are considered acceptable using the chronic TRVs, risks would also be considered acceptable for sub-chronic exposure.
- Tier 1a: The exposure level is compared to a published TRV for a comparable duration (e.g., a sub-chronic TRV).
- Tier 1b: If sub-chronic TRVs are not available, studies that form the basis of chronic TRVs should be reviewed, and TRVs should be adjusted to match sub-chronic exposure durations.

Based on the guidance in Haber and Meek (2013), the multimedia assessment was first conducted using chronic TRVs (Tier 0). If potentially unacceptable risks were identified based on the chronic TRV, the assessment would be revised using sub-chronic TRVs where appropriate (Tier 1). Based on the results of the assessment, risks were considered not significant for the retained COPCs; therefore, a detailed sub-chronic evaluation was not conducted.

D3.1.4 Receptor Characteristics

Receptor characteristics and exposure parameters used in the human health risk assessment are presented in Table D-25.

D3.1.4.1 Ingestion Rates for Country Foods

The traditional land use assessment (DAR, Section 5) indicates that local Aboriginal (Inuit, Dene, and Metis) peoples have traditionally relied on lands within the ESA as a source of food, and they continue to do so. In particular, the narrows between Lac du Sauvage and Lac de Gras is an important hunting location for caribou during their migration. Other food sources in the area include fish, small game, berries, and traditional plants. For the risk assessment, caribou was selected to represent large game, snowshoe hare was selected as a surrogate for small game, and Labrador tea was selected as a surrogate for traditional plants. Fish from Lac du Sauvage and Lac de Gras were selected to represent fish within the ESA because this is where the Project influence is expected to be greatest. It was assumed that non-Aboriginal receptors, including hunting and fishing guides, also harvest food from the ESA seasonally.

Site-specific consumption-rate data were not available; therefore, other sources, including peer-reviewed papers and Canadian guidance documents, were consulted to obtain ingestion rates for the assessment.

Fish

Fish consumption rates were selected from a Health Canada (2007) evaluation of mercury risks in fish, which included a compilation and review of relevant fish consumption rates for the general public and sensitive sub-groups. The average fish ingestion rates for the general public were selected for non-Aboriginal receptors, and the ingestion rates for subsistence fishers were used for Aboriginal receptors. The Health Canada ingestion rates represent total fish ingestion (self-caught as well as commercial), and are therefore, considered conservative to represent fish caught and consumed from the ESA.

Berries and traditional plants

Consumption rates for berries were obtained from Wein et al. (1991), based on the mean daily frequency of consumption of country berries for Cree, Chipewyan, and Metis living in the vicinity of Wood Buffalo National Park, which is on the border of Alberta and the Northwest Territories. Consumption rates were based on repeated 24-hour recall surveys, and were presented by gender and by age group (adolescents and young adults, middle adults, and older adults). The maximum rate among middle and older adults (15 grams per day [g/day]) was selected as the adult rate, and the maximum rate for adolescents and young adults (4 g/day) was used for other age groups. It was assumed that both Aboriginal and non-Aboriginal receptors would consume berries at the same rate.

Alberta Health and Wellness (2007) reported ingestion rates for traditional above-ground plants (1 g/day for toddler and children, 3 g/day for teens and adults), which were based on the combined consumption rates for mint and Labrador tea reported in Wein (1989, cited in Alberta Health and Wellness 2007). These consumption rates were used to represent consumption of traditional plants (surrogate – Labrador tea) in the current assessment.

Large and small game

The following sources were considered for an appropriate ingestion rate for large and small game:

- Wein et al. (1991) reported a mean daily intake of country meat and bird of 117 g/day for frequent users of country food, based on four individual 24-hour recall surveys of Cree, Chipewyan, and Metis communities in the vicinity of Wood Buffalo National Park.
- Health Canada (2012) recommended use of a wild game ingestion rate of 270 g/day (for adults) for Canadian aboriginal populations. The ingestion rate, obtained from Richardson (1997), was based on 24-hour recall survey data of 1,873 Amerindian and 377 Inuit participants obtained from the Foods Directorate of Health Canada. The adult ingestion rate of 270 g/day was for consumers only (i.e., those who did not consume in previous 24 hours were not considered), and included ungulates as well as small game.
- Receveur et al. (1996) conducted a study of traditional food consumption in 16 Dene and Metis communities in the Northwest Territories. The study consisted of household interviews about the frequency of traditional food consumption within the previous three months, as well as 24-hour recall surveys to detail the types and quantities of food consumed on the day before the visit. Mean daily consumption rates were not reported for large and small game as a whole; however, frequency of consumption and average daily portion information was available for specific game items. Participants reported eating cooked barren-ground caribou meat on average of 2 to 3.8 days per week, and smoked barren-ground caribou meat on average 1.7 to 2.4 days per week (averaged for consumers only). Consumption of small game was slightly lower, with consumption of cooked rabbit meat (the most frequently consumed small game) averaging 0.3 to 1.1 days per week (averaged for consumers only). Average daily portions (based on 24-hour recall of consumers only) were presented by community grouping, age group (20 to 40 years, and 41 and above years), and sex. Average reported daily portions ranged from 115 g to 477 g for caribou meat, and from 112 g to 338 g for rabbit meat.

The Health Canada (2012) wild game ingestion rates for Canadian aboriginal peoples were selected for the assessment, assuming that large game accounted for 90% of total game and small game accounted for 10%. The Health Canada values were selected because they were more conservative than the Wein et al. (1991) ingestion rate and generally corresponded to the data presented in the Receveur et al. (1996) study.

D3.1.5 Bioavailability

Bioavailability (also referred to as absorption efficiency) is a measure of the amount of a chemical that is absorbed and retained within the body. Consideration of bioavailability may be important under the following circumstances (Health Canada 1995):

- if the medium of exposure is different from the medium on which the toxicity reference value is based (e.g., exposure is from soil, but the toxicity reference value is based on exposure from water);
- if the route of exposure is different from the route of exposures in the study used to derive the toxicity reference value (e.g., oral route of exposure, but based on an inhalation study); or,
- the toxicity reference value derived by the regulatory agency has been adjusted for bioavailability.

In the human health assessment, chemical bioavailability was taken into account by using relative absorption factors (RAFs). Oral and inhalation exposures were assumed to have a relative absorption of 100% (relative absorption factor = 1) because pathway-specific TRVs were typically available. As TRVs typically do not exist for the dermal exposure pathway, the dermal exposures were estimated from the oral dose, taking into account the relative bioavailability and absorption. For dermal bioavailability, the RAFs were obtained from Health Canada (2010). For dermal exposure in water, water permeability coefficients (K_p , in cm/hour) were obtained from US EPA (2004). The dermal RAFs and water dermal permeability coefficients used in the assessment are summarized in Table D-26.

D3.1.5.1 Arsenic

Arsenic can exist in organic and inorganic forms, with inorganic arsenic generally regarded as the more toxic form (Schoof et al. 1999). Arsenic in water is predominantly in the inorganic form, whereas arsenic in food items, such as meat or fish, can be largely in the organic form. There are several different forms of organic arsenic (e.g., arsenobetaine, monomethylarsonous acid) with varying degrees of toxicity (US EPA 2003). Arsenobetaine is considered virtually non-toxic; whereas, monomethylarsonous and dimethylarsonous acids may elicit some cytotoxic and genotoxic effects, but are generally considered to be less toxic than the inorganic forms of arsenic (US EPA 2003; Schoof et al. 1999). The toxicity reference values used in the assessment were based on inorganic arsenic (US EPA 1993); therefore, to the extent possible, exposure concentrations were adjusted to reflect the fraction of inorganic arsenic.

The predominant forms of arsenic in fish and shellfish (i.e., arsenobetaine and arsenocholine) have been reported to be essentially non-toxic under conditions of human consumption (Hughes et al. 2011). However, a small percentage in fish tissue may be the more toxic inorganic form. The consensus in the literature is that approximately 10% of arsenic found in edible portions of marine fish and shellfish is inorganic arsenic (US EPA 2003). Although less data are available for freshwater fish, organic arsenic appears to form a large portion of total arsenic. For example, Schoof et al. (1999) reported an inorganic mercury content of less than 1% in Rainbow Trout. Therefore, an inorganic arsenic fish content of 10% (US EPA 2003; Alberta Health and Wellness 2007) was used in calculations for arsenic exposures via the fish pathway.

The total amount and forms of arsenic (e.g., inorganic arsenic) in several food items such as meats, vegetables, bread, rice, and tap water were measured by Schoof et al. (1999) so that the amount of inorganic arsenic ingested in a typical North American diet could be estimated. Of the food items Schoof et al. (1999) measured, fruit (as apples, bananas, grapes, oranges, peaches, and watermelon) was considered relevant to the multimedia assessment for berries and beef was considered relevant to wild

game. The fraction of inorganic arsenic was calculated and applied as the percent of arsenic that was bioavailable in the multimedia assessment. The percent of bioavailable inorganic arsenic was 46% in fruit and 0.78% in beef. Therefore, an inorganic arsenic content of 46% was applied to berries, and 0.78% was applied to game meat (caribou and hare). Arsenic was assumed to be 100% in the inorganic form in all other environmental media (water, air, sediment, soil, and Labrador tea).

D3.1.6 Market Food Intake

To evaluate total risks to people, an estimate of the amount of each COPC consumed from market foods was conducted. Average daily intakes of arsenic and selenium have been published by Health Canada (2011) for residents of Halifax, Toronto, and Vancouver; however, no data specific for the Northwest Territories are available. Data from the Toronto survey were considered more representative than those from coastal cities, given that the ESA is located in the interior and is adjacent to a freshwater lake. Background dietary food intake for mercury was obtained from Dabeka et al. (2003), who estimated intakes for adults and children in two Canadian cities (Whitehorse and Ottawa). The values for Whitehorse were selected for the assessment. Both the Health Canada (2011) and Dabeka et al. (2003) daily intakes were provided separately for males and females and for different age classes. For each of the age classes evaluated in this human health risk assessment, the maximum daily intakes for males or females for the relevant age classes were applied (e.g., for the 0 to 6 months age class in the human health risk assessment, the maximum intake from the 0 to 1 month, 2 to 3 months, and 4 to 6 months Health Canada age categories were used). Elevated intakes were reported for the 0 to 1 month life stage for arsenic and mercury (i.e., 2.5 to 5 times greater than the other infant life stages, and higher than the other life stages), based on an unusually high consumption rate of marine fish in this age group (Dabeka et al. 2003). These outliers were not included in the selection because infants were assumed to not consume fish.

The Health Canada (2011) and Dabeka et al. (2003) daily intakes included several food items that are already accounted for in the predicted ingestion of food items from the ESA, including meat, fish, and berries. Inclusion of these food items in the daily intake would double-count them, and would result in overestimation of total risks. Therefore, the daily intake of beef steak, beef roast, ground beef, fresh pork (in lieu of wild game from the ESA), freshwater fish, and blueberries, raspberries, and strawberries (in lieu of berries from the ESA) were removed from the total daily intake.

Mean dietary intakes for chromium were selected from Health Canada's Priority Substances List assessment report for chromium (Health Canada 1994). Average daily intakes from food were based on concentrations of chromium in Canadian food reported by Mann Testing Laboratories (1992; as cited in Health Canada 1994) and food consumption patterns from Health and Welfare Canada (1977; as cited in Health Canada 1994), and are reported for individual life stages (i.e., infant, toddler, child, teen, and adult). For infants, the non-breastfed value was selected because it was higher than the value for breastfed infants. For intakes expressed as "less than" (e.g., less than 0.001 mg/kg/day for toddlers), the detection limit (or upper limit) was conservatively used (e.g., 0.001 mg/kg/day for toddlers).

To calculate the fraction inorganic arsenic that should be applied to the market food intake, the fraction in each food items that was measured by Schoof et al. (1999; 40 food items) was applied to matching food items that were included as part of the Canadian Total Diet Study (Health Canada 2011). For foods in the Canadian Total Diet Study that did not have a corresponding measurement in Schoof et al. (1999), either an average value for the food type was used (e.g., dairy, vegetables, fruit, meat) or a surrogate food was

selected (e.g., tomatoes as a surrogate for tomato sauce). For processed foods, such as popcorn, French fries, and candy, a weighted-average inorganic arsenic fraction was applied. This weighted-average was calculated using the fraction inorganic content of the 40 food items measured by Schoof et al. (1999) and the food item ingestion rates provided by Health Canada (2007), such that the fraction inorganic arsenic for food items that were consumed more frequently contributed more to the average than foods that were rarely eaten.

Average dietary intakes used in the human health risk assessment are provided in Table D-27. For mercury, it was assumed that 75% of background intake was in the form of methyl mercury, and 25% was in the form of inorganic mercury. Dabeka et al. (2003) indicated that the predominant background exposure to mercury was through consumption of fish (40 to 74% of total dietary intake from toddler to adult life stages), and to a lesser extent meat and dairy products (approximately 15 to 30%, depending on life stage).

Table D-27 Average Dietary Intakes Used in the Human Health Risk Assessment

Parameter	Average Dietary Intakes				
	Infant	Toddler	Child	Adolescent	Adult
	0-6 months	7 mo-4 years	5-11 years	12-19 years	20+ years
	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day
Arsenic ^(a)	0.00024	0.00019	0.00011	0.000068	0.00006
Chromium ^(b)	0.0009	0.001	0.0007	0.0004	0.0003
Mercury ^(c)	0.000019	0.000030	0.000032	0.000024	0.000028
Inorganic mercury ^(d)	0.0000047	0.0000074	0.0000079	0.0000058	0.0000070
Methyl mercury ^(d)	0.000014	0.000022	0.000024	0.000018	0.000021
Selenium ^(a)	0.0049	0.0051	0.0040	0.0024	0.0019

a) Health Canada. (2011) table for Toronto, 2005; adjusted for inorganic mercury content, as reported in Schoof et al. (1999).

b) Health Canada (1994).

c) Dabeka et al. (2003) estimates for Whitehorse.

d) Assumed that total mercury intake was 25% inorganic and 75% methyl mercury.

mg/kg/day = milligrams per kilogram per day; mo = months.

D3.2 Wildlife Health

For the wildlife health multimedia risk assessment, the following wildlife receptors were retained for the multimedia risk assessment:

- muskrat;
- grizzly bear;
- semi-palmated sandpiper;
- rusty blackbird;
- green-winged teal;

- common merganser;
- bald eagle; and,
- caribou.

The receptor selection process is detailed further in Appendix C (Section C3.4).

For the wildlife receptors retained for the multimedia risk assessment, the EDI was estimated in units of milligram of a chemical per kilogram of body weight per day.

The EDI was calculated using a food-chain model that integrated site-specific concentrations of substances in each environmental medium (e.g., water, soil, sediment, and food), and receptor-specific parameters, such as body weight, ingestion rates, and dietary preferences. The body weights, food (dietary) ingestion rates, water ingestion rates, and soil ingestion rates for each wildlife receptor evaluated in the wildlife health risk assessment are provided in Table D-27. Food and water ingestion rates were calculated using the average body weight for each wildlife receptor (Table D-28). When necessary, tissue concentrations were converted from dry weight to wet weight using the equation presented in Table D-29. The moisture contents of various food items were determined using site-specific and literature values (Table D-30).

A habitat range factor for wildlife can be estimated based on the ratio of the Project area (estimated to be approximately 403,049 hectares) to each receptor's home range (Table D-31). However, in practice, wildlife will be exposed to background concentrations of metals and contaminants even when not in the Project area, meaning that applying a habitat range factor estimated in this way could underestimate actual exposure. As an initial tier of analysis, the habitat range factor was conservatively estimated to be 1.0 for all wildlife receptors assessed (i.e., it is assumed that the receptors spend their entire life foraging within the ESA boundaries). This was considered to provide a conservative estimate of the effects of other projects. Where risks were predicted to be unacceptable (i.e., hazard quotient greater than 1), it would be possible to apply habitat range considerations either qualitatively or quantitatively.

Table D-28 Wildlife Exposure Parameters Used in the Risk Assessment

Receptor	Mean Body Weight [BW; kg]	Dietary Consumption Rate [kg/day ww]	Diet Composition	Water Consumption Rate [IR _{water} ; L/day]	Soil/ Sediment Ingestion [fraction of diet]	Soil/Sediment Consumption Rate [kg/day dw]
Caribou	150 ^(m)	5.7 ^(m)	50% lichen 30% willow/birch 20% aquatic plants	9.0 ^(m)	0.02 ^(g)	0.0845
Muskrat	1.1 ^(a)	0.0828 ^(b)	80% aquatic plants 10% grasses 5% fish 5% aquatic invertebrates	0.108 ^(b)	0.033 ^(c)	0.00245

Receptor	Mean Body Weight [BW; kg]	Dietary Consumption Rate [kg/day ww]	Diet Composition	Water Consumption Rate [IR _{water} ; L/day]	Soil/Sediment Ingestion [fraction of diet]	Soil/Sediment Consumption Rate [kg/day dw]
Grizzly bear	128 ^(d)	4.96 ^(b)	45% caribou 5% small mammals 15% berries 15% grasses 15% aquatic plants 5% fish	7.8 ^(b)	0.02 ^(e)	0.0742
Semi-palmated sandpiper	0.0265 ^(f)	0.00322 ^(b)	100% aquatic insects	0.0052 ^(b)	0.3 ^(g)	0.0016
Rusty blackbird	0.0546	0.0296 ^(b)	60% aquatic insects 10% fish 10% berries 10% grasses 10% willow/birch	0.0084 ^(b)	0.10 ^(g)	0.00088
Green-winged teal	0.32 ^(h)	0.0302 ^(b)	90% aquatic plants 10% aquatic insects	0.0275 ^(b)	0.02 ^(g)	0.00055
Common merganser	1.53 ⁽ⁱ⁾	0.102 ^(b)	60% fish 30% aquatic insects 10% aquatic plants	0.0785 ^(b)	0.026 ⁽ⁱ⁾	0.002
Bald eagle	4.65 ^(k)	0.24 ^(b)	50% small fish 50% small mammals	0.165 ^(b)	0 ^(c)	0

Note:

a) Miller (1994).

b) US EPA (1993); see Tables 28 and 29 for equations used.

c) US EPA (1999).

d) Gau and Case (1998).

e) Assumed based on diet.

f) Gratto-Trevor (1992); average body weight.

g) Beyer et al. (1994); green-winged teal sediment ingestion rate is based on the blue-winged teal; caribou soil ingestion rate based on elk; rusty blackbird ingestion rate derived by considering value for semi-palmated sandpiper and adjusting for differences in feeding methods and preferences.

h) Johnson (1995); average body weight.

i) Mallory and Metz (1999); average body weight.

j) Sample and Suter (1994).

k) Buehler (2000).

l) Assumed negligible due to diet.

m) Environment Canada (2012).

BW = body weight; kg = kilogram; kg/day – kilograms per day; dw = dry weight; ww = wet weight; IR_{water} = water ingestion rate; L/day = litres per day; % = percent.

Table D-29 Food Ingestion and Water Ingestion Rate Calculations

Pathway	Equation and Equation Parameters
Food ingestion rate	Mammals: $IR_{\text{food}} = 0.0687 Wt^{0.822}$
	Birds: $IR_{\text{food}} = 0.0582 Wt^{0.651}$
	IR_{food} = food ingestion rate (kg/day) (dry weight) Wt = body weight (kg) Wt = body weight (g)
Water ingestion rate	Mammals: $IR_{\text{water}} = 0.099 Wt^{0.90}$
	Birds: $IR_{\text{water}} = 0.059 Wt^{0.67}$
	IR_{water} = water ingestion rate (L/day) Wt = body weight (kg)

Source: US EPA (1993).

kg = kilogram; kg/day = kilograms per day; g = gram; L/day = litres per day.

Table D-30 Conversion Equation from Wet Weight to Dry Weight

Parameter Conversion	Equation and Equation Parameters
Wet weight to dry weight conversion	WW Concentration = $DW \times (1 - \text{moisture content})$
	WW Intake Rate = $DW / (1 - \text{moisture content})$
	DW = dry weight (kg) WW = wet weight (kg)

kg = kilogram.

Table D-31 Fraction of Moisture in Dietary Items Used in the Food Chain Model

Dietary Item	Fraction of Moisture	Source
Berry	0.846	Site-specific ^(a)
Willow and birch	0.60	Site-specific ^(a)
Lichen	0.16	Site-specific ^(a)
Grass	0.61	Site-specific ^(a)
Aquatic plants	0.66	US EPA (1999) ^(b)
Terrestrial invertebrates	0.84	US EPA (1999) ^(b)
Aquatic invertebrates	0.83	Sample et al. (1997) ^(c)
Small mammals	0.68	Sample et al. (1997) ^(c)

a) Site-specific median value from measured soil and tissue concentrations.

b) Recommended value.

c) Average value.

D4 REFERENCES

- AANDC (Aboriginal Affairs and Northern Development Canada). 2012. Canadian Arctic Contaminants Assessment Report III: Mercury in Canada's North. Chételaa JC and Braune B (editors). Northern Contaminants Program.
- Alberta Health and Wellness. 2007. Assessment of the Potential Lifetime Cancer Risk Associated with Exposure to Inorganic Arsenic among Indigenous People Living in the Wood Buffalo Region of Alberta. Prepared by Cantox Environmental Inc., Calgary, Alberta.
- Baes III CF, Sharp RD, Sjoreen AL, Shor RW. 1984. A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture. Office of Radiation Programs, U. S. Environmental Protection Agency. AD-89-F-2-A106 (formerly EPA-78-D-X0394).
- Beyer WN, Connor EE, Gerould S. 1994. Estimates of soil ingestion by wildlife. *J Wildl Manage* 58, 375-382.
- Buehler DA. 2000. Bald Eagle (*Haliaeetus leucocephalus*). In *The Birds of North America*, No. 564 (A. Poole and F. Gill, eds.). The Birds of North America Online, Ithaca, New York. Available at: http://www.allaboutbirds.org/guide/bald_eagle/lifehistory. Accessed: November 17, 2014.
- CCME (Canadian Council of Ministers of the Environment). 2000. Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota: Methylmercury. Available at: <http://ceqg-rcqe.ccme.ca/download/en/294/>. Accessed: June 2, 2014.
- Chételat JC, Hintelmann H, Amyot M, Poulain AJ. 2013. Production and loss of methylmercury and its uptake in lake food webs of the high Arctic. In *Synopsis of Research Conducted under the 2011-2012 Northern Contaminant Program*. Available at: <http://mysite.science.uottawa.ca/apoulain/page3/files/ncp.pdf>. Accessed: Jan 4, 2015.
- Dabeka RW, McKenzie AD, Bradley P. 2003. Survey of total mercury in total diet food composites and an estimation of the dietary intake of mercury by adults and children from two Canadian cities, 1998-2000. *Food Additives and Contaminants. Food Add. Cont.*, 20, 629-638.
- DeForest DK, Brix K V, William JA. 2007. Assessing metal bioaccumulation in aquatic environments: The inverse relationship between bioaccumulation factors, trophic transfer factors and exposure concentration. *Aquatic Toxicology*, 84, 236-246.
- Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Developer's Assessment Report for the Jay Project. Prepared by Golder Associates Ltd. Yellowknife, NWT, Canada.
- Environment Canada. 2012. Federal Contaminated Sites Action Plan (FCSAP) Ecological Risk Assessment Guidance, Module C: Standardization of Wildlife Receptor Characteristics. Prepared by: Azimuth Consulting Group Inc. March 2012.

- Gau RJ, Case R. 1998. Grizzly Bear (*Ursus arctos*) Studies in the Northwest Territories: Final Report to the West Kitikmeot/Slave Study Component No. 1, Nutritional Ecology. Accessed October 2014. Accessed November 2014. Available at: http://www.enr.gov.nt.ca/sites/default/files/wkss_grizzly_bear_nutritional_study.pdf. Accessed: November 17, 2014.
- Gratto-Trevor CL. 1992. Semipalmated Sandpiper. In The Birds of North America, No. 6 (Poole A, Stettenheim P, F. Gill F, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union. Accessed October 2014. Available at: http://www.allaboutbirds.org/guide/semipalmated_sandpiper/lifehistory. Accessed: November 17, 2014.
- Haber L, Meek B. 2013. Position Paper on Human Health Risk Assessment for Less-Than-Chronic Exposures to Chemicals (Non-cancer Endpoints). Final Draft. Prepared for Health Canada Contaminated Sites Division. April 2013.
- Hammerschmidt CR, Fitzgerald WF, Lamborg CH, Balcom, PH, Mao Tseng C. 2006. Biogeochemical cycling of methyl mercury in lakes and tundra watersheds of arctic Alaska. *Environ Sci Technol* 40: 1204-1211.
- Health Canada. 1994. Priority Substances List Assessment Report, Chromium and its compounds. Government of Canada, Health and Welfare Canada, Environment Canada. Minister of Supply and Services, Ottawa, ON.
- Health Canada. 1995. Human Health Risk Assessment of Chemicals from Contaminated Sites: Volumes I and II. Health Canada. Ottawa, ON.
- Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption. Bureau of Chemical Safety, Food Directorate, Health Products and Food Branch. Ottawa, ON.
- Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada toxicological reference values (TRVs) and chemical-specific factors, Version 2.0. Contaminated Sites Division, Safe Environments Directorate. September 2010. Ottawa, ON.
- Health Canada. 2011. Dietary Intakes of Contaminants & Other Chemicals for Different Age-Sex Groups of Canadians. January. Available at: <http://www.hc-sc.gc.ca/fn-an/surveill/total-diet/intake-apport/index-eng.php>. Accessed: December 1, 2014.
- Health Canada. 2012. Federal Contaminated Site Risk Assessment in Canada. Part 1: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. Ottawa, ON.
- Hintelmann H. 2010. Organomercurials: Their formation and pathways in the environment. *Met Ions Life Sci.* 7:365-401. Epub Jan 30, 2010.
- Hughes MF, Beck BD, Chen Y, Lewis AS, Thomas DJ. 2011. Arsenic exposure and toxicology: a historical perspective. *Toxicol Sci* 123: 305-332.

- Intrinsik (Intrinsik Environmental Sciences Inc.). 2011. Interim Guideline for Evaluating Human Health Risks Associated with Direct Exposure to Contaminated Sediment at Federal Contaminated Sites in Canada. Intrinsik Environmental Sciences Inc. Project #20060.
- Johnson K. 1995. Green-winged Teal (*Anas crecca*). In The Birds of North America, No. 193 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. Available at: http://www.allaboutbirds.org/guide/Green-winged_Teal/lifehistory. Accessed: October 20, 2014.
- Mailman M, Bodaly RA. 2005. Total mercury, methyl mercury, and carbon in fresh and burned plants and soil in Northwestern Ontario. Environ Pollut 138: 161-166.
- Mallory M, Metz K. 1999. Common Merganser (*Mergus merganser*). In The Birds of North America Online, No. 442 (A. Poole and F. Gill, eds.). Cornell Lab of Ornithology, Ithaca, New York. Accessed November 2014. Available at: http://www.allaboutbirds.org/guide/Common_merganser/lifehistory. Accessed: October 20, 2014.
- Miller JE. 1994. The Handbook: Prevention and Control of Wildlife Damage, Muskrats. University of Nebraska-Lincoln. Paper 15.
- RAIS (Risk Assessment Information System). 2014. Online Database and Web Resource. US Department of Energy (DOE), Office of Environmental Management, Oak Ridge Operations (ORO) Office. Available at: <http://rais.ornl.gov/>. Accessed: November 17, 2014.
- Receveur O, Boulay M, Mills C, Carpenter W, Kuhnlein HV. 1996. Variance in food use in Dene / Métis communities (Research report). Center for Indigenous Peoples' Nutrition and Environment (CINE). Ste. Anne de Bellevue, QC.
- Regier N, Larras F, Bravo AG, Ungureanu V, Amouroux D, Cosio C. 2013. Mercury bioaccumulation in the aquatic plant *Elodea nuttallii* in the field and in microcosm: Accumulation in shoots from the water might involve copper transporters. Chemosphere, 90, 595-602.
- Reid NB, Naeth MA. 2002. Ekati Diamond Mine processed kimberlite reclamation. Proceedings of the 26th Annual British Columbia Mine Reclamation Symposium in Dawson Creek, BC, 2002. The Technical and Research Committee on Reclamation.
- Richardson GM. 1997. Compendium of Canadian Human Exposure Factors for Risk Assessment. O'Connor Associates Environmental Inc. Ottawa, ON, Canada.
- Sample BE, Suter GW. 1994. Estimating Exposure of Terrestrial Wildlife to Contaminants. US Department of Energy, Office of Environmental Restoration and Waste Management. ES/ER/TM-125. September 1994.
- Sample BE, Aplin MS, Efroymsen RA, Suter GW, Welsh CJE. 1997. Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants. US Department of Energy, Office of Environmental Policy and Assistance. ORNL/TM-13391. October 1997.

- Sample BE, Beauchamp JJ, Efroymson RA, Suter II GW, Ashwood TL. 1998a. Development and Validation of Bioaccumulation Models for Earthworms. US Department of Energy, Office of Environmental Restoration and Waste Management. ES/ER/TM-220. February 1998.
- Sample BE, Beauchamp JJ, Efroymson RA, Suter II GW. 1998b. Development and Validation of Bioaccumulation Models for Small Mammals. US Department of Energy, Office of Environmental Restoration and Waste Management. ES/ER/TM-219. February 1998.
- Schoof RA, Yost LJ, Eickhoff J, Crecelius EA, Cragin DW, Meacher DM, Menzel DB. 1999. A market basket survey of inorganic arsenic in food. *Food and Chem Toxicol* 37: 839-846.
- Tong Y, Zhang W, Hu D, Ou L, Hu X, Yang T, Wei W, Ju L, Wang X. 2013. Behavior of mercury in an urban river and its accumulation in aquatic plants. *Environmental Earth Sciences* 68, 1089-1097.
- United Nations Environment Programme. 2014. Mercury Programme, Global Mercury Assessment, Chapter 5: Impacts of mercury on the environment. Available at: <http://www.chem.unep.ch/mercury/Report/Chapter5.htm>. Accessed: May 28, 2014.
- US EPA (United States Environmental Protection Agency). 1993. Wildlife Exposure Factors Handbook. Office of Health and Environmental Assessment and Office of Research and Development. EPA/600/R-993/187. December 1993. Washington, DC, USA.
- US EPA. 1997. Mercury Study Report to Congress. Volume III: Fate and Transport of Mercury in the Environment. Office of Air Quality Planning and Standards and Office of Research and Development. EPA-452/R-97-005. December 1997. Washington, DC, USA.
- US EPA. 1999. Screening Level eEcological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Peer Review Draft. Appendix C: Media-to-Receptor Bioconcentration Factors (BCFs). Solid Waste and Emergency Response. EPA530-D-99-001A. August 1999.
- US EPA. 2003. Technical Summary of Information Available on the Bioaccumulation of Arsenic in Aquatic Organisms. Office of Science and Technology and Office of Water. EPA-822-R-03-032. Washington, DC, USA.
- US EPA. 2004. Risk Assessment Guidance for Superfund Sites (RAGS) part E, Supplemental Guidance for Dermal Risk Assessment. Office of Superfund Remediation and Technology Innovation. EPA/540/R/99/005. Washington, DC, USA.
- US EPA. 2005a. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP): Chapter 5 Estimating media concentrations. Office of Solid Waste and Emergency Response. EPA530-05-006. Washington, DC, USA.
- US EPA. 2005b. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP), Appendix B: Estimating Media Concentration Equations and Variable Values. Office of Solid Waste and Emergency Response. EPA530-05-006. Washington, DC, USA.

- US EPA. 2005c. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (HHRAP Companion Database). Available at:
http://www.epa.gov/region6/6pd/rcra_c/protocol/protocol.htm. Accessed: October 17, 2015.
- US EPA. 2007. Attachment 4-1: Exposure factors and bioaccumulation models for derivation of wildlife Eco-SSLs. In: Guidance for Developing Ecological Soil Screening Levels. OSWER Directive 9285.7-55.
- US EPA. 2013. Statistical Software ProUCL 5.0.00 for Environmental Applications for Data Sets with and without Nondetect Observations. September 2013.
- Wein EE, Sabry JH, Evers FT. 1991. Food consumption patterns and use of country foods by native Canadians near Wood Buffalo National Park, Canada. Arctic 44: 196-205.



ATTACHMENT D1

METAL DEPOSITION DATA



Tables

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Table D1-1 Total Deposition Rates for Metals under the Base Case

Deposition Rate [kg/ha/yr]	Courageous_Lake_Lodge	Diavik_Camp	Diavik_TK_Camp	Ekati_Camp/Admin	Lac_de_Gras_Winter_Road _Rest_Stop	LDG_Hunting_Camp	Misery_Camp	Pellatt_Lake_Cabin	Salmita_Airstrip	Treeline_Lodge	Jay Fenceline	MPOI
Aluminum	6.45E-03	3.01E+00	4.14E-01	2.06E-01	2.27E-01	3.09E-02	8.22E+00	1.08E-02	6.49E-03	6.42E-03	7.85E-01	1.74E+02
Antimony	1.81E-07	8.78E-05	1.17E-05	5.79E-06	6.33E-06	8.69E-07	2.28E-04	3.03E-07	1.82E-07	1.80E-07	2.18E-05	4.84E-03
Arsenic	9.41E-07	5.21E-04	5.99E-05	2.72E-05	2.82E-05	4.32E-06	9.63E-04	1.47E-06	1.01E-06	1.00E-06	9.42E-05	2.03E-02
Barium	6.23E-05	4.86E-02	4.28E-03	2.14E-03	2.02E-03	3.08E-04	6.75E-02	1.02E-04	6.43E-05	6.34E-05	6.66E-03	1.42E+00
Beryllium	2.88E-07	1.25E-04	1.72E-05	6.52E-06	7.15E-06	1.20E-06	2.36E-04	4.08E-07	3.30E-07	3.31E-07	2.34E-05	4.92E-03
Cadmium	3.16E-06	9.50E-04	1.06E-04	2.67E-05	2.39E-05	8.64E-06	1.28E-04	3.40E-06	4.17E-06	4.42E-06	4.01E-05	9.50E-04
Chromium	2.46E-05	2.68E-02	1.78E-03	8.88E-04	7.13E-04	1.24E-04	2.12E-02	3.89E-05	2.63E-05	2.59E-05	2.20E-03	4.44E-01
Cobalt	1.63E-06	1.72E-03	1.03E-04	4.80E-05	3.39E-05	7.26E-06	8.07E-04	2.28E-06	1.88E-06	1.90E-06	9.32E-05	1.63E-02
Copper	2.66E-06	1.65E-03	1.60E-04	7.16E-05	6.92E-05	1.16E-05	2.19E-03	3.94E-06	2.96E-06	2.98E-06	2.21E-04	4.58E-02
Iron	1.84E-03	1.48E+00	1.27E-01	6.33E-02	5.91E-02	9.11E-03	1.96E+00	3.00E-03	1.90E-03	1.88E-03	1.94E-01	4.13E+01
Lead	2.45E-06	1.16E-03	1.39E-04	5.92E-05	6.20E-05	1.02E-05	2.02E-03	3.56E-06	2.75E-06	2.78E-06	2.01E-04	4.21E-02
Manganese	3.05E-05	2.73E-02	2.13E-03	1.06E-03	9.39E-04	1.51E-04	3.00E-02	4.90E-05	3.21E-05	3.17E-05	3.02E-03	6.31E-01
Mercury	5.38E-07	3.43E-04	3.34E-05	1.51E-05	1.42E-05	2.41E-06	4.53E-04	8.01E-07	6.00E-07	5.97E-07	4.56E-05	9.47E-03
Molybdenum	1.51E-07	1.08E-04	1.02E-05	5.09E-06	4.97E-06	7.41E-07	1.69E-04	2.48E-07	1.55E-07	1.53E-07	1.66E-05	3.57E-03
Nickel	1.19E-05	2.53E-02	1.05E-03	5.29E-04	2.44E-04	6.67E-05	3.11E-03	1.73E-05	1.38E-05	1.35E-05	5.17E-04	5.76E-02
Selenium	5.58E-07	2.08E-04	2.92E-05	4.46E-06	4.76E-06	1.79E-06	5.91E-05	5.59E-07	7.63E-07	7.80E-07	9.91E-06	8.02E-04
Silver	5.24E-07	1.60E-04	1.78E-05	4.83E-06	4.41E-06	1.46E-06	4.08E-05	5.76E-07	6.85E-07	7.25E-07	8.40E-06	5.39E-04
Strontium	3.90E-05	2.83E-02	2.65E-03	1.32E-03	1.28E-03	1.92E-04	4.36E-02	6.42E-05	4.01E-05	3.96E-05	4.27E-03	9.20E-01
Tellurium	1.01E-08	6.07E-06	6.70E-07	3.34E-07	3.45E-07	4.93E-08	1.21E-05	1.69E-08	1.03E-08	1.02E-08	1.17E-06	2.56E-04
Thallium	1.23E-07	5.49E-05	7.86E-06	3.91E-06	4.35E-06	5.89E-07	1.58E-04	2.07E-07	1.24E-07	1.22E-07	1.51E-05	3.36E-03
Titanium	1.48E-04	8.48E-02	9.72E-03	4.84E-03	5.07E-03	7.18E-04	1.79E-01	2.46E-04	1.50E-04	1.48E-04	1.73E-02	3.79E+00
Tungsten	4.20E-07	1.99E-04	2.70E-05	1.34E-05	1.48E-05	2.02E-06	5.33E-04	7.05E-07	4.22E-07	4.18E-07	5.09E-05	1.13E-02
Uranium	5.30E-07	2.82E-04	3.45E-05	1.72E-05	1.84E-05	2.56E-06	6.55E-04	8.86E-07	5.36E-07	5.30E-07	6.29E-05	1.39E-02
Vanadium	3.74E-06	2.83E-03	2.56E-04	1.28E-04	1.22E-04	1.85E-05	4.11E-03	6.14E-06	3.86E-06	3.80E-06	4.04E-04	8.67E-02
Zinc	8.73E-06	4.12E-03	4.57E-04	1.96E-04	1.99E-04	3.45E-05	6.16E-03	1.23E-05	9.99E-06	1.02E-05	6.27E-04	1.28E-01

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingement; TK = Traditional Knowledge.

Table D1-2 Dry Deposition Rates for Metals under the Base Case

DRY Deposition Rate [kg/ha/yr]	Courageous_Lake_ Lodge	Diavik_Camp	Diavik_TK_Camp	Ekati_Camp/Admin	Lac_de_Gras_Winter_ Road_Rest_Stop	LDG_Hunting_Camp	Misery_Camp	Pellatt_Lake_Cabin	Salmita_Airstrip	Treeline_Lodge	Jay Fenceline	MPOI
Aluminum	5.16E-03	2.94E+00	3.88E-01	1.73E-01	2.10E-01	2.83E-02	7.91E+00	9.42E-03	5.43E-03	5.23E-03	7.32E-01	1.71E+02
Antimony	1.45E-07	8.58E-05	1.09E-05	4.87E-06	5.86E-06	7.96E-07	2.20E-04	2.64E-07	1.53E-07	1.47E-07	2.03E-05	4.75E-03
Arsenic	7.61E-07	5.07E-04	5.58E-05	2.30E-05	2.61E-05	3.95E-06	9.26E-04	1.28E-06	8.46E-07	8.18E-07	8.77E-05	1.99E-02
Barium	5.06E-05	4.75E-02	3.99E-03	1.82E-03	1.87E-03	2.84E-04	6.49E-02	8.92E-05	5.46E-05	5.26E-05	6.22E-03	1.40E+00
Beryllium	2.33E-07	1.20E-04	1.59E-05	5.50E-06	6.59E-06	1.09E-06	2.27E-04	3.54E-07	2.74E-07	2.66E-07	2.17E-05	4.83E-03
Cadmium	2.30E-06	6.63E-04	9.42E-05	1.96E-05	1.88E-05	6.91E-06	1.17E-04	2.60E-06	3.04E-06	3.05E-06	3.28E-05	7.73E-04
Chromium	2.03E-05	2.61E-02	1.66E-03	7.65E-04	6.60E-04	1.15E-04	2.04E-02	3.42E-05	2.25E-05	2.17E-05	2.06E-03	4.36E-01
Cobalt	1.30E-06	1.64E-03	9.54E-05	4.12E-05	3.09E-05	6.58E-06	7.75E-04	1.96E-06	1.54E-06	1.51E-06	8.63E-05	1.61E-02
Copper	2.12E-06	1.57E-03	1.48E-04	6.04E-05	6.35E-05	1.05E-05	2.11E-03	3.38E-06	2.42E-06	2.35E-06	2.05E-04	4.50E-02
Iron	1.49E-03	1.44E+00	1.18E-01	5.39E-02	5.48E-02	8.40E-03	1.89E+00	2.63E-03	1.62E-03	1.56E-03	1.81E-01	4.06E+01
Lead	1.93E-06	1.09E-03	1.29E-04	4.95E-05	5.67E-05	9.17E-06	1.94E-03	3.04E-06	2.23E-06	2.17E-06	1.87E-04	4.14E-02
Manganese	2.49E-05	2.67E-02	1.98E-03	9.05E-04	8.69E-04	1.40E-04	2.89E-02	4.30E-05	2.73E-05	2.63E-05	2.82E-03	6.19E-01
Mercury	4.36E-07	3.33E-04	3.10E-05	1.28E-05	1.31E-05	2.20E-06	4.36E-04	6.97E-07	5.02E-07	4.85E-07	4.24E-05	9.30E-03
Molybdenum	1.22E-07	1.05E-04	9.53E-06	4.32E-06	4.60E-06	6.81E-07	1.63E-04	2.17E-07	1.31E-07	1.26E-07	1.54E-05	3.51E-03
Nickel	1.03E-05	2.47E-02	9.66E-04	4.70E-04	2.26E-04	6.30E-05	2.99E-03	1.56E-05	1.23E-05	1.19E-05	4.85E-04	5.65E-02
Selenium	4.62E-07	1.93E-04	2.63E-05	3.85E-06	4.24E-06	1.59E-06	5.57E-05	4.80E-07	6.27E-07	6.15E-07	8.82E-06	7.87E-04
Silver	3.80E-07	1.13E-04	1.59E-05	3.58E-06	3.55E-06	1.17E-06	3.84E-05	4.41E-07	4.99E-07	5.01E-07	7.09E-06	5.28E-04
Strontium	3.16E-05	2.77E-02	2.48E-03	1.12E-03	1.19E-03	1.77E-04	4.19E-02	5.61E-05	3.40E-05	3.27E-05	3.99E-03	9.04E-01
Tellurium	8.17E-09	5.93E-06	6.27E-07	2.82E-07	3.20E-07	4.53E-08	1.16E-05	1.47E-08	8.69E-09	8.37E-09	1.09E-06	2.52E-04
Thallium	9.84E-08	5.36E-05	7.37E-06	3.28E-06	4.03E-06	5.39E-07	1.52E-04	1.80E-07	1.03E-07	9.95E-08	1.41E-05	3.30E-03
Titanium	1.19E-04	8.29E-02	9.10E-03	4.09E-03	4.70E-03	6.59E-04	1.72E-01	2.15E-04	1.26E-04	1.22E-04	1.61E-02	3.72E+00
Tungsten	3.36E-07	1.94E-04	2.53E-05	1.13E-05	1.37E-05	1.85E-06	5.13E-04	6.13E-07	3.54E-07	3.41E-07	4.75E-05	1.11E-02
Uranium	4.26E-07	2.75E-04	3.23E-05	1.45E-05	1.70E-05	2.35E-06	6.30E-04	7.72E-07	4.50E-07	4.34E-07	5.86E-05	1.36E-02
Vanadium	3.04E-06	2.77E-03	2.39E-04	1.09E-04	1.13E-04	1.70E-05	3.95E-03	5.37E-06	3.27E-06	3.15E-06	3.77E-04	8.52E-02
Zinc	6.73E-06	3.72E-03	4.21E-04	1.63E-04	1.81E-04	3.05E-05	5.91E-03	1.03E-05	7.86E-06	7.72E-06	5.80E-04	1.26E-01

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingemen; TK = Traditional Knowledge.



Table D1-3 Wet Deposition Rates for Metals under the Base Case

WET Deposition Rate [kg/ha/yr]	Courageous Lake Lodge	Diavik Camp	Diavik TK Camp	Ekati Camp/Admin	Lac de Gras Winter Road Rest Stop	LDG Hunting Camp	Misery Camp	Pellatt Lake Cabin	Salmita Airstrip	Treeline Lodge	Jay Fenceline	MPOI
Aluminum	1.29E-03	6.92E-02	2.59E-02	3.29E-02	1.68E-02	2.63E-03	3.17E-01	1.41E-03	1.06E-03	1.19E-03	5.31E-02	3.10E+00
Antimony	3.61E-08	2.01E-06	7.32E-07	9.21E-07	4.68E-07	7.33E-08	8.79E-06	3.94E-08	2.95E-08	3.31E-08	1.48E-06	8.60E-05
Arsenic	1.81E-07	1.45E-05	4.10E-06	4.19E-06	2.13E-06	3.69E-07	3.74E-05	1.90E-07	1.64E-07	1.87E-07	6.47E-06	3.60E-04
Barium	1.17E-05	1.07E-03	2.82E-04	3.17E-04	1.49E-04	2.42E-05	2.61E-03	1.27E-05	9.71E-06	1.08E-05	4.48E-04	2.53E-02
Beryllium	5.45E-08	4.90E-06	1.29E-06	1.02E-06	5.62E-07	1.11E-07	9.31E-06	5.44E-08	5.59E-08	6.52E-08	1.67E-06	8.76E-05
Cadmium	8.66E-07	2.87E-04	1.19E-05	7.13E-06	5.03E-06	1.72E-06	1.05E-05	8.02E-07	1.13E-06	1.36E-06	7.37E-06	2.87E-04
Chromium	4.34E-06	6.27E-04	1.24E-04	1.23E-04	5.31E-05	9.21E-06	8.23E-04	4.67E-06	3.77E-06	4.19E-06	1.48E-04	7.90E-03
Cobalt	3.22E-07	8.11E-05	8.08E-06	6.82E-06	3.03E-06	6.76E-07	3.22E-05	3.26E-07	3.42E-07	3.94E-07	6.88E-06	2.92E-04
Copper	5.45E-07	8.46E-05	1.16E-05	1.12E-05	5.71E-06	1.11E-06	8.59E-05	5.61E-07	5.41E-07	6.26E-07	1.58E-05	8.15E-04
Iron	5.45E-07	8.46E-05	1.16E-05	1.12E-05	5.71E-06	1.11E-06	8.59E-05	5.61E-07	5.41E-07	6.26E-07	1.30E-02	7.35E-01
Lead	3.43E-04	3.27E-02	8.38E-03	9.32E-03	4.37E-03	7.12E-04	7.57E-02	3.73E-04	2.86E-04	3.19E-04	1.46E-05	7.50E-04
Manganese	5.14E-07	7.63E-05	1.03E-05	9.70E-06	5.22E-06	1.04E-06	7.92E-05	5.23E-07	5.24E-07	6.10E-07	2.03E-04	1.12E-02
Mercury	5.61E-06	6.46E-04	1.44E-04	1.53E-04	6.98E-05	1.17E-05	1.16E-03	6.07E-06	4.79E-06	5.35E-06	3.17E-06	1.69E-04
Molybdenum	1.02E-07	1.02E-05	2.41E-06	2.26E-06	1.11E-06	2.07E-07	1.77E-05	1.04E-07	9.86E-08	1.12E-07	1.11E-06	6.35E-05
Nickel	2.86E-08	2.39E-06	6.65E-07	7.66E-07	3.67E-07	5.91E-08	6.52E-06	3.12E-08	2.37E-08	2.65E-08	3.19E-05	1.50E-03
Selenium	1.59E-06	5.39E-04	7.98E-05	5.96E-05	1.78E-05	3.75E-06	1.24E-04	1.68E-06	1.50E-06	1.61E-06	1.08E-06	1.55E-05
Silver	9.60E-08	1.50E-05	2.88E-06	6.11E-07	5.19E-07	1.94E-07	3.37E-06	7.94E-08	1.36E-07	1.64E-07	1.31E-06	4.75E-05
Strontium	1.44E-07	4.75E-05	1.96E-06	1.25E-06	8.63E-07	2.87E-07	2.46E-06	1.34E-07	1.87E-07	2.24E-07	2.88E-04	1.64E-02
Tellurium	7.41E-06	6.27E-04	1.73E-04	1.98E-04	9.49E-05	1.53E-05	1.68E-03	8.07E-06	6.14E-06	6.85E-06	7.91E-08	4.55E-06
Thallium	1.98E-09	1.36E-07	4.29E-08	5.16E-08	2.55E-08	4.05E-09	4.67E-07	2.16E-09	1.63E-09	1.82E-09	1.02E-06	5.97E-05
Titanium	9.84E-08	5.36E-05	7.37E-06	3.28E-06	4.03E-06	5.39E-07	1.52E-04	1.80E-07	1.03E-07	9.95E-08	1.17E-03	6.74E-02
Tungsten	1.19E-04	8.29E-02	9.10E-03	4.09E-03	4.70E-03	6.59E-04	1.72E-01	2.15E-04	1.26E-04	1.22E-04	3.45E-06	2.01E-04
Uranium	2.90E-05	1.91E-03	6.20E-04	7.54E-04	3.75E-04	5.93E-05	6.90E-03	3.17E-05	2.38E-05	2.67E-05	4.25E-06	2.47E-04
Vanadium	8.40E-08	4.55E-06	1.69E-06	2.14E-06	1.09E-06	1.71E-07	2.05E-05	9.17E-08	6.85E-08	7.70E-08	2.72E-05	1.54E-03
Zinc	1.05E-07	6.38E-06	2.19E-06	2.70E-06	1.36E-06	2.14E-07	2.52E-05	1.14E-07	8.58E-08	9.63E-08	4.77E-05	2.28E-03

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingement; TK = Traditional Knowledge.



Table D1-4 Total Deposition Rates for Metals under the Application Case

Deposition Rate [kg/ha/yr]	Courageous_Lake_ Lodge	Diavik_Camp	Diavik_TK_Camp	Ekati_Camp/Admin	Lac_de_Gras_Winter_ Road_Rest_Stop	LDG_Hunting_Camp	Misery_Camp	Pellatt_Lake_Cabin	Salmita_Airstrip	Treeline_Lodge	Jay Fenceline	MPOI
Aluminum	8.14E-03	3.02E+00	4.81E-01	1.08E-01	1.99E+00	4.70E-02	2.97E+00	1.33E-02	7.90E-03	7.77E-03	2.94E+02	3.62E+02
Antimony	2.28E-07	8.82E-05	1.35E-05	3.08E-06	5.52E-05	1.31E-06	8.27E-05	3.71E-07	2.21E-07	2.18E-07	8.15E-03	1.01E-02
Arsenic	1.14E-06	5.23E-04	6.83E-05	1.54E-05	2.33E-04	6.20E-06	3.60E-04	1.75E-06	1.17E-06	1.16E-06	3.41E-02	4.21E-02
Barium	7.68E-05	4.87E-02	4.94E-03	1.29E-03	1.65E-02	4.46E-04	2.62E-02	1.23E-04	7.65E-05	7.51E-05	2.40E+00	2.96E+00
Beryllium	3.33E-07	1.25E-04	1.91E-05	3.65E-06	5.67E-05	1.65E-06	8.82E-05	4.73E-07	3.66E-07	3.67E-07	8.28E-03	1.02E-02
Cadmium	3.78E-06	9.58E-04	1.22E-04	2.75E-05	9.73E-05	1.24E-05	2.24E-04	4.38E-06	4.66E-06	4.96E-06	6.34E-03	6.34E-03
Chromium	2.96E-05	2.69E-02	2.05E-03	5.97E-04	5.31E-03	1.71E-04	9.11E-03	4.62E-05	3.05E-05	3.00E-05	7.49E-01	9.23E-01
Cobalt	1.93E-06	1.73E-03	1.19E-04	3.61E-05	2.17E-04	9.73E-06	4.17E-04	2.74E-06	2.13E-06	2.15E-06	2.85E-02	3.42E-02
Copper	3.22E-06	1.66E-03	1.83E-04	4.45E-05	5.46E-04	1.66E-05	8.73E-04	4.77E-06	3.42E-06	3.44E-06	7.80E-02	9.54E-02
Iron	2.26E-03	1.48E+00	1.46E-01	3.84E-02	4.81E-01	1.31E-02	7.65E-01	3.62E-03	2.26E-03	2.22E-03	6.97E+01	8.59E+01
Lead	2.95E-06	1.17E-03	1.59E-04	3.51E-05	4.99E-04	1.47E-05	7.78E-04	4.31E-06	3.17E-06	3.20E-06	7.18E-02	8.78E-02
Manganese	3.72E-05	2.74E-02	2.45E-03	6.68E-04	7.41E-03	2.14E-04	1.21E-02	5.88E-05	3.77E-05	3.71E-05	1.06E+00	1.31E+00
Mercury	6.31E-07	3.44E-04	3.77E-05	9.35E-06	1.11E-04	3.30E-06	1.77E-04	9.36E-07	6.77E-07	6.71E-07	1.60E-02	1.97E-02
Molybdenum	1.87E-07	1.08E-04	1.18E-05	2.99E-06	4.13E-05	1.08E-06	6.45E-05	3.00E-07	1.85E-07	1.81E-07	6.02E-03	7.42E-03
Nickel	1.32E-05	2.53E-02	1.18E-03	4.41E-04	9.63E-04	7.85E-05	2.93E-03	1.93E-05	1.49E-05	1.46E-05	9.82E-02	3.77E-01
Selenium	5.53E-07	2.08E-04	2.94E-05	3.42E-06	1.26E-05	1.81E-06	3.59E-05	5.49E-07	7.53E-07	7.71E-07	1.34E-03	1.65E-03
Silver	6.32E-07	1.62E-04	2.06E-05	4.73E-06	2.10E-05	2.13E-06	4.40E-05	7.46E-07	7.70E-07	8.20E-07	1.78E-03	1.78E-03
Strontium	4.83E-05	2.84E-02	3.06E-03	7.79E-04	1.06E-02	2.80E-04	1.67E-02	7.77E-05	4.79E-05	4.71E-05	1.55E+00	1.91E+00
Tellurium	1.27E-08	6.09E-06	7.77E-07	1.87E-07	2.94E-06	7.33E-08	4.49E-06	2.05E-08	1.24E-08	1.22E-08	4.32E-04	5.33E-04
Thallium	1.56E-07	5.51E-05	9.15E-06	2.04E-06	3.83E-05	8.97E-07	5.69E-05	2.54E-07	1.51E-07	1.48E-07	5.66E-03	6.98E-03
Titanium	1.85E-04	8.51E-02	1.13E-02	2.68E-03	4.35E-02	1.07E-03	6.61E-02	3.01E-04	1.81E-04	1.78E-04	6.39E+00	7.88E+00
Tungsten	5.30E-07	2.00E-04	3.14E-05	7.09E-06	1.29E-04	3.06E-06	1.93E-04	8.64E-07	5.14E-07	5.06E-07	1.91E-02	2.35E-02
Uranium	6.66E-07	2.83E-04	4.01E-05	9.32E-06	1.59E-04	3.85E-06	2.40E-04	1.08E-06	6.49E-07	6.39E-07	2.34E-02	2.88E-02
Vanadium	4.62E-06	2.84E-03	2.95E-04	7.61E-05	1.01E-03	2.68E-05	1.58E-03	7.42E-06	4.59E-06	4.51E-06	1.46E-01	1.80E-01
Zinc	1.07E-05	4.14E-03	5.28E-04	1.24E-04	1.57E-03	5.09E-05	2.49E-03	1.53E-05	1.16E-05	1.19E-05	2.22E-01	2.68E-01

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingement; TK = Traditional Knowledge.

Table D1-5 Dry Deposition Rates for Metals under the Application Case

DRY Deposition Rate [kg/ha/yr]	Courageous_Lake_Lodge	Diavik_Camp	Diavik_TK_Camp	Ekati_Camp/Admin	Lac_de_Gras_Winter_Road_Rest_Stop	LDG_Hunting_Camp	Misery_Camp	Pellatt_Lake_Cabin	Salmita_Airstrip	Treeline_Lodge	Jay Fenceline	MPOI
Aluminum	6.65E-03	2.94E+00	4.60E-01	9.87E-02	1.89E+00	4.24E-02	2.78E+00	1.13E-02	6.41E-03	6.01E-03	2.90E+02	3.56E+02
Antimony	1.86E-07	8.60E-05	1.29E-05	2.81E-06	5.25E-05	1.19E-06	7.75E-05	3.16E-07	1.80E-07	1.69E-07	8.05E-03	9.87E-03
Arsenic	9.35E-07	5.08E-04	6.46E-05	1.40E-05	2.22E-04	5.61E-06	3.38E-04	1.49E-06	9.58E-07	9.07E-07	3.37E-02	4.13E-02
Barium	6.35E-05	4.76E-02	4.69E-03	1.17E-03	1.57E-02	4.05E-04	2.46E-02	1.06E-04	6.31E-05	5.94E-05	2.37E+00	2.90E+00
Beryllium	2.74E-07	1.20E-04	1.79E-05	3.31E-06	5.39E-05	1.48E-06	8.26E-05	4.03E-07	2.99E-07	2.86E-07	8.18E-03	1.00E-02
Cadmium	2.68E-06	6.70E-04	1.08E-04	2.08E-05	8.80E-05	9.97E-06	2.06E-04	3.37E-06	3.43E-06	3.44E-06	6.22E-03	6.22E-03
Chromium	2.47E-05	2.62E-02	1.93E-03	5.41E-04	5.05E-03	1.56E-04	8.60E-03	3.99E-05	2.55E-05	2.41E-05	7.40E-01	9.05E-01
Cobalt	1.55E-06	1.65E-03	1.10E-04	3.20E-05	2.06E-04	8.73E-06	3.94E-04	2.31E-06	1.73E-06	1.67E-06	2.81E-02	3.36E-02
Copper	2.59E-06	1.57E-03	1.72E-04	3.98E-05	5.18E-04	1.48E-05	8.20E-04	4.02E-06	2.75E-06	2.63E-06	7.70E-02	9.36E-02
Iron	1.87E-03	1.45E+00	1.39E-01	3.49E-02	4.57E-01	1.19E-02	7.19E-01	3.10E-03	1.86E-03	1.75E-03	6.88E+01	8.43E+01
Lead	2.35E-06	1.09E-03	1.49E-04	3.13E-05	4.74E-04	1.31E-05	7.29E-04	3.61E-06	2.52E-06	2.42E-06	7.09E-02	8.61E-02
Manganese	3.08E-05	2.67E-02	2.32E-03	6.06E-04	7.04E-03	1.95E-04	1.14E-02	5.05E-05	3.12E-05	2.95E-05	1.05E+00	1.29E+00
Mercury	5.19E-07	3.34E-04	3.55E-05	8.43E-06	1.05E-04	2.99E-06	1.66E-04	8.00E-07	5.55E-07	5.27E-07	1.58E-02	1.93E-02
Molybdenum	1.54E-07	1.06E-04	1.12E-05	2.72E-06	3.92E-05	9.81E-07	6.06E-05	2.57E-07	1.52E-07	1.43E-07	5.94E-03	7.28E-03
Nickel	1.16E-05	2.48E-02	1.10E-03	3.99E-04	9.13E-04	7.36E-05	2.82E-03	1.73E-05	1.31E-05	1.26E-05	9.69E-02	3.75E-01
Selenium	4.60E-07	1.93E-04	2.66E-05	3.01E-06	1.18E-05	1.62E-06	3.31E-05	4.70E-07	6.19E-07	6.07E-07	1.32E-03	1.62E-03
Silver	4.48E-07	1.14E-04	1.84E-05	3.62E-06	1.92E-05	1.72E-06	4.07E-05	5.74E-07	5.66E-07	5.67E-07	1.75E-03	1.75E-03
Strontium	3.99E-05	2.77E-02	2.91E-03	7.09E-04	1.01E-02	2.54E-04	1.57E-02	6.65E-05	3.94E-05	3.71E-05	1.53E+00	1.88E+00
Tellurium	1.04E-08	5.94E-06	7.40E-07	1.70E-07	2.80E-06	6.64E-08	4.22E-06	1.75E-08	1.02E-08	9.54E-09	4.26E-04	5.23E-04
Thallium	1.27E-07	5.38E-05	8.74E-06	1.86E-06	3.64E-05	8.10E-07	5.34E-05	2.16E-07	1.22E-07	1.14E-07	5.59E-03	6.85E-03
Titanium	1.52E-04	8.30E-02	1.08E-02	2.44E-03	4.13E-02	9.70E-04	6.20E-02	2.56E-04	1.48E-04	1.39E-04	6.31E+00	7.73E+00
Tungsten	4.32E-07	1.95E-04	3.00E-05	6.46E-06	1.23E-04	2.76E-06	1.81E-04	7.34E-07	4.17E-07	3.91E-07	1.88E-02	2.31E-02
Uranium	5.45E-07	2.76E-04	3.82E-05	8.50E-06	1.51E-04	3.48E-06	2.25E-04	9.22E-07	5.29E-07	4.96E-07	2.31E-02	2.83E-02
Vanadium	3.82E-06	2.77E-03	2.81E-04	6.92E-05	9.56E-04	2.44E-05	1.49E-03	6.35E-06	3.78E-06	3.56E-06	1.44E-01	1.77E-01
Zinc	8.29E-06	3.74E-03	4.94E-04	1.08E-04	1.49E-03	4.46E-05	2.33E-03	1.26E-05	9.04E-06	8.75E-06	2.19E-01	2.62E-01

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingement; TK = Traditional Knowledge.

Table D1-6 Wet Deposition Rates for Metals under the Application Case

WET Deposition Rate [kg/ha/yr]	Courageous_Lake_Lodge	Diavik_Camp	Diavik_TK_Camp	Ekati_Camp/Admin	Lac_de_Gras_Winter_Road_Rest_Stop	LDG_Hunting_Camp	Misery_Camp	Pellatt_Lake_Cabin	Salmita_Airstrip	Treeline_Lodge	Jay Fenceline	MPOI
Aluminum	1.49E-03	7.58E-02	2.16E-02	9.50E-03	9.72E-02	4.55E-03	1.86E-01	1.99E-03	1.49E-03	1.76E-03	3.91E+00	6.86E+00
Antimony	4.17E-08	2.19E-06	6.14E-07	2.71E-07	2.70E-06	1.27E-07	5.17E-06	5.55E-08	4.15E-08	4.91E-08	1.09E-04	1.91E-04
Arsenic	2.03E-07	1.53E-05	3.62E-06	1.41E-06	1.15E-05	5.93E-07	2.24E-05	2.57E-07	2.14E-07	2.54E-07	4.55E-04	7.98E-04
Barium	1.33E-05	1.13E-03	2.50E-04	1.17E-04	8.11E-04	4.04E-05	1.57E-03	1.76E-05	1.34E-05	1.57E-05	3.20E-02	5.61E-02
Beryllium	5.94E-08	5.08E-06	1.16E-06	3.43E-07	2.82E-06	1.63E-07	5.63E-06	7.01E-08	6.75E-08	8.09E-08	1.10E-04	1.94E-04
Cadmium	1.10E-06	2.88E-04	1.37E-05	6.63E-06	9.29E-06	2.45E-06	1.71E-05	1.02E-06	1.23E-06	1.53E-06	1.21E-04	2.88E-04
Chromium	4.89E-06	6.47E-04	1.16E-04	5.63E-05	2.63E-04	1.46E-05	5.14E-04	6.31E-06	4.99E-06	5.83E-06	1.00E-02	1.75E-02
Cobalt	3.80E-07	8.21E-05	8.17E-06	4.08E-06	1.15E-05	1.00E-06	2.27E-05	4.25E-07	4.06E-07	4.85E-07	3.89E-04	6.53E-04
Copper	6.36E-07	8.66E-05	1.09E-05	4.75E-06	2.76E-05	1.75E-06	5.35E-05	7.51E-07	6.74E-07	8.08E-07	1.05E-03	1.81E-03
Iron	6.36E-07	8.66E-05	1.09E-05	4.75E-06	2.76E-05	1.75E-06	5.35E-05	7.51E-07	6.74E-07	8.08E-07	9.30E-01	1.63E+00
Lead	3.91E-04	3.44E-02	7.48E-03	3.50E-03	2.36E-02	1.18E-03	4.56E-02	5.16E-04	3.93E-04	4.61E-04	9.64E-04	1.67E-03
Manganese	6.00E-07	7.81E-05	9.57E-06	3.87E-06	2.53E-05	1.63E-06	4.90E-05	6.98E-07	6.45E-07	7.76E-07	1.42E-02	2.49E-02
Mercury	6.38E-06	6.72E-04	1.31E-04	6.20E-05	3.65E-04	1.91E-05	7.09E-04	8.31E-06	6.47E-06	7.59E-06	2.13E-04	3.73E-04
Molybdenum	1.12E-07	1.06E-05	2.20E-06	9.17E-07	5.50E-06	3.13E-07	1.08E-05	1.36E-07	1.22E-07	1.44E-07	8.03E-05	1.41E-04
Nickel	3.28E-08	2.53E-06	5.85E-07	2.70E-07	2.02E-06	9.94E-08	3.90E-06	4.34E-08	3.29E-08	3.87E-08	1.38E-03	2.30E-03
Selenium	1.66E-06	5.45E-04	8.21E-05	4.28E-05	4.96E-05	4.84E-06	1.11E-04	2.04E-06	1.77E-06	1.98E-06	1.84E-05	3.18E-05
Silver	9.31E-08	1.50E-05	2.85E-06	4.08E-07	8.60E-07	1.95E-07	2.77E-06	7.88E-08	1.34E-07	1.64E-07	2.99E-05	4.77E-05
Strontium	1.84E-07	4.77E-05	2.24E-06	1.11E-06	1.77E-06	4.13E-07	3.24E-06	1.72E-07	2.04E-07	2.53E-07	2.07E-02	3.63E-02
Tellurium	8.47E-06	6.64E-04	1.52E-04	7.04E-05	5.22E-04	2.57E-05	1.01E-03	1.12E-05	8.50E-06	1.00E-05	5.76E-06	1.01E-05
Thallium	2.27E-09	1.46E-07	3.69E-08	1.67E-08	1.44E-07	6.91E-09	2.77E-07	3.02E-09	2.27E-09	2.68E-09	7.54E-05	1.32E-04
Titanium	1.27E-07	5.38E-05	8.74E-06	1.86E-06	3.64E-05	8.10E-07	5.34E-05	2.16E-07	1.22E-07	1.14E-07	8.51E-02	1.49E-01
Tungsten	1.52E-04	8.30E-02	1.08E-02	2.44E-03	4.13E-02	9.70E-04	6.20E-02	2.56E-04	1.48E-04	1.39E-04	2.54E-04	4.45E-04
Uranium	3.34E-05	2.06E-03	5.30E-04	2.38E-04	2.13E-03	1.02E-04	4.08E-03	4.44E-05	3.34E-05	3.94E-05	3.11E-04	5.46E-04
Vanadium	9.70E-08	4.98E-06	1.42E-06	6.23E-07	6.31E-06	2.96E-07	1.21E-05	1.29E-07	9.68E-08	1.14E-07	1.95E-03	3.42E-03
Zinc	1.21E-07	6.91E-06	1.85E-06	8.25E-07	7.77E-06	3.68E-07	1.49E-05	1.61E-07	1.21E-07	1.43E-07	3.00E-03	5.09E-03

kg/ha/yr = kilograms per hectare per year; MPOI = maximum point of impingement; TK = Traditional Knowledge.

APPENDIX E

HUMAN HEALTH TOXICITY ASSESSMENT

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Abbreviations

Abbreviation	Definition
ATSDR	Agency for Toxic Substances and Disease Registry
CalEPA	California Environmental Protection Agency
COPC	constituent of potential concern
Cr ₂ O ₃	chromium (III) oxide
e.g.	for example
et al.	and more than one additional author
IARC	International Agency for Research on Cancer
i.e.	that is
IOM	Institute of Medicine
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
LD ₅₀	dose resulting in 50% mortality in the test population
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
MAC	maximum acceptable concentration
mo	month
MRL	minimal risk level
n/a	not available
NC	not classified
NOAEL	no observed adverse effect level
PPRTV	provisional peer-reviewed toxicity value
RfC	reference concentration
RfD	reference dose
RIVM	National Institute for Public Health and the Environment (Netherlands)
SF	slope factor
the Project	Jay Project
TRV	toxicity reference value
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
yr	year

Units of Measure

Unit	Definition
%	percent
>	greater than
≥	greater than or equal to
<	less than
≤	less than or equal to
µg/day	micrograms per day
µg/kg	micrograms per kilogram
µg/kg/day	micrograms per kilogram per day
µg/L	micrograms per litre
µg/m ³	micrograms per cubic metre
µm	micrometre
g	gram
g/kg	grams per kilogram
kg	kilogram
L	litre
L/day	litres per day
m ³	cubic metre
mg	milligram
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
mg/L	milligrams per litre
mg/m ³	milligrams per cubic metre
mL	millilitre
ppm	parts per million

E1 INTRODUCTION

This appendix provides the toxicity reference values (TRVs) used in support of the human health risk assessment conducted as part of the Developer's Assessment Report (DAR) for the Dominion Diamond Ekati Corporation Jay Project (the Project).

The human health toxicity assessment includes the development of TRVs for the constituents of potential concern (COPCs) retained following the inhalation and multimedia screening process.

E2 HUMAN HEALTH TOXICITY ASSESSMENT

This section provides the results of the toxicity assessment for the long-term human health inhalation and multimedia risk assessments. Toxicity assessment involves the classification of the toxic effects of chemicals and the estimation of the amounts of chemicals that can be received by an organism over a lifetime without adverse health effects. For each COPC, an appropriate TRV was determined based on a reported mode of action (i.e., threshold vs. non-threshold mode of action). For threshold chemicals (i.e., generally not a carcinogen) adverse effects are expected only to occur above a certain dose rate. However, for non-threshold chemicals (i.e., most carcinogens), theoretically all doses can potentially lead to adverse effects.

E2.1 Summary of Constituents of Potential Concern

E2.1.1 Chronic Inhalation Risk Assessment

Based on the screening process outlined in Appendix B, no COPCs were retained for the chronic (long-term) inhalation risk assessment.

E2.1.2 Multimedia Risk Assessment

Based on the screening process outlined in Appendix C, arsenic, chromium, mercury, and selenium were retained as COPCs for the multimedia risk assessment.

E2.2 Chemical Classification

Non-carcinogenic chemicals are assumed to have a threshold level below which no adverse effects are anticipated to occur. In contrast, carcinogenic chemicals are considered to have some level of risk for adverse effects at any level of exposure greater than zero (i.e., non-threshold). Different agencies and jurisdictions classify chemicals based on their mode of action (i.e., threshold versus non-threshold substances). The classification systems for Health Canada (2010), United States Environmental Protection Agency (USEPA; 2014a), and the International Agency for Research on Cancer (IARC; 2014), are presented in Table E-1.

Table E-1 Carcinogen Classification System

Health Canada ^(a)	USEPA ^(b)	IARC ^(c)	Description
Group I	Group A	Group 1	Human carcinogen
Group II	Group B	Group 2A	Probable human carcinogen
	Group B1		Limited human evidence available
	Group B2		Inadequate human evidence, sufficient animal evidence

Table E-1 Carcinogen Classification System

Health Canada ^(a)	USEPA ^(b)	IARC ^(c)	Description
Group III	Group C	Group 2B	Possible human carcinogen
Group IV	Group D	Group 3	Unclassifiable as to human carcinogenicity/ Unlikely to be a carcinogen (Health Canada only)
Group V	Group E	Group 4	Probably not carcinogenic to humans
Group VI	-	-	Unclassifiable as to human carcinogenicity

a) Health Canada (2010).

b) USEPA (2014a).

c) IARC (2014).

"-" Not applicable; IARC = International Agency for Research on Cancer; USEPA = United States Environmental Protection Agency.

The carcinogenicity classification for COPCs retained for the multimedia assessment, based on Health Canada, USEPA, and IARC classification is summarized in Table E-1.

Table E-2 Carcinogenicity Classification of Constituents of Potential Concern

Constituent of Potential Concern	Health Canada ^(a)	USEPA ^(b)	IARC ^(c)	Assessed as a Carcinogen?
Metals				
Arsenic	Group I	Group A	Group 1	Yes
Chromium	NC ^(d)	Group D ^(e)	Group 3 ^(e)	Yes ^(f)
Chromium (VI)	Group I ^(f)	Group D ^(g) Group A ^(f)	Group 1	
Mercury	NC	Group D ^(h) Group C ⁽ⁱ⁾	Group 3 ^(h) Group 2B ⁽ⁱ⁾	No
Selenium	NC	Group D	Group 3	No

a) Health Canada (2010).

b) USEPA (USEPA 2014a).

c) IARC (2014).

d) Total chromium.

e) Chromium (III).

f) Via inhalation pathway.

g) Via oral pathway.

h) Inorganic mercury.

i) Methyl mercury.

IARC = International Agency for Research on Cancer; NC = not classified; USEPA = United States Environmental Protection Agency.

E2.3 Toxicity Reference Values

The toxicity assessment involves identification of the potentially toxic effects of chemicals and determination of the amount of chemicals that people can be exposed to over a lifetime without experiencing unacceptable effects. This value is called the TRV or toxicity benchmark. The TRVs are based on critical effects observed from studies in exposed human populations or animal species.

For non-carcinogenic chemicals, TRVs are called reference doses (RfDs) for the oral pathway and reference concentrations (RfCs) for the inhalation pathway. An RfD is an estimate of daily oral exposure to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. An RfC is an estimate of continuous inhalation exposure to a chemical by the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects over a lifetime.

For carcinogenic chemicals, TRVs are called slope factors (SFs) for the oral pathway and inhalation unit risks (IURs) for the inhalation pathway. An SF is the upper-bound increased cancer risk from a lifetime exposure to a chemical. An IUR is the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) in air.

Toxicity reference values were obtained preferentially from Health Canada (2010) and from the USEPA's Integrated Risk Information System (IRIS; USEPA 2014a). Selection of the final TRV was based on the currency of the study, study duration (i.e., chronic duration preferred), and whether the critical endpoint was based a no-observed-adverse effect level (NOAEL). When a suitable TRV was not available from Health Canada (2010) or USEPA IRIS, the following sources were also consulted:

- World Health Organization (WHO 2014);
- Netherlands National Institute of Public Health and the Environment (RIVM; 2001, 2009);
- Agency of Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (ATSDR 2013a);
- California Environmental Protection Agency (CalEPA; 2007); and,
- USEPA provisional peer-reviewed toxicity reference values (PPRTV; USEPA 2014b).

The toxicity of a substance can differ between exposure routes (e.g., oral versus inhalation), and as a result, route-to-route extrapolation of TRVs was not conducted in the absence of inhalation-specific reference values (USEPA 2009). Oral RfD values and slope factors were conservatively used to assess dermal exposure.

The TRVs and corresponding toxicological basis selected for the multimedia risk assessment are presented in Table E-3. Toxicity profiles for the COPCs outlining pharmacokinetics, toxicity from different exposure routes, and carcinogenic effects are provided in Section E3.

Table E-3 Toxicity Reference Values for Constituents of Potential Concern Retained for the Multimedia Risk Assessment

COPC	Oral/Dermal ^(a)				Inhalation			
	RfD (mg/kg/day)	SF (mg/kg/day) ⁻¹	Target Organ(s)/Effect	Source	RfC (mg/m ³)	IUR (mg/m ³) ⁻¹	Target Organ(s)/Effect	Source
Chronic TRVs								
Arsenic	0.0003	1.8	RfD: Skin hyperpigmentation, keratosis and potential vascular complications (Blackfoot Disease) SF: Liver, lung and bladder cancer	RfD: USEPA 1993a SF: Health Canada 2010	0.001	6.4	RfC: Lung cancer IUR: Lung cancer	RfC: RIVM 2001 IUR: Health Canada 2010
Chromium	0.003 ^(b)	n/a	No effects reported	USEPA 1998a	0.0001 ^(c)	76 ^(b)	RfC: Lung IUR: Lung cancer	RfC: USEPA 1998a IUR: Health Canada 2010
Mercury (inorganic)	0.0003	n/a	Nephrotoxicity	USEPA 1995a	0.0003	n/a	Nervous system effects (hand tremor, increases in memory disturbance; slight subjective and objective evidence of autonomic dysfunction)	USEPA 1995a
Methyl mercury	0.00023	n/a	Neurobehavioral	WHO 2003	-	n/a	-	-
Selenium	0-6 mo: 0.0055 7 mo-4 yr: 0.0062 5-11 yr: 0.0063 12-19 yr: 0.0062 ≥20 yr: 0.0057	n/a	Selenosis (skin discolouration, nail deformation)	Health Canada 2010	-	n/a	-	-

a) Oral TRV adopted as dermal TRV in the absence of dermal TRVs.
 b) Chromium (VI).
 c) Chromium (VI) particulates.
 ≥ = greater than or equal to; "n/a" = not applicable; "-" = not available; ATSDR = Agency for Toxic Substances and Disease Registry; COPC = constituent of potential concern; IUR = inhalation unit risk; mg/kg/day = milligrams per kilogram per day; mg/m³ = milligrams per cubic metre; mo = months; n/a = not available; RfC = reference concentration; RfD = reference dose; RIVM = National Institute of Public Health and the Environment; SF = slope factor; TRV = toxicity reference value; USEPA = United States Environmental Protection Agency; yr = years.

E3 TOXICITY PROFILES

E3.1 Arsenic

E3.1.1 Pharmacokinetics

E3.1.1.1 Oral Exposure

Human studies show that arsenates and arsenites are well absorbed across the gastrointestinal tract; evidence is provided by the small percentage of arsenic eliminated directly in feces (the absorption of insoluble arsenic salts following oral exposure is much lower than that of arsenates and arsenites). Absorption of arsenates and arsenites through the gastrointestinal tract is estimated to be on the order of 95%, and urinary excretion ranges from 55% to 87% of the daily intake rate (ATSDR 2007).

Animal studies on arsenic bioavailability indicate the absorption of arsenic ingested in dust or soil is considerably less than the absorption of arsenic from ingested salts (ATSDR 2007). The bioavailability of arsenic from soil is reduced by low solubility and accessibility due to the presence of other soil matrix components (ATSDR 2007). A study where arsenic-contaminated soil from mining and smelting sites was incubated in simulated stomach acid found that only a portion of the arsenic (ranging from 3% to 50%) became soluble. The estimates of soluble or bioavailable arsenic agreed well with the bioavailability estimates for the same soil samples.

E3.1.1.2 Inhalation Exposure

Inhaled airborne arsenic is rapidly deposited in the respiratory tract and absorbed into the bloodstream (Hrudey et al. 1996). The size and solubility of the aerosols containing arsenic influence the extent of deposition, retention, and clearance from the lungs. A study of arsenic absorption by inhalation in a group of lung cancer patients who smoked indicated that about 40% of the arsenic in cigarette smoke was deposited in the lungs, and absorption was estimated to be 75% to 85% (ATSDR 2007), resulting in a total absorption of about 30% to 40% of the arsenic in the cigarette smoke.

The American Conference of Governmental Industrial Hygienists (2001) indicates approximately 77% of airborne particles with a diameter of 10 micrometres (μm) are generally deposited in the respiratory tract. Smelter workers exposed to arsenic trioxide absorbed about 40% to 60% of the estimated inhaled dose (ATSDR 2007). Vahter et al. (1986; as cited in ATSDR 2007) also demonstrated that smelter workers exposed to arsenic trioxide in dust eliminated arsenic relatively rapidly via urine, because urinary arsenic excretion increased within a few hours of the workers beginning work for the week, and decreased over the weekend.

E3.1.1.3 Dermal Exposure

Several studies have been conducted on the absorption of inorganic arsenic through skin in humans and animals. Wester et al. (1993; as cited in Hrudey et al. 1996) studied the absorption of arsenic from water and soil in humans and monkeys. Absorption of arsenic and arsenic mixed with soil by the skin was tested using radiolabelled arsenic acid on cadavers. Only 0.8% of the arsenic in water solution was found to penetrate human skin in comparison to the 2% to 6% that penetrated the monkey abdominal skin. The monkey skin absorbed 3% to 4.5% of the arsenic mixed with soil, while human skin absorbed 1.9%.

E3.1.2 Toxicity

E3.1.2.1 Non-Carcinogenic Effects

E3.1.2.1.1 Chronic Oral Exposure

Respiratory effects such as pulmonary edema, respiratory distress, and hemorrhagic bronchitis have been reported following cases of acute oral arsenic poisoning resulting from the consumption of doses of 8 milligrams per kilogram (mg/kg). These respiratory effects may be secondary effects resulting from damage to the cardiovascular system (ATSDR 2007). High oral doses of arsenic have resulted in cardiac arrhythmias (ATSDR 2007).

Blackfoot disease (the loss of circulation in the fingers and toes) is the primary effect of chronic arsenic exposure on the cardiovascular system. Blackfoot disease has been demonstrated in an area of Taiwan with elevated arsenic levels in drinking water (ATSDR 2007). However, similar but less severe cases of peripheral vascular disease such as Raynaud's disease and gangrene of the fingers and toes have been observed in populations chronically exposed to elevated arsenic concentrations in drinking water in Chile (ATSDR 2007). Peripheral neuropathy, characterized by numbness in hands and feet, is the most common neurological side effect of chronic oral arsenic exposure at lower doses. Symptoms improve after the exposure stops, but recovery tends to be slow and incomplete (ATSDR 2007).

Gastrointestinal distress results from oral consumption of inorganic arsenic and symptoms typically include nausea, vomiting, and diarrhea. These gastrointestinal symptoms generally subside after the exposure has stopped (ATSDR 2007). Depression of the red blood cells (anemia) or white blood cells (leukopenia) is frequently observed in humans exposed orally to arsenic for a chronic duration (ATSDR 2007). Skin lesions such as hyperkeratinization of the skin on the palms of the hands and soles of the feet, formation of corns and warts, and hyper- or hypopigmentation of the skin are the first clinical signs of chronic oral arsenic exposure (ATSDR 2007).

There is suggestive evidence that arsenic may cause developmental effects. One case of a mother who ingested arsenic at week 30 of pregnancy resulted in the birth of a premature infant who died several days later. High arsenic was found in the baby's liver, kidney, and brain. The infant demonstrated severe pulmonary hemorrhaging which was attributed to the arsenic exposure (ATSDR 2007).

Human subpopulations with a particular susceptibility to arsenic include those with decreased ability to methylate arsenic in the liver, which is the mechanism by which arsenic toxicity is reduced. Reduced capacity of the liver to methylate arsenic could be due to lack of choline or methionine in the diet (ATSDR 2007).

E3.1.2.1.2 Chronic Inhalation Exposure

Workers exposed to arsenic dusts in air have experienced irritation to the mucous membranes of the nose and throat that may lead to laryngitis, bronchitis, or rhinitis (ATSDR 2007). There is some evidence that inhaled inorganic arsenic may also result in cardiovascular effects. Cohort mortality studies of arsenic-exposed workers at various smelters have reported increased risk of mortality from cardiovascular disease (i.e., ischemic heart disease and cerebrovascular disease) and peripheral neurological effects. However, several factors (copper and other metal exposure) may have confounded the conclusions (ATSDR 2007). Gastrointestinal effects in occupationally exposed workers include nausea, vomiting, and diarrhea (ATSDR 2007). Dermatitis (hyperpigmentation, folliculitis, and superficial

ulcerations) was observed in 11 employees in one department of a Malaysian tin smelter exposed to mean arsenic oxide concentrations of 5.2 to 14.4 milligrams (mg) arsenic trioxide per cubic metre (m^3) (ATSDR 2007). There are also several studies suggesting that inhalation exposure to arsenic may have caused increased incidences of spontaneous abortion, significant increases in incidences of congenital malformations, and significantly decreased average birth weight in female smelter employees in Sweden (ATSDR 2007).

E3.1.2.1.3 Chronic Dermal Exposure

Several studies of humans exposed to arsenic dusts in the workplace have reported inorganic arsenic (usually arsenic trioxide) can cause contact dermatitis (erythema and swelling, with papules and vesicles) (ATSDR 2007). Dermatitis (hyperpigmentation, folliculitis, and superficial ulcerations) was observed in 11 employees in one department of a Malaysian tin smelter exposed to mean arsenic oxide concentrations of 5.2 to 14.4 mg arsenic trioxide/ m^3 (ATSDR 2007). Repeated contact to arsenic dust may lead to arsenic sensitization in occupational settings (ATSDR 2007).

Application of organic arsenic to the skin of rabbits was reported to result in mild dermal irritation (ATSDR 2007).

E3.1.2.1.4 Sub-Chronic Oral Exposure

Hematological effects (anemia and leukopenia) have been reported in humans orally exposed to arsenic for a sub-chronic duration (ATSDR 2007).

Respiratory effects such as pulmonary edema, respiratory distress, and hemorrhagic bronchitis have been reported following cases of acute oral arsenic poisoning resulting from the consumption of doses of 8 mg/kg body weight (ATSDR 2007). Respiratory effects may be secondary outcomes as the result of damage to the cardiovascular system (ATSDR 2007). High oral doses of arsenic have caused cardiac arrhythmias (ATSDR 2007).

E3.1.2.1.5 Sub-Chronic Inhalation Exposure

Holson et al. (1999; as cited in ATSDR 2007) reported respiratory effects (laboured breathing and gasping), gastrointestinal effects (severe hyperemia and plasma discharge into the intestinal lumen), decreased body weight and food consumption, and developmental effects (decreased fetus viability) in rats exposed to arsenic trioxide. A study by Aranyi et al. (1985; as cited in ATSDR 2007) reported decreased pulmonary bactericidal activity in female mice exposed to arsenic trioxide.

E3.1.2.1.6 Toxicity Reference Values

Reference Dose for Chronic Oral Exposure (RfD)

Health Canada (2010) has not derived an oral RfD for arsenic.

The USEPA has derived an RfD of 0.0003 milligrams per kilogram per day (mg/kg/day) based on a NOAEL of 0.009 milligrams per litre (mg/L) (Tseng 1977 and Tseng et al. 1968; as cited in USEPA 1993a) for skin lesions, keratosis, and potential cardiovascular effects (Blackfoot disease). The NOAEL identified was the arithmetic mean of arsenic concentrations of the water wells used by the control group

who did not obtain keratosis, skin lesions, or Blackfoot disease (assumed although not explicitly stated in the original study).

The NOAEL was converted into daily dose of 0.008 mg/kg/day utilizing the following assumptions: 1) a water intake rate of 4.5 litres per day (L/day); 2) an estimated arsenic exposure concentration of 0.002 milligrams per day (mg/day) in sweet potatoes and rice to account for the arsenic content in food due to a lack of measured data; and, 3) a body weight of 55 kilograms (kg). An uncertainty factor of 3 was applied for lack of data to determine whether reproductive toxicity could be a critical effect and whether the NOAEL of the critical study sufficiently accounts for a range of sensitive individuals.

Reference Concentration for Chronic Inhalation Exposure (RfC)

Health Canada (2010), USEPA (2014a), and WHO (2014) have not derived inhalation RfCs for arsenic.

The RIVM RfC is 0.001 milligrams per cubic metre (mg/m³) and is based on a lowest observed adverse effect concentration (LOAEC) of 0.01 mg/m³. RIVM (2001) indicated that lung cancer occurs in humans at concentrations greater than 0.01 mg/m³, but that the mechanism for tumours is not directly genotoxic, and therefore a threshold exists for this effect. The threshold value determined by RIVM (2001) was a tolerable concentration in air, not a cancer risk value. An uncertainty factor of 10 was applied to account for variation in susceptibility of humans (RIVM 2001). RIVM (2001) indicates that the RfC is applicable for trivalent and pentavalent forms for arsenic.

E3.1.2.2 Carcinogenic Effects

Health Canada has classified arsenic and arsenic inorganic compounds as Group I – carcinogenic to humans, based on documented human carcinogenicity following inhalation and oral exposure (Health Canada 1993). Human cancers associated with occupational exposure to arsenic compounds include lung, stomach, colon, liver, and urinary system cancers, with inhalation exposure being the most significant pathway (Health Canada 1993). Oral exposure has also been characterized, and a Taiwanese study found skin cancers associated with arsenic ingested in drinking water (Tseng et al. 1968; and Tseng 1977; as cited in Health Canada 1993).

The USEPA has classified inorganic arsenic as Group A – known human carcinogen by inhalation and oral exposure based on increased lung cancer mortality in multiple human populations (exposed primarily through inhalation), increased mortality from multiple internal organ cancers (liver, kidney, lung, and bladder), and increased incidence of skin cancer in populations consuming drinking water with high levels of inorganic arsenic (USEPA 1998b).

The IARC has classified arsenic and inorganic arsenic compounds as Group 1 – carcinogenic to humans. Increased incidence of skin and liver angiosarcoma (Roat et al. 1982; as cited in IARC 1987), intestinal and bladder cancer (von Roemeling et al. 1979; as cited in IARC 1987), and lung cancer (Matanoski et al. 1981, 1983; as cited in IARC 1987) have been reported in populations exposed to arsenic by oral and inhalation routes.

E3.1.2.2.1 Toxicity Reference Values

Slope Factor for Chronic Oral Exposure (SF)

Health Canada (2010) and USEPA have derived slope factors for arsenic and further detail on the derivation of these values is provided below.

The Health Canada oral SF is based on epidemiological studies where humans were exposed to 10 to greater than 600 micrograms per litre ($\mu\text{g/L}$) arsenic in drinking water for less than or equal to 60 years (Morales et al. 2000, Chen et al. 1985 and Wu et al. 1989; as cited in Health Canada 2010). The unit risks associated with ingestion of 1 $\mu\text{g/L}$ of arsenic in drinking water ranged from 3.06×10^{-6} to 3.85×10^{-5} (95% upper bound ranging from 6.49×10^{-6} to 4.64×10^{-5}). The most sensitive endpoint for both males and females was lung cancer. The overall unit risk associated with the ingestion of arsenic in drinking water was reported as a range, given that lifetime exposure to arsenic results in more than one cancer endpoint in different individuals. The above unit risk range has the liver cancer unit risk (3.06×10^{-6}) as its lower bound and the lung cancer unit risk (3.85×10^{-5}) as its upper bound. Based on these data, Health Canada (2010) derived an oral slope factor of $1.8 (\text{mg/kg/day})^{-1}$.

The oral SF derived by the USEPA is based on dose response data from two studies by Tseng et al. (1968; as cited in USEPA 1998b) and Tseng (1977; as cited in USEPA 1998b) on the Taiwanese population exposed to inorganic arsenic in drinking water. Several assumptions were made in the derivation of an oral SF. The population was assumed to be exposed to arsenic from birth. Males and females were assumed to consume water at a rate of 3.5 and 2.0 L/day, respectively. The maximum likelihood estimate of skin cancer risk ranged from 0.001 to 0.002 for an arsenic intake of 1 micrograms per kilogram per day ($\mu\text{g/kg/day}$) (70 kg person drinking 2 litres [L] of water per day). The USEPA (1998b) study assumed that skin cancer risk in the US population is the same as that of the Taiwanese population, and derived a cancer unit risk for drinking water of 0.05 per mg/L . This value was converted to an oral SF of 1.5 per mg/kg day .

The Health Canada slope factor was selected for the assessment given that it is based on data that are more recent and is more conservative.

Inhalation Unit Risk for Chronic Inhalation Exposure (IUR)

Health Canada (2010) and USEPA have derived inhalation unit risks for arsenic and further detail on the derivation of these values is provided below.

Health Canada derived its IUR of $6.4 (\text{mg/m}^3)^{-1}$ based on a study by Higgins et al. (1986; as cited in Health Canada 2010), where an association between arsenic exposure and increased risk in lung cancer was observed in workers at the Anaconda smelter. The estimate of the tumorigenic concentration that induces a 5% increase in the incidence of respiratory cancer was determined to be 0.0078 mg/m^3 . Health Canada (2010) derived the IUR by dividing 5% (0.05) by the corresponding incidence of respiratory cancer (0.0078 mg/m^3)

The USEPA (1998b) derived an IUR of $4.3 (\text{mg/m}^3)^{-1}$ based on occupational exposure data for smelter workers from two distinct exposed populations (USEPA 1984; as cited in USEPA 1998b). The geometric mean unit risk from the two smelters was selected as the final IUR value.

The Health Canada IUR (6.4 mg/m^3) was selected because it is the more conservative value.

E3.1.3 Summary of Toxicity Reference Values Used

Oral Chronic RfD	0.0003 mg/kg/day	USEPA 1993a
Oral Sub-Chronic RfD	Not available	-
Inhalation RfC	0.001 mg/m ³	RIVM 2001
Inhalation Sub-Chronic RfC	Not available	-
Oral Slope Factor	1.8 (mg/kg/day) ⁻¹	Health Canada 2010
Inhalation Unit Risk	6.4 (mg/m ³) ⁻¹	Health Canada 2010

E3.2 Chromium

Although chromium can exist in the valences states –2 to +6, the trivalent (+3) and the hexavalent (+6) states are the two most common species. Chromium (III) is generally considered the most thermodynamically stable of the two species under ambient redox conditions (CCME 1997). Chromium (III) is the most common and naturally occurring state of chromium and is an essential element for humans. Toxic effects of chromium are attributed primarily to the hexavalent form. Chromium (VI) rarely occurs naturally in the environment and is most commonly the result of industrial and domestic emissions.

In the multimedia assessment, only total concentrations of chromium were measured or predicted in environmental matrices, and speciation information was not available (i.e., relative proportions of hexavalent and trivalent forms were not determined). For the purposes of evaluating toxicity to human receptors, total chromium was assumed to be entirely chromium (VI) because the toxicity associated with the hexavalent form is typically greater. This assumption is highly conservative because chromium (III) is the most common, naturally occurring, and stable species in the environment.

E3.2.1 Pharmacokinetics

E3.2.1.1 Oral Exposure

Chromium (III) is an essential nutrient in the human body. The US National Academy of Sciences (2001) estimates an adequate intake level of 20 to 45 micrograms per day (µg/day) for adolescents and adults. Ingested chromium (III) and chromium (VI) are not well absorbed in the gastrointestinal tract. The estimated absorption of chromium (III) is less than or equal to 1% in humans and animals. Studies have shown that chromium (VI) is reduced to chromium (III) in the stomach, lowering the absorbed dose of ingested chromium (VI) (ATSDR 2012).

Following acute oral exposure in humans, chromium is distributed to the liver, kidneys, and brain (Kaufman et al. 1970; as cited in ATSDR 2012). In an animal study where rats were exposed to chromium VI in water for 7 days, rats in the highest exposure group (5.8 mg chromium [VI]/kg/day) had elevated concentrations of chromium in the liver, kidney, lungs, blood, and spleen. Although not all organs were analyzed, the amount of chromium retained in the organs represented only 1.7% of the final dose. Ingested chromium is excreted mainly through the feces (ATSDR 2012).

E3.2.1.2 Inhalation Exposure

Transport of inhaled chromium occurs through one of three pathways after being deposited in the respiratory tract: mucociliary transport to the gastrointestinal tract for the ciliated airways; phagocytosis by lung macrophages and cellular transport to thoracic lymph nodes; or absorption and transfer by blood and/or lymph to other tissues (ATSDR 2012). Inhaled chromium (III) and (VI) are readily absorbed from the lungs.

Studies have shown that inhaled chromium can result in elevated concentrations in the hilar lymph node, lung, spleen, liver, kidney, and heart. Chromium concentrations were highest in the lungs and tended to increase with age. However, concentrations tended to be lower the longer the time lapse between exposure and examination (ATSDR 2012).

Inhaled chromium is excreted in the urine. Tests did not show detectable levels of chromium (VI) in urine, indicating that inhaled chromium (VI) is metabolized before being excreted (ATSDR 2012).

E3.2.1.3 Dermal Exposure

Chromium (III) and (VI) can be absorbed by the skin and then distributed to the heart, stomach, blood, muscles, and kidneys (ATSDR 2012). An animal study with rabbits showed that chromium (VI) is absorbed to a greater extent than chromium (III) (Walhberg and Skog 1965; as cited in ATSDR 2012). There is limited information regarding the elimination of chromium following dermal exposure.

E3.2.2 Toxicity

E3.2.2.1 Non-Carcinogenic Effects

E3.2.2.1.1 Chronic Oral Exposure

Chronic oral exposure to chromium (VI) is associated with systemic effects (gastrointestinal, hematological, and hepatic). Gastrointestinal symptoms (oral ulcers, diarrhea, abdominal pain, indigestion, and vomiting) and hematological effects (leukocytosis and immature neutrophils) were reported in a cross-sectional epidemiological study where humans were exposed to chromium (VI) in drinking water. Estimated exposures were 0.57 mg chromium (VI)/kg/day. Exposure duration was not reported (ATSDR 2012). Hepatic effects were reported in rats and mice of both sexes exposed to varying concentrations of chromium (VI) for 1 or 2 years. There is limited information regarding the toxicity of chromium (III) from oral exposure. Most of the available studies on the toxicity of chromium (III) indicated no effects (ATSDR 2012).

E3.2.2.1.2 Chronic Inhalation Exposure

Inhalation exposure to chromium is generally in the form of particulates. Several occupational exposure studies have indicated that chronic chromium inhalation is associated with a variety of respiratory effects, including upper respiratory problems and nasal septum perforation. Occupationally exposed workers experienced excessive sneezing, runny nose, nose bleeds, ulcerations and/or perforations when exposed to 0.0001 to 0.0071 mg chromium (VI)/m³ for an average of 26.9 months (Cohen et al. 1974; as cited in ATSDR 2012). Similar symptoms were exhibited in another study by Lucas and Kramkowski (1975; as cited in ATSDR 2012), where workers were exposed to a mean concentration of 0.004 mg chromium (VI)/m³ for an average of 7.5 years. Evidence of neurological, reproductive, and developmental effects of inhaled chromium is inconclusive.

E3.2.2.1.3 *Chronic Dermal Exposure*

Information regarding the dermal toxicity of chromium for a chronic duration could not be located.

E3.2.2.1.4 *Sub-Chronic Oral Exposure*

Sub-chronic oral exposure to chromium in rats may be associated with musculoskeletal effects (increases in enzyme activity), hepatic effects (increased liver enzyme activity, activation of an immune system response at the cellular level, chronic focal inflammation), renal effects (increased accumulation of lipids). Significant decreases in body weight were reported after intermediate duration exposures to chromium (VI).

Reproductive effects have been reported in some animals orally exposed to chromium (VI). Decreased testes weight, histopathological changes of the epididymis, disrupted spermatogenesis, and decreased sperm count and motility were reported in monkeys exposed to 2.1, 4.1, or 8.3 mg chromium (VI)/kg/day in drinking water for 180 days.

E3.2.2.1.5 *Sub-Chronic Inhalation Exposure*

Respiratory effects have been reported for sub-chronic inhalation exposure to chromium. Results from occupational exposure studies indicate that inhaling chromium for a sub-chronic duration (2 to 3 months) is associated with thick nasal and postnatal discharge, and nasal septum ulceration or perforation (Lieberman 1941; as cited in ATSDR 2012). An increased risk of respiratory-related deaths was also reported in chrome plating workers exposed to chromium for at least 6 months. The exposure concentrations were not reported (Sorahan et al. 1987; as cited in ATSDR 2012). Decreased body weight gain was reported in rats exposed to sodium dichromate for 30 or 90 days (Glaser et al. 1990; as cited in ATSDR 2012).

E3.2.2.1.6 *Toxicity Reference Values*

Reference Dose for Chronic Oral Exposure (RfD)

Health Canada (2010) and USEPA (1998a) have derived RfD values for chromium, and further information on the derivation of each RfD is provided below.

The Health Canada RfD of 0.001 mg/kg/day for total chromium is based on a maximum acceptable concentration (MAC) of 0.05 mg/L for chromium (VI) in drinking water (chromium (III) was considered an essential element and non-toxic) (Health Canada 1986; as cited in Health Canada 2010). No harmful human health effects are known at this concentration and concentrations of total chromium in drinking water was generally much lower than the MAC, averaging 0.0023 mg/L (Health Canada 1986; as cited in Health Canada 2010). The RfD was derived based on an adult drinking water ingestion rate of 1.5 L/day and a body weight of 70 kg.

The USEPA RfD for chromium (VI) is 0.003 mg/kg/day and is based on a NOAEL of 25 mg/L reported by MacKenzie et al. 1958 (as cited in USEPA 1998a). The NOAEL was determined from two experiments in which rats were fed drinking water containing concentrations of chromium (VI) (as K_2CrO_4) ranging from 0.45 to 25 parts per million (ppm) for 1 year. Weight gain, food consumption, and pathological changes were monitored. No significant effects were observed at the highest concentration evaluated in the study, so the highest concentration tested was used as the NOAEL. The NOAEL was converted to a daily dose

using the average body weight and average drinking water consumption for the rat. Uncertainty factors for intraspecies variability (10) and interspecies variability (10) were applied. A modifying factor for study uncertainty (3) was also applied due to observations in a human study conducted in China that indicated that gastrointestinal effects may be observed at concentrations of 25 ppm chromium in water. However, the USEPA (1998a) indicates that a NOAEL was not derived for the human epidemiological study.

The USEPA (1998a) reference dose was selected for the assessment given that it is based on a study with multiple doses (NOAEL conservatively used). The USEPA TRV is for chromium (VI), which adds further conservatism.

Reference Concentration for Chronic Inhalation Exposure (RfC)

Health Canada (2010) has not derived an inhalation TRV for chromium (VI).

The USEPA has derived an RfC of 0.0001 mg/m³ for chromium (VI) particulates based on two studies.

In the first study by Glaser et al. (1990; as cited in USEPA 1998a), Wistar rats were exposed to 0.05 to 0.4 mg chromium (VI)/m³ for 22 hours per day, 7 days per week for 30 to 90 days (sub-acute and sub-chronic durations, respectively). Effects observed included significantly increased lung weights (both exposure durations), inflammation in the upper airways (sub-chronic duration), and increased albumin and lactate dehydrogenase in bronchoalveolar fluid.

In the second study by Glaser et al. (1985; as cited in USEPA 1998a), Wistar rats were exposed to 0.025 to 0.2 mg chromium (VI)/m³ for 22 hours per day for 28 or 90 days (sub-acute and sub-chronic durations, respectively). Effects observed included increased spleen weights (both exposure durations), decreased bronchoalveolar lavage cell counts (sub-chronic duration), and a significant increase in lymphocytes and granulocytes in lavage fluid (both exposure durations).

A benchmark concentration approach was applied using these two studies, resulting in a benchmark dose of 0.016 mg/m³. The benchmark dose was adjusted by a factor of 2.1 to account for differences between the deposition patterns in species, and uncertainty factors for pharmacodynamics differences (3), extrapolation from sub-chronic to chronic duration (10), and variability in sensitivity in humans (10) were applied.

E3.2.2.2 Carcinogenic Effects

Health Canada has not assessed the carcinogenicity of total chromium or chromium (III). Health Canada has classified chromium (VI) as Group I – carcinogenic to humans, based on documented human carcinogenicity following inhalation exposure (Health Canada 1994). Human cancers associated with occupational exposure to chromium compounds include nasal and lung cancer.

The USEPA has classified chromium (III) as Group D – not classifiable as to human carcinogenicity, due to inadequate human and animal data. The USEPA has classified chromium (VI) as Group A – known human carcinogen by inhalation based on sufficient human and animal evidence. Increased incidence of lung cancers have been reported in chromate plant workers in several studies.

The IARC has classified chromium (III) as Group 3 – not classifiable as to its carcinogenicity to humans. The IARC has classified chromium (VI) as Group 1 – carcinogenic to humans based on strong evidence of association between chromium (VI) exposure and lung cancer (IARC 2012).

E3.2.2.2.1 Toxicity Reference Values

Slope Factor for Chronic Oral Exposure (SF)

An oral SF was not available from any of the agencies listed in Section E2.3.

Inhalation Unit Risk for Chronic Inhalation Exposure (IUR)

Health Canada (2010) and USEPA (1998a) have derived inhalation unit risks for chromium (VI), and further details on the derivations of these toxicity reference values are provided below.

Health Canada derived an IUR of $76 \text{ (mg/m}^3\text{)}^{-1}$ for chromium (III) and (VI) based on excess respiratory and nasal cancer incidence in chromate production workers exposed to trivalent and hexavalent chromium (Health Canada 1994; as cited in Health Canada 2010). An increase in lung cancer mortality from exposure to total chromium was reported (Mancuso 1975; as cited in Health Canada 2010). Details of the Mancuso (1975) study are provided below.

The USEPA derived an IUR of $12 \text{ (mg/m}^3\text{)}^{-1}$ (USEPA 1998a). The USEPA IUR is based on increased lung cancer incidence in chromate industry workers. The IUR is based on a study by Mancuso (1975; as cited in USEPA 1998a), which reported over 50% lung cancer mortality in 332 workers employed from 1931 to 1951. Workers were exposed to insoluble trivalent, soluble hexavalent, and total chromium. The form of chromium responsible for lung cancer is uncertain.

The Health Canada (2010) and USEPA (1998a) IURs for chromium were based on the Mancuso 1975 study. Health Canada derived an IUR specific to chromium (VI) using the proportion chromium (VI) to total chromium reported in the study (one seventh hexavalent chromium). The Health Canada IUR for chromium (VI) of $76 \text{ (mg/m}^3\text{)}^{-1}$ was conservatively used in the assessment.

E3.2.3 Summary of Toxicity Reference Values Used

Chromium (VI)

Oral Chronic RfD	0.003 mg/kg/day	USEPA 1998a
Oral Sub-Chronic RfD	0.005 mg/kg/day	ATSDR 2012
Inhalation RfC	0.0001 mg/m^3 (particulates)	USEPA 1998a
Oral Slope Factor	Not available	-
Inhalation Unit Risk	$76 \text{ (mg/m}^3\text{)}^{-1}$	Health Canada 2010

E3.3 Mercury

Mercury can exist in the different chemical forms, including metallic (or elemental) mercury, inorganic mercury (e.g., mercuric chloride), and organic mercury (e.g., methyl mercury). Inorganic mercury can be converted to organic mercury (and vice versa) through various processes including microbial activity.

Inorganic and organic forms of mercury can be found in the natural environment. Inorganic mercury is more prevalent in abiotic matrices (i.e., soil, water), and organic mercury is more prevalent in fish.

Analysis of total and methyl mercury in Lake Trout collected from Lac du Sauvage in 2014 (Golder 2015) indicates that the fraction of methyl mercury in fish muscle is 19% (95% upper confidence limit of the mean). Therefore, both inorganic and organic forms of mercury were considered in the toxicity assessment.

E3.3.1 Pharmacokinetics

E3.3.1.1 Oral Exposure

The major sources of mercury exposure for the general population are consumption of fish, which contain methyl mercury (ATSDR 2013b), and the release of elemental mercury from dental fillings (ATSDR 1999). Human and animal data are generally limited to inhalation exposure to metallic mercury vapors, and oral exposure to inorganic and organic mercury compounds.

Metallic mercury is highly lipophilic and diffuses rapidly into the blood to major target organs such as the blood, hair, teeth, kidneys, brain, lungs, liver, and spleen (ATSDR 1999). Ingesting small amounts of metallic mercury such as the volume found in a standard thermometer (approximately 0.1 millilitre [mL] or 1 gram [g]) does not produce symptoms of intoxication (ATSDR 1999). Reports of ingestion of substantial amounts of elemental mercury indicate that absorption is negligible (less than 0.01%) (ATSDR 1999).

A number of animal studies indicate oral absorption of inorganic mercury in the 10% to 30% range, with the rate in rats and mice being dependent on several factors (e.g., intestinal pH, compound dissociation, age and diet). In animal studies, inorganic mercury tends to be distributed to the liver and kidneys. Smaller amounts were also found in the brain and retention was longest in this tissue.

Although inorganic mercury compounds do not move easily from the blood of a pregnant woman to the fetus, there is efficient transfer of inorganic mercury from blood to breast milk. Following exposure to metallic mercury, elimination can occur via the urine, feces, and expired air (ATSDR 1999).

Organic mercury compounds are more readily absorbed via oral exposure than inorganic mercury compounds, with methyl mercury being the most easily absorbed through the gastrointestinal tract (ATSDR 1999). Absorption and bioavailability of methyl mercury in food, specifically fish and bread, maybe affected by other dietary components. However, Sprague Dawley rats exposed to different diet groups (based on dietary fat) and then dosed by gavage showed no influence of diet on total mercury content in the brain, liver, and blood (ATSDR 2013b). Methyl mercury distributes readily to tissues, and Sprague Dawley rats exposed to methyl mercury in water over eight weeks resulted in elevated mercury levels in the spleen, testes, brain, and liver with the largest concentration in the kidneys (ATSDR 2013b).

Methyl mercury may also be excreted in mother's milk (ATSDR 1999). Demethylation occurs in the brain, as well as in other organs, including the kidneys and liver, and may contribute substantially to high concentrations of inorganic mercury in the brain. Organic mercury compounds are excreted primarily via the feces in humans.

E3.3.1.2 Inhalation Exposure

Retention of mercury after exposure to elemental mercury vapor released from liquid mercury is approximately 74% to 80% in human tissues (ATSDR 1999). No studies were located regarding absorption of organic mercurial compounds (e.g., phenyl- or methyl mercury) in humans or animals via inhalation exposure (ATSDR 1999).

E3.3.1.3 Dermal Exposure

Dermal absorption of metallic mercury vapor poses a very minor occupational hazard compared to inhalation exposure (ATSDR 1999). Exposure through the dermal route is estimated to result in absorption of approximately 2.6% of the amount of mercury absorbed by the lung. No information was available on the dermal absorption of liquid metallic mercury, but unless the skin surface is damaged, it is expected to be minimal (ATSDR 1999). The dermal absorption of dimethylmercury species is nearly complete (i.e., 100%) (ATSDR 1999).

E3.3.2 Toxicity

E3.3.2.1 Non-Carcinogenic Effects

E3.3.2.1.1 Chronic Oral Exposure

The major target organ following oral exposure to inorganic mercury is the kidney. The major target organs following oral exposure to organic mercury are the central nervous system and cardiovascular system (ATSDR 2013b). The major effects of organic mercury on the central nervous system include motor disturbances, sensory dysfunction, and neurodevelopmental effects (ATSDR 2013b). Cardiovascular effects include increased incidence of heart attacks and parasympathetic dysfunction (ATSDR 2013b).

Reported widespread outbreak of neurological disorders associated with the ingestion of methyl mercury-contamination occurred in the Minamata area of Japan and in Iraq (ATSDR 1999). Neurological syndromes observed in these highly exposed populations include tingling sensation in the extremities, impaired peripheral vision, hearing, taste, and smell; slurred speech; muscle weakness; irritability; memory loss; depression; and sleeping difficulties. Prenatal methyl mercury exposure in rodents has shown delayed development and impairment of motor function.

E3.3.2.1.2 Chronic Inhalation Exposure

The most commonly reported symptoms after exposure to high-concentration metallic mercury vapors include cough, dyspnea, and tightness or burning pains in the chest (ATSDR 1999). In more severe cases, respiratory distress, pulmonary edema and pneumonia have been observed. Other major target organs for the inhalation of metallic mercury-induced toxicity are the kidneys, the central nervous and gastrointestinal systems. Rabbits exposed for various durations to mercury vapor have demonstrated neurological effects (e.g., tremors), behavioural changes, and liver damage.

Exposure to organic mercury via inhalation is extremely rare. However, dyspnea and breathing difficulties were observed in a farmer who had treated grain with unknown amounts of phenylmercuric acetate (ATSDR 1999). Gastrointestinal effects, similar to metallic mercury exposure, have been reported in several case studies of humans exposed to organic mercury compounds.

E3.3.2.1.3 *Chronic Dermal Exposure*

Chronic occupational inorganic mercury exposure has resulted in contact dermatitis (ATSDR 1999). Application of ammoniated mercury ointment to skin in children resulted in itching, flushing, swelling, and conjunctivitis. A woman exposed to a topical application of a cream containing 17.5% mercuric ammonium chloride for 18 years demonstrated mild tremors, anxiety, and depression. Dermal exposure to methyl mercury or phenylmercury in humans may cause rashes and blisters on the skin (ATSDR 1999).

E3.3.2.1.4 *Sub-Chronic Oral Exposure*

Cardiovascular effects (increased blood pressure and decreased cardiac contractility) in rats have been reported after oral exposure to 28 mg mercury (as mercuric chloride)/kg/day for 180 days. Gastrointestinal effects (inflammation and necrosis of the glandular stomach) in mice were reported after oral exposure to 59 mg mercury/kg as mercuric chloride for 5 days/week for 2 weeks. Hepatic effects (increased lipid peroxidation, decreased glutathione peroxidase, decreased absolute liver weights) were reported in rats exposed to mercuric chloride orally for 30 days (ATSDR 1999).

Renal effects (increased absolute and relative kidney weights, incidence of tubular necrosis, urinary alkaline phosphatase, aspartate aminotransferase, lactate dehydrogenase, and urinary γ -glutamyltransferase activity) in rats were reported after exposure to 0.93 to 14.8 mg mercury/kg/day as mercuric chloride by gavage for 5 days/week for 2 weeks. Nephrosis and proteinaceous casts (which are markers of renal disease) in the kidneys have also been observed after a 4-week exposure to diets containing mercury. Mice exposed to mercury in drinking water for 7 weeks exhibited slight degeneration of the tubular epithelial cells and renal nephropathy. Renal effects were also observed in a 6-month study where rats and mice were exposed to 0.23 to 3.7 mg mercury/kg/day (ATSDR 1999).

E3.3.2.1.5 *Sub-Chronic Inhalation Exposure*

Respiratory effects (chronic coughs) were reported in humans exposed to mercury vapours for several weeks. Rabbits exposed to 0.86 to 6 mg/m³ mercury vapour for 2 to 12 weeks exhibited cardiovascular (mild to moderate pathological changes in the heart). Gastrointestinal (anorexia, intermittent abdominal cramps, mild diarrhea, and bleeding gums) and hematological (elevated white blood cell count, thrombocytopenia, and frequent nosebleeds) effects were reported after exposure to 0.02 to 1 mg mercury/m³ for 2 weeks (ATSDR 1999).

Renal effects from sub-chronic mercury vapour exposure have been reported in humans and animals. Renal effects in humans, including nephrotic syndrome, were reported after an intermediate exposure duration to mercury vapour. The exact duration and exposure concentrations were not reported. Renal effects (moderate, reversible pathological kidney changes) were reported in rabbits exposed to 0.86 mg/m³ mercury vapour for 7 hours/day, 5 days/week for 12 weeks. Rabbits exposed to 6 mg/m³ mercury vapour for 7 hours/day, 5 days/week for up to 11 weeks exhibited effects ranging from mild pathological changes to marked cellular degeneration and widespread necrosis. Rats exposed to 3 mg/m³ mercury vapour for 3 hours/day, 5 days/week for 12 to 42 weeks showed slight degenerative changes in the renal tubular epithelium (ATSDR 1999).

A wide range of neurological effects (dizziness, joint pain, weakness, sleep disturbance, numbness and tingling in palms, decreased pinprick and vibration sensations in the lower extremities, tremors, irritability, shyness, auditory hallucinations, photophobia, declining academic performance, headaches, anorexia, depression, and rash) were reported in adolescents (12 to 14 years old) exposed to mercury vapour for an intermediate duration (ATSDR 1999). Animals also exhibit neurological effects after exposure to mercury vapours, but appear to be less sensitive than humans (ATSDR 1999).

Reproductive effects (longer estrous cycles) were reported in rats exposed to an average of 2.5 mg/m³ mercury vapour for 6 hours/day, 5 days/week for 21 days (ATSDR 1999).

E3.3.2.1.6 Toxicity Reference Values

Health Canada (2010) and USEPA (1995b) have derived RFDs for inorganic mercury (as mercuric chloride), while USEPA (2001) and WHO (2003) have derived RFDs for organic mercury (methyl mercury). The toxicological derivations for these RFDs are provided below.

Reference Dose for Chronic Oral Exposure (RfD)

Inorganic Mercury

The Health Canada (2010) RfD is based on the USEPA RfD for mercuric chloride. The USEPA (1987; as cited in USEPA 1995b) completed a review of several studies to derive an RfD. Three main studies were utilized in the derivation.

In the first study, Brown Norway rats were exposed via subcutaneous injection to 0, 100, 250, 1,000, or 2,000 micrograms per kilogram (µg/kg) mercuric chloride three times per week, for 8 weeks. The lowest observed adverse effect level (LOAEL) was 0.226 mg/kg/day (Druet et al. 1978; as cited in USEPA 1995b).

In the second study, Brown Norway rats were force fed 0 or 3,000 µg/kg mercuric chloride for up to 60 days. The LOAEL identified in the second study was 0.317 mg/kg/day (Bernaudin et al. 1981; as cited in USEPA 1995b).

In the third study, five Brown Norway rats and two Lewis rats were exposed to 3 mg/kg mercuric chloride by gavage twice a week for 60 days. The LOAEL was 0.633 mg/kg/day (Andres et al. 1984; as cited in USEPA 1995b).

The most sensitive effect was the formation of mercuric-mercury-induced autoimmune glomerulonephritis. The LOAELs were adjusted for amount of Hg²⁺ in mercuric chloride (0.739) and a time-weighted average for days/week of dosing, assuming 100% for subcutaneous extrapolation to oral exposure.

Uncertainty factors for use of a LOAEL (10), sub-chronic duration (10), and extrapolation from animals to humans and sensitive populations (10) were applied.

Based on these studies, a drinking water equivalent level of 0.010 mg/L was derived. Using a drinking water ingestion rate of 2 L/day and an adult body weight of 70 kg, the resulting RfD is 0.0003 mg/kg/day.

Organic Mercury

The USEPA (2001) has derived a reference dose for methyl mercury based on developmental neurophysical effects in human epidemiological studies. Three studies were considered in the derivation of the RfD.

The first study (Myers et al 1995, Davidson et al. 1995, 1998, cited in USEPA 2001) consisted of 779 mother-infant pairs from a fish-eating population in the Seychelle Islands, where infants were followed from birth to 5.5 year of age and assessed for various standardized neuropsychological endpoints. The exposure endpoint was maternal hair mercury levels.

The second study (Grandjean et al. 1997; as cited in USEPA 2001) consisted of approximately 900 mother-infant pairs in the Faroe Islands, in which cord-blood mercury and maternal hair mercury concentrations were measured and children were tested at age seven on a variety of tasks designed to assess behavioural function.

The third study (Kjellstrom et al. 1989, 1986; as cited in USEPA 2001) was a prospective study from New Zealand in which 38 children of mothers with hair mercury levels during pregnancy greater than 6 ppm were matched with children whose mothers had lower hair mercury levels. At 6 years of age, a total of 237 children were assessed on a number of neuropsychological endpoints similar to those used in the Seychelles study (USEPA 2001).

The Faroe Islands and New Zealand studies found dose-related effects on neuropsychological endpoints, and emphasis was placed on the Faroe Island study (the larger of the two) to derive the RfD. A benchmark dose analysis was used in the derivation, and a benchmark dose lower limit was derived based on cord blood levels, and converted to a daily dose using a one-compartment model.

An uncertainty factor of 10 was applied ([3] for pharmacokinetic variability and uncertainty in estimating ingested dose from cord-blood concentrations and [3] for pharmacodynamics variability and uncertainty) resulting in an RfD of 0.0001 mg/kg/day.

The WHO (2003) conducted a review of the methyl mercury epidemiological studies taking into account the additional results of the Seychelles cohort at 8 years (not available at the time of the USEPA [2001] assessment). The Seychelles study employed similar methods to that of the Faroe Islands study and employed additional statistical analyses and adjustment for confounding factors. However, unlike the Faroe Islands study, the Seychelles study found no adverse effects of prenatal methyl mercury exposure.

A provisional tolerable weekly intake was derived combining the benchmark dose from the Faroe Island and NOAEL from the Seychelles study. This value translates to a daily dose of 0.00023 mg/kg/day, and is considered protective of sensitive receptors (i.e., the developing fetus).

The WHO (2003) TRV was used by Health Canada in their human health risk assessment of mercury in fish (Health Canada 2007).

The USEPA (1995b) chronic oral TRV for mercuric chloride was selected to assess inorganic mercury, whereas the WHO (2003) chronic oral TRV was selected to assess methyl mercury.

Reference Concentration for Chronic Inhalation Exposure (RfC)

Health Canada (2010) has not derived an inhalation RfC for mercury.

The USEPA RfC of 0.0003 mg/m^3 is based on several epidemiological studies of workers exposed to elemental mercury.

Fawer et al. (1983; as cited in USEPA 1995a) reported neurophysiological impairments that might result from accumulation of mercury in the cerebellum and basal ganglia in workers from different occupations. The average exposure concentration was 0.026 mg/m^3 (LOAEL) and the average exposure duration was 15.3 years.

Piikivi and Tolonen (1989; as cited in USEPA 1995a) reported significantly slower and attenuated electrical signals in the visual processing center of the brain in workers exposed to mercury vapours for an average of 15.6 years, and Piikivi and Hanninen (1989; as cited in USEPA 1995a) reported a significant increase in subjective measures of memory disturbance and sleep disorders in workers exposed to mercury vapours for an average of 13.7 years. In both of these studies, the authors extrapolated an exposure level of 0.025 mg/m^3 .

Piikivi (1989; as cited in USEPA 1995a) reported a significant increase in palpitations in workers exposed to mercury vapours for an average of 15.6 years. Piikivi (1989; as cited in USEPA 1995a) extrapolated an exposure level of 0.030 mg/m^3 .

Central and peripheral neurotoxicity were reported by Ngim et al. (1992; as cited in USEPA 1995a) in dentists exposed to 0.014 mg/m^3 (range: 0.0007 to 0.042 mg/m^3) for 8 to 10 hours/day for an average of 5.5 years.

Liang et al. (1993; as cited in USEPA 1995a) reported neurobehavioral effects in fluorescent lamp factory workers exposed to an average concentration of 0.033 mg/m^3 (range: 0.005 to 0.19 mg/m^3) for an average duration 15.8 years.

A LOAEL of 0.025 mg/m^3 for neurobehavioural effects, including hand tremor, increases in memory disturbance, and slight subjective and objective evidence of autonomic dysfunction in humans was derived based on the above studies. The LOAEL was adjusted for inhalation rate ($10 \text{ m}^3/20 \text{ m}^3$) and duration (5 days/7 days).

Uncertainty factors for sensitive populations (10) and database deficiencies for lack of developmental and reproductive studies (3) were applied.

E3.3.2.2 Carcinogenic Effects

Health Canada (2010) has not assessed the carcinogenicity of mercury.

The USEPA (1995a) has classified mercury as a Group D carcinogen – not classifiable as to human carcinogenicity, due to inadequate human and animal data. Epidemiological studies show conflicting evidence of mercury carcinogenicity in humans. Increased cancer incidence in the studies was attributed to concurrent exposures to other chemicals and lifestyle factors such as smoking.

The IARC has classified mercury as Group 3 – not classifiable as to its carcinogenicity to humans.

E3.3.2.2.1 Toxicity Reference Values

Slope Factor for Chronic Oral Exposure (SF)

An oral SF was not available from any of the agencies listed in Section E2.3.

Inhalation Unit Risk for Chronic Inhalation Exposure (IUR)

An IUR was not available from any of the agencies listed in Section E2.3.

E3.3.3 Summary of Toxicity Reference Values Used

Oral Chronic RfD	0.0003 mg/kg/day	USEPA 1995a
Oral Chronic RfD (me-Hg)	0.00023 mg/kg/day	WHO 2003
Oral Sub-Chronic RfD	0.002 mg/kg/day	ATSDR 1999
Inhalation Chronic RfC	0.0003 mg/m ³	USEPA 1995a
Inhalation Sub-Chronic RfC	Not available	-
Oral Slope Factor	Not available	-
Inhalation Unit Risk	Not available	-

E3.4 Selenium

E3.4.1 Pharmacokinetics

E3.4.1.1 Oral Exposure

Human and animal studies have found that selenium in the form of selenite, selenate, and selenomethionine are absorbed readily through the gastrointestinal tract following ingestion, to over 80% of the administered dose (ATSDR 2003). After absorption, selenium accumulates in numerous organ systems, with the highest concentrations in the liver and kidney, although tissue concentration levels do not correlate with effect levels (ATSDR 2003). Selenium is an essential micronutrient in humans and is a component of blood, hair, and nails, and has been found in human milk. Placental transfer is known to occur.

Excess selenium ingested in the form of selenite and selenate are metabolized to methylated compounds and excreted. Elimination is via urine and feces in humans and animals, with the distribution between the two routes varying with the level of exposure and time after exposure (ATSDR 2003). The form of selenium excreted is dependent on the form ingested and, in the case of acute exposure to toxic concentrations of selenium or selenium compounds, significant amounts are excreted via exhaled air. Sweat is a minor excretion pathway.

E3.4.1.2 Inhalation Exposure

Quantitative studies have not been performed to estimate the rate of absorption of elemental selenium and selenium compounds in humans, although occupational studies have shown that these forms are absorbed (ATSDR 2003). Studies with dogs and rats have found the absorption of selenium following inhalation exposure is extensive. No studies were available on the distribution of selenium following inhalation exposure in humans, although a study with dogs found absorption of selenium following exposure to selenious acid and elemental selenium aerosols in the liver, kidney, spleen, and lungs (ATSDR 2003). Excretion of selenium following inhalation exposure in humans is via exhaled air.

E3.4.1.3 *Dermal Exposure*

A study of dermal absorption with selenomethionine in humans did not detect transdermal absorption; however, a study with the same form of selenium conducted on mice did find evidence of transdermal absorption (ATSDR 2003). Although the mice were found to absorb selenomethionine, application sites were not occluded and absorption following ingestion was considered a possible explanation.

The absorption of selenium sulphides is not well understood, but it is believed that selenium disulphides are not absorbed through intact skin. Selenium distribution following dermal exposure has not been described for humans, but has been shown to occur in the liver and skin of the mice treated with a topical lotion containing selenomethionine (ATSDR 2003). No studies were available on the excretion of selenium in humans or animals following dermal exposure.

E3.4.2 Toxicity

E3.4.2.1 *Non-Carcinogenic Effects*

E3.4.2.1.1 *Chronic Oral Exposure*

Most toxicity information for oral exposure to selenium is from animal studies using selenite, selenate, selenium sulphides, and organic selenium compounds. Livestock grazing in areas with high soil selenium concentrations has been associated with “blind staggers” and alkali disease, although this may be due to compounds in the vegetation other than selenium. There have been accidental poisoning cases in humans, but few fatalities have been reported. In animals, the most acutely orally toxic compounds of selenium are sodium selenite and sodium selenate (ATSDR 2003).

Respiratory effects (including pulmonary edema and lesions) in humans and animals have been reported, as well as tachycardia, gastrointestinal distress (including nausea, vomiting, diarrhea, and abdominal pain), hematological changes (in men), immunological and lymphoreticular enhancement, and neurological effects (including aches pains and irritability) in humans following ingestion of selenium (ATSDR 2003).

Chronic oral exposure leads to selenosis. Selenosis is characterized through dermal manifestations (including hair and nail loss, and discoloration and excessive decay of teeth) and neurological effects (including numbness, paralysis, and occasional hemiplegia). Selenosis has been observed in several villages in China where people were exposed to foods high in selenium for months to years. In contrast, adverse health effects have not been observed for populations living in naturally elevated selenium concentrations in the United States.

Oral uptake studies identified NOAELs for selenium (form not specified) as low as 0.001 mg/kg/day in humans following ingestion (causing endocrine system effects) to 464 mg/kg/day in mice treated with selenium sulphide and selenium disulphide via gavage (with effects on the respiratory, cardiovascular, gastrointestinal, musculoskeletal, hepatic, endocrine, and dermal systems) (ATSDR 2003).

Selenium LOAELs from oral uptake studies range from 0.001 mg/kg/day in male rabbits following gavage with water exposure to sodium selenite (causing a significant reduction in testosterone serum levels) to 6,700 mg/kg/day in male rats following gavage exposure to elemental selenium (the LD₅₀ [dose resulting in 50% mortality in the test population] value).

E3.4.2.1.2 *Chronic Inhalation Exposure*

No studies have been found regarding deaths in humans following inhalation exposure to selenium, although animal studies have found acute lethality in guinea pigs exposed to hydrogen selenide at concentrations similar to those at which systemic effects are observed in other laboratory animals including rats and rabbits (8 to 33 mg/m³) (ATSDR 2003).

Occupational human exposure studies have found that, upon inhalation exposure to selenium dust or other compounds, the respiratory tract is the primary site of toxicological effect followed by gastrointestinal and cardiovascular effects and irritation of the skin and eyes (ATSDR 2003). Cardiovascular effects (including shock), and gastrointestinal effects (including vomiting and nausea) have been described in humans exposed to selenium dioxide during a fire. Animal toxicity is similar and the respiratory tract is the primary site of injury following exposure to selenium dust and hydrogen selenide.

E3.4.2.1.3 *Chronic Dermal Exposure*

No cases of death have been reported in humans with dermal exposure to selenium and selenium compounds, although mice exposed to selenium sulphide at 714 mg/kg died within 17 applications (these application sites were not occluded and ingestion cannot be ruled out) (ATSDR 2003).

No studies are available showing respiratory, cardiovascular, gastrointestinal or other effects in humans or animals following dermal exposure to selenium or selenium compounds, although dermal effects (including burns, rashes and contact dermatitis) have occurred in humans exposed to selenium fumes and selenium dioxide.

Ocular effects (including ocular and conjunctival irritation and severe pain, lacrimation and blurred vision) have been reported in older reports of humans having eye contact with selenium dioxide (ATSDR 2003).

E3.4.2.1.4 *Sub-Chronic Oral Exposure*

Sub-chronic oral exposure to selenium and selenium compounds is associated with cardiovascular effects in animals. Wistar rats exhibited severe diffuse degenerative changes and myofibril swelling with profuse intercellular edema (Turan et al. 1999a; as cited in ATSDR 2003). Increased coronary perfusion pressure, increased resting force, and increased heart rate with irregular beating were reported by the authors. Mice exposed to selenium had cardiac damage characterized by cardiomyocytes that had numerous damaged mitochondria, a large number of lipid droplets, and numerous lysosomes (Skowerski et al. 1997b; as cited in ATSDR 2003). In a sub-chronic rabbit study, oral selenium exposure caused degenerative changes in the heart (Turan et al. 1999b; as cited in ATSDR 2003).

Hepatic effects of sub-chronic oral selenium exposure in rats include reduced liver-to-body-weight ratios and increased bilirubin (Halverson et al. 1966; as cited in ATSDR 2003); cirrhosis of the liver (Palmer and Olson 1974; as cited in ATSDR 2003); and increased serum bile acids (National Toxicology Program 1994; as cited in ATSDR 2003). Mice exposed to selenium exhibited hepatic damage characterized by extremely large and irregularly shaped vacuoles in the cytoplasm of hepatocytes.

Sub-chronic exposure to selenium and selenium compounds is associated with changes in weight (reduced body weight gain in young animals and abnormal weight loss in older animals) (ATSDR 2003). Increased mortality has been reported in rats exposed to selenium and selenium compounds (ATSDR 2003). Dermal effects including skin lesions on the forearm in long-tailed macaques (Cukierski et al. 1989; as cited in ATSDR 2003) and hoof-cracking in pigs (Mahan and Magee 1991; as cited in ATSDR 2003) have been reported.

Exposure to selenium and selenium compounds causes immune/lymphoreticular system effects, as indicated by increased proliferation of active T cells in a group of 11 volunteer subjects (Kiremidjian-Schumacher et al. 1994; as cited in ATSDR 2003), significantly decreased relative spleen and thymus weights in mice (Johnson et al. 2000; as cited in ATSDR 2003), and reduced humoral antibody (IgG) production in response to an administered antigen and reduced prostaglandin synthesis in rats (Koller et al. 1986; as cited in ATSDR 2003).

Reproductive effects of sub-chronic oral exposure to selenium and selenium compounds include altered menstrual cycle in monkeys (Cukierski et al. 1989; as cited in ATSDR 2003), reduction in serum testosterone levels in rabbits (El-Zarkouny et al. 1999; as cited in ATSDR 2003), and decreased sperm counts in rats (National Toxicology Program 1994; as cited in ATSDR 2003).

E3.4.2.1.5 *Toxicity Reference Values*

Reference Dose for Chronic Oral Exposure (RfD)

Health Canada (2010) and USEPA (1991) have derived RfD values for selenium, and further detail on the toxicological derivation of each RfD is provided below.

The Health Canada adult RfD (see Section E3.4.3 for age-specific values) is based on a NOAEL of 800 µg/day. The critical effect was selenosis (Yang and Zhou 1994; as cited in Health Canada 2010 and Institute of Medicine [IOM] 2000). An uncertainty factor for protection of sensitive individuals (2) was applied, resulting in an upper limit intake level of 400 µg/day for adults 19 years and over.

The infant RfD is based on a NOAEL of 60 µg/L from a study by Shearer and Hadjimarkos (1975; as cited in Health Canada 2010). The NOAEL was adjusted for milk intake rate (0.78 L/day). The resulting upper limit intake levels, 46.8 µg/day, was rounded down to the nearest 5 µg (45 µg/day). The upper intake levels for infant, children, and adolescent age groups were derived from the infant value using relative body weights. The upper intake levels were as follows: 7 to 12 months: 60 µg/day; 1 to 3 years: 90 µg/day; 4 to 8 years: 150 µg/day; 9 to 13 years: 280 µg/day; and 14 to 18 years: 400 µg/day. Health Canada adjusted the upper intake levels for life stage and body weight.

The USEPA RfD is based on a NOAEL of 0.015 mg/kg/day. Yang et al. (1989b; as cited in USEPA 1991) reported clinical selenosis in a Chinese population living in an area with high environmental selenium concentrations. Dietary selenium intake was proportional to blood and tissue selenium levels. The estimated daily average intake of selenium was 70, 195, and 1,438 µg for adult males, and 62, 198, and 1,238 µg for adult females in the low-, medium- and high-selenium areas, respectively. A daily selenium intake of 1.261 mg/day (blood selenium concentration of 1.35 mg/L) resulted in signs of selenosis. The LOAEL was therefore set at 1.26 mg/day.

At 0.853 mg/day (blood selenium concentration of 1.0 mg/L), no signs of selenosis were apparent and this concentration was determined to be a NOAEL. To derive the RfD, the NOAEL was adjusted for an average body weight of 55 kg. An uncertainty factor for sensitive individuals (3) was applied, resulting in an RfD of 0.005 mg/kg/day.

The Health Canada (2010) RfD was used in the assessment because it is more current than the USEPA derivation and also provides age-group specific TRVs based on upper limit values. The IOM considers selenium to be a required nutrient, and has set a recommended daily allowance at 55 µg (IOM 2000). The IOM defines required as “the lowest continuing intake level of a nutrient that, for a specified indicator of adequacy, will maintain a defined level of nutriture in an individual”. Therefore, Health Canada has derived upper limit values for selenium.

Reference Concentration for Chronic Inhalation Exposure (RfC)

An inhalation RfC was not available from any of the agencies listed in Section E2.3.

E3.4.2.2 Carcinogenic Effects

Health Canada (2010) has not classified selenium with respect to carcinogenicity.

The USEPA classifies selenium and selenium compounds as Group D – not classifiable as to human carcinogenicity (USEPA 1993b). This classification is based on inadequate human data and inadequate evidence of carcinogenicity in animals.

IARC (2014) has classified selenium and selenium compounds as Group 3 or unclassifiable.

E3.4.2.2.1 Toxicity Reference Values

Slope Factor for Chronic Oral Exposure (SF)

An oral SF was not available from any of the agencies listed in Section E2.3.

Inhalation Unit Risk for Chronic Inhalation Exposure (IUR)

An IUR was not available from any of the agencies listed in Section E2.3.

E3.4.3 Summary of Toxicity Reference Values Used

Oral Chronic RfD	0 to 6 months: 0.0055 mg/kg/day 7 months to 4 years: 0.0062 mg/kg/day 5 to 11 years: 0.0063 mg/kg/day 12 to 19 years: 0.0062 mg/kg/day ≥20 years: 0.0057 mg/kg/day	Health Canada 2010
Oral Sub-Chronic RfD	Not available	-
Inhalation Chronic RfC	Not available	-
Inhalation Sub-Chronic RfC	Not available	-
Oral Slope Factor	Not available	-
Inhalation Unit Risk	Not available	-

E4 REFERENCES

- American Conference of Government and Industrial Hygienists. 2001. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- ATSDR (Agency for Toxic Substances and Disease Registry). 1999. Toxicological profile for mercury. US Department of Health and Human Services, Public Health Service. Atlanta, GA, USA.
- ATSDR. 2003. Toxicological profile for selenium. US Department of Health and Human Services, Public Health Service. Atlanta, GA, USA.
- ATSDR. 2007. Toxicological profile for arsenic. US Department of Health and Human Services, Public Health Service. Atlanta, GA, USA.
- ATSDR. 2012. Toxicological profile for chromium. US Department of Health and Human Services, Public Health Service. Atlanta, GA, USA.
- ATSDR. 2013a. Minimal Risk Levels (MRLs) for Hazardous Substances. July 2013. US Department of Health and Human Services, Public Health Service. Available at: <http://www.atsdr.cdc.gov/mrls/mrlist.asp>. Accessed: November 2014.
- ATSDR. 2013b. Addendum to the toxicological profile for mercury (alkyl and dialkyl compounds). US Department of Health and Human Services, Public Health Service. Atlanta, GA, USA.
- Cal EPA (California Environmental Protection Agency). 2007. All OEHHA Acute, 8-hour and chronic reference exposure levels (chRELs) summary as of June 2014. Air Toxicology and Epidemiology. California Environmental Protection Agency. Sacramento, CA. Available at: <http://www.oehha.ca.gov/air/allrels.html>. Accessed: November 2014.
- CCME (Canadian Council of Ministers of the Environment). 1997. Canadian soil quality guidelines for the protection of environmental and human health, Chromium. In: Canadian environmental quality guidelines, 1999. CCME, Winnipeg, MB, Canada.
- Golder (Golder Associates Ltd.). 2015. 2014 Aquatic Health Field Investigation – Fish Tissue Chemistry [draft]. Technical Memorandum from Blair D. Hersikorn to Eric Denholm, Mats Heimersson, and Richard Bargery, Dominion Diamond Ekati Corporation, 2015.
- Health Canada. 1993. Canadian Environmental Protection Act. Priority Substances List Assessment Report. Arsenic and its Compounds. Ottawa, ON, Canada. Health Canada. 1994. Canadian Environmental Protection Act. Priority Substances List Assessment Report. Chromium and its Compounds. Ottawa, ON, Canada.
- Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption. Bureau of Chemical Safety, Food Directorate, Health Products and Food Branch. Ottawa, ON, Canada.

- Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada toxicological reference values (TRVs) and chemical-specific factors, Version 2.0. Contaminated Sites Division, Safe Environments Directorate. September 2010. Her Majesty the Queen in Right of Canada: Ottawa, ON, Canada.
- Hrudey SE, Chen W, Rousseaux CG. 1996. Bioavailability in environmental risk assessment. CRC Press, Lewis Publishers: Boca Raton, USA.
- IARC (International Agency for Research on Cancer). 1987. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42, Supplement 7.
- IARC. 2012. A review of human carcinogens, Volume 100 C: Arsenic, metals, fibres, and dusts. IARC Monographs on the evaluation of carcinogenic risks to humans. IARC: Lyon, France.
- IARC. 2014. Agents Classified by the IARC Monographs, Volumes 1 – 110. July 2014. Available at: <http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf>.
- IOM (Institute of Medicine). 2000. Dietary reference intakes for vitamin C, vitamin E, selenium, and carotenoids. Food and Nutrition Board, Institute of Medicine. National Academy Press: Washington, DC, USA.
- RIVM (National Institute of Public Health and the Environment). 2001. Re-evaluation of human toxicological maximum permissible risk levels. RIVM Report No. 711701 025.
- RIVM. 2009. Re-evaluation of some human-toxicological maximum permissible risk levels earlier evaluated in the period 1991-2001. Research for Man and Environment. RIVM Report 711701092/2009.
- USEPA (United States Environmental Protection Agency). 1991. IRIS (Integrated Risk Information System) profile for selenium and compounds, Oral RfD assessment. Available at: <http://www.epa.gov/iris/subst/0472.htm#reforal>. Accessed: December 17, 2014.
- USEPA. 1993a. IRIS profile for arsenic, inorganic, Oral RfD assessment. Available at: <http://www.epa.gov/iris/subst/0278.htm#reforal>. Accessed: November 26, 2014.
- USEPA. 1993b. IRIS profile for selenium, Carcinogenic assessment. Available at: <http://www.epa.gov/iris/subst/0472.htm#carc>. Accessed: November 27, 2014.
- USEPA. 1995a. IRIS profile for mercury, elemental, Inhalation RfC assessment. Available at: <http://www.epa.gov/iris/subst/0370.htm#refinhal>. Accessed: November 26, 2014.
- USEPA. 1995b. IRIS profile for mercuric chloride, Oral RfD assessment. Available at: <http://www.epa.gov/iris/subst/0692.htm#reforal>. Accessed: November 28, 2014.
- USEPA. 1998a. IRIS profile for chromium (VI), Oral RfD, inhalation RfC, and carcinogenic assessment. Available at: <http://www.epa.gov/iris/subst/0144.htm#reforal>. Accessed: December 2, 2014.
- USEPA. 1998b. IRIS profile for arsenic, inorganic, Carcinogenic assessment. Available at: <http://www.epa.gov/iris/subst/0278.htm#carc>. Accessed: November 26, 2014.

- USEPA. 2001. IRIS profile for methyl mercury, Oral RfD assessment. Available at:
<http://www.epa.gov/iris/subst/0073.htm>
- USEPA. 2009. Risk Assessment Guidance for Superfund Volume 1. Human Health Evaluation Manual. Part F. Supplemental Guidance for Inhalation Risk Assessment. January. EPA-540-R-070-002.
- USEPA. 2014a. Integrated Risk Information System (IRIS) On Line Database. USEPA, Cincinnati, OH. Available at: <http://cfpub.epa.gov/ncea/iris/index.cfm>. Accessed: November 2014.
- USEPA. 2014b. Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV). Derivation Support Documents. 2001-2014. USEPA. Available at:
http://hhpprtv.ornl.gov/quickview/pprtv_papers.php. Accessed: November 2014.
- US National Academy of Sciences. 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Panel on Macronutrients, Subcommittees on Upper Reference Levels of Nutrients and of Interpretation and Use of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. National Academy Press, Washington, DC, USA.
- WHO (World Health Organization). 2003. Joint FAO/WHO Expert Committee on Food Additives, Sixty-first meeting 10-19 June 2003, Summary and Conclusions. Available at:
<ftp://ftp.fao.org/es/esn/jecfa/jecfa61sc.pdf>. Accessed: January 2015.
- WHO. 2014. Alphabetical List of EHCs (Environmental Health Criteria). International Programme on Chemical Safety. Available at:
http://www.who.int/ipcs/publications/ehc/ehc_alphabetical/en/index.html. Accessed: November 2014.

APPENDIX F

WILDLIFE TOXICITY REFERENCE VALUES

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Abbreviations

Abbreviation	Definition
COPC	Constituent of Potential Concern
e.g.	<i>exempli gratia</i> (for example)
Eco-SSL	Ecological Soil Screening Levels
et al.	and more than one additional author
i.e.	<i>id est</i> (that is)
LOAEL	lowest observed adverse effect levels
NOAEL	no observed adverse effect levels
NV	no value
Project	Jay Project
TRV	Toxicity Reference Value
US EPA	United States Environmental Protection Agency

Units of Measure

Unit	Definition
%	percent
Cr ³⁺	chromium (III) ion
Cr ⁶⁺	chromium (VI) ion
mg/kg bw/day	milligrams per kilogram body weight per day
mg/kg/day	milligrams per kilogram per day
ppm	parts per million

F1 OVERVIEW

This appendix summarizes the methods and data sources used to derive toxicity reference values (TRVs) for the wildlife risk assessment as part of the Developer's Assessment Report (DAR) for the Dominion Diamond Ekati Corporation Jay Project (Project). The TRVs are used as effects thresholds for evaluation of estimated intake rates of constituents of potential concern (COPCs) by receptors. The derived TRVs are summarized in Tables F1-1 and F1-2 for mammals and birds, respectively.

F2 GENERAL APPROACH

A stepwise procedure was used to identify wildlife TRVs. Where available, the United States Environmental Protection Agency (US EPA) Ecological Soil Screening Levels (Eco-SSLs) were selected for each COPC (US EPA 2010). Eco-SSLs represent a conservative, systematic, and rigorous assessment of wildlife toxicity information.

Where Eco-SSLs were unavailable, a literature review was conducted to identify candidate TRVs, beginning with the Oak Ridge National Laboratory Toxicological Benchmarks for Wildlife (Sample et al. 1996) and supported by an additional detailed literature review as needed.

No observed adverse effect level (NOAEL)-based TRVs were used for listed wildlife species and are referred to hereafter as Lower-TRVs. Lowest observed adverse effect levels (LOAEL)-based TRVs were used for all other wildlife and are referred to hereafter as Upper-TRVs. When possible, documentation of the effect size (magnitude) associated with the LOAEL was provided.

F2.1 SUMMARY OF ECOLOGICAL SOIL SCREENING LEVELS DERIVATION

Eco-SSLs are derived separately for birds and mammals, and are intended to protect mammalian and avian terrestrial wildlife (US EPA 2010). The Eco-SSL derivation process represents the collaborative effort of a multi-stakeholder workgroup, and identifies screening levels (including TRVs for avian and mammalian wildlife) that are conservative. The default Eco-SSL TRV is the geometric mean of the NOAEL values for reproduction and growth. However, consistent with the Eco-SSL derivation rules, where this geometric mean was higher than the lowest bounded LOAELs for reproduction, growth, or survival, the Eco-SSL TRV was set equal to the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth, or survival.

Where Eco-SSL TRVs were available, the LOAEL-based TRV was set as the lowest LOAEL for reproduction, growth, or survival above the NOAEL.

F2.2 OTHER LITERATURE-BASED TOXICITY REFERENCE VALUES

Eco-SSL-based TRVs are not available for mercury and methyl mercury in birds and mammals. The default secondary study for use in the TRV derivations for mercury/methyl mercury was obtained from Sample et al. (1996).

F2.2.1 Study Review Considerations

F2.2.1.1 Biological Effects Measured in Study

The preferred measurement endpoints in the study were reproduction, growth, and/or development. Histopathology, enzyme induction, immunosuppression, and behavioral responses were not considered appropriate measurement endpoints due to their questionable linkage to the assessment endpoints of the risk assessment. Mortality was not a preferred measurement endpoint, unless other sub-lethal effects were evaluated (but not observed) in the study. Effects measured in the study were considered “significant” only if there was clear biological significance (i.e., relevance to overall maintenance and health of the population). Effects that were statistically significant but that have little or no relevance to health, either due to small effect sizes or to compensatory effects) were not considered relevant endpoints. Preference was given to studies that provide both a NOAEL and a LOAEL for the effect of interest (i.e., bounded effects thresholds).

F2.2.1.2 Technical Quality of Study

Studies selected for TRV development must have included sufficient numbers of test organisms, and have included an appropriate control. The substance under investigation must have been isolated to avoid interactive effects. The test should have been conducted with normal levels of nutrition in the diet, because many metals are made more bioavailable in a nutrient-deficient diet.

F2.2.1.3 Method of Administration

The preferred method of administration was oral exposure in the diet, either by food or drinking water, because the receptors are assumed to receive their exposure via this route. Oral exposure by capsule and force-feeding (i.e., gavage studies) were less desirable administration methods. Injection studies were not considered to be acceptable exposure pathways, since gastrointestinal uptake is a process strongly influencing bioavailability and toxicity.

F2.2.1.4 Duration of Study

Preferred test endpoints were chronic or subchronic, as it is conservatively assumed that wildlife receptors in the vicinity of the Project will be resident for periods sufficient for chronic exposure. Chronic studies that assessed effects spanning entire life spans or multiple generations of animals were preferred for TRV development. Because chronic or multi-generational studies were not always available, tests spanning a significant portion of a life span or covering a sensitive life stage (i.e., reproductive period or juvenile development period) were also considered.

F3 RESULTS

The derivations of Lower-TRVs and Upper-TRVs are provided in Tables F1-1 and F1-2 for mammals and birds, respectively.

Table F1-1 Toxicity Data Used to Calculate Toxicity Reference Values for Mammals

Parameter	Lower-TRV	Upper-TRV	Details of Toxicity Study
Metals			
Arsenic	1.04	1.66	A geometric mean of the NOAEL values for growth and reproduction based on multiple studies using standard laboratory mammals was calculated (2.47 mg/kg/day) (US EPA 2005a). However, because this value was higher than the lowest bounded LOAEL for reproduction, growth, or survival results, a TRV of 1.04 mg/kg/day was identified, which is the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival (Neiger and Osweiler 1989; as cited in US EPA 2005a). This NOAEL was identified from an 8-month feeding study of juvenile dogs (<i>Canis familiaris</i>) that examined reproduction, growth or survival. The Upper-TRV (1.66 mg/kg/day) was established based on the lowest bounded LOAEL from the same study (Neiger and Osweiler 1989; as cited in US EPA 2005a) and was based on growth effects.
Chromium	2.4	2.82	For trivalent chromium, a geometric mean of the NOAEL values for growth and reproduction based on multiple studies using standard laboratory mammals was calculated to be 2.40 mg/kg/day (US EPA 2008). There were no bounded Cr³⁺ LOAEL values for reproduction, growth or mortality results for comparison to this value. However, this value was lower than both: (1) the hexavalent chromium geometric mean of the NOAEL values for reproduction and growth (9.24 mg/kg/day Cr⁶⁺); and (2) the lowest bounded hexavalent chromium LOAEL value for reproduction, growth and survival results (7.2 mg/kg/day Cr⁶⁺). Therefore, the threshold of 2.40 mg/kg/day Cr³⁺ was adopted as the chromium lower-TRV. The lowest chromium LOAEL for growth, reproduction, and survival above provided by the US EPA (US EPA 2008) that was above the lower-TRV was is 2.82 mg/kg/day. This LOAEL is based on a study by Mercado and Bibby (1973), where juvenile rats were exposed to trivalent via drinking water for 50 days. The LOAEL is based on a reduction in survival. The lowest hexavalent chromium LOAEL value for reproduction, growth and survival results (7.2 mg/kg/day Cr⁶⁺) was higher than the LOAEL for trivalent chromium and therefore 2.82 mg/kg/day was selected as the upper-TRV.
Methyl mercury ^(a)	0.032	0.16	An Eco-SSL was not available for methyl mercury from US EPA. However, Sample et al. (1996) report TRVs for methyl mercury for wildlife receptors. A NOAEL of 0.032 mg/kg/day and LOAEL of 0.16 mg/kg/day were reported for reproduction (pup viability) in laboratory rats exposed to methyl mercury chloride via diet for more than a year during a critical lifestage (Verschuuren et al. 1976; as cited in Sample et al. 1996). In addition, Wobeser et al. (1976) reported the results of a subchronic toxicity study on mink, in which adult mink were fed methyl mercury via diet for 93 days. The NOAEL and LOAEL for mortality, weight loss, and behavioral abnormalities were 0.15 and 0.25 mg/kg/day, respectively. These exposure levels are higher than the Verschuuren et al. (1976; as cited in Sample et al. 1996) thresholds, although extrapolation from subchronic to chronic effects could yield lower final thresholds. As the extrapolation to chronic effects would be highly uncertain, the Verschuuren et al. (1976; as cited in Sample et al. 1996) NOAEL and LOAEL were retained for TRV derivation.

Table F1-1 Toxicity Data Used to Calculate Toxicity Reference Values for Mammals

Parameter	Lower-TRV	Upper-TRV	Details of Toxicity Study
Selenium	0.143	0.145	A geometric mean of the NOAEL values for reproduction and growth based on multiple studies using standard laboratory mammals was calculated to be 0.437 mg selenium/kg bw/day (US EPA 2007). However, this value is higher than the lowest bounded LOAEL for reproduction, growth, or mortality results. Therefore, the TRV was set to the highest bounded NOAEL below the lowest bounded LOAEL for reproduction, growth, or survival, and is 0.143 mg selenium/kg bw/day (Mahan and Moxon 1984, as cited in US EPA 2007). The lowest LOAEL for growth, reproduction, and survival above the NOAEL provided by the US EPA (US EPA 2007) is 0.145 mg/kg/day. The LOAEL is based on reproductive effects noted in a study by Nobunaga et al. (1979) where mice were exposed to selenium in drinking water for 56 days.

a) Mercury is expected to be present as both inorganic and methyl mercury in food items in terrestrial and aquatic habitats (refer to Appendix D, Section D2.2.1). Methyl mercury is known to be more toxic to birds and mammals than inorganic mercury and therefore the use of TRVs for methyl mercury is protective.

bw = body weight; Eco-SSL = Ecological Soil Screening Level; LOAEL = lowest observable adverse effect level; Cr³⁺ = chromium (III) ion; Cr⁶⁺ = chromium (VI) ion; m^g/kg/day = milligrams per kilogram per day; NOAEL = no observable adverse effect level; TRV = toxicity reference value; US EPA = United States Environmental Protection Agency.

Table F1-2 Toxicity Data Used to Calculate Toxicity Reference Values for Birds

Parameter	Lower-TRV	Upper-TRV	Details of Toxicity Study
Metals			
Arsenic	2.24	3.55	The Lower-TRV was based on the lowest NOAEL of 2.24 mg/kg/day determined in a study where chickens were exposed to arsenic in food and growth and reproduction were test endpoints (Holcman and Stibilj 1997; as cited in US EPA 2005b). The upper-TRV was based on the lowest LOAEL for growth, reproduction, and survival above the NOAEL provided by the US EPA (2005b). The lowest LOAEL is 3.55 mg/kg/day. This LOAEL was based on a study by Howell and Hill (1978) where day-old chicks were fed arsenic as arsenic trichloride for 21 days. Body weight of the chicks was reduced by 19% in chicks exposed to 50 ppm arsenic trichloride (Howell and Hill 1978).
Chromium	2.66	2.78	A geometric mean of the NOAEL values for reproduction and growth for trivalent chromium was calculated at 2.66 mg/kg/day based on multiple studies where chickens, turkeys, or ducks were exposed to chromium (US EPA 2008). The lowest LOAEL for growth, reproduction, and survival above the NOAEL provided by the US EPA (US EPA 2008) is 2.78 mg/kg/day (Haseltine et al. unpublished; as cited in US EPA 2008). Survival and reproductive effects were noted in black ducks exposed to chromium 180-190 days and 10 months respectively in their food (Haseltine et al. unpublished; as cited in US EPA 2008). US EPA (2008) does not report an Eco-SSL for hexavalent chromium because the data set was considered insufficient. Review of the available data presented in US EPA (2008) indicated that unbounded NOAEL values were lacking. The one available LOAEL value of 4.02 mg/kg/day Cr⁶⁺ for reproductive and growth effects in chickens was higher than the LOAEL for trivalent chromium that was applied as the Upper-TRV.
Methyl mercury ^(a)	0.064	0.13	An Eco-SSL is not available for effects of methyl mercury to avian wildlife. However, a LOAEL of 0.064 mg/kg- was reported for effects on reproduction (egg and hatchling success) in mallard ducks exposed to methyl mercury dicyandiamide in the diet for three generations (Heinz, 1979; as cited in Sample et al. 1996). Exposure was considered to be chronic because it occurred over three generations and during a critical life stage (reproduction); however, the LOAEL was not bounded. Because no bounded LOAEL or NOAEL was available in Sample et al. (1996), a supplemental literature review was conducted. Numerous other studies have been conducted using methyl mercury dicyandiamide exposures to bird species including mallards, black ducks, zebra finches, leghorn hens, pheasants, and Japanese quail. Studies by Heinz (1974), Heinz and Locke (1975), Heinz (1976a,b, 1979), Scheuhammer (1988), Haegele et al. (1974), Lundholm (1995), McEwen et al. (1973), El-Begearmi et al. (1977), and Fimreite (1971) were evaluated (methyl mercury fed orally for more than 10 weeks). The chronic NOAELs and LOAELs for these studies ranged from 0.064 mg/kg/day to 1.0 mg/kg/day. Several studies indicated that the bounded NOAEL for survival, growth, and reproductive effect was 0.064 mg/kg/day. Therefore, this value was retained as the Lower-TRV. The Upper-TRV was determined by selecting the lowest LOAEL (0.13 mg/kg/day) for reproduction, growth, or survival that was above the Lower-TRV; the latter threshold was from a study by Fimreite (1971) that administered methyl mercury dicyandiamide to pheasants via diet for 12 weeks and measured reproductive effects.



Table F1-2 Toxicity Data Used to Calculate Toxicity Reference Values for Birds

Parameter	Lower-TRV	Upper-TRV	Details of Toxicity Study
Selenium	0.29	0.31	A geometric mean of the NOAEL values for reproduction and growth was calculated at 0.606 mg selenium/kg bw/day US EPA 2007). This value, however, is higher than the lowest bounded LOAEL for reproduction, growth, or survival. Therefore, the TRV is equal to the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival and is equal to 0.290 mg selenium/kg bw/day (US EPA 2007). The lowest LOAEL for growth, reproduction, and survival above the NOAEL provided by the US EPA is 0.306 mg/kg/day (US EPA 2007). The LOAEL is based on a study by Dafalla and Adam (1986; as cited in US EPA 2007), that administered selenium to juvenile chickens via food for 2 weeks. The LOAEL was based on a reduction in body weight (Dafalla and Adam 1986).

a) Mercury is expected to be present as both inorganic and methyl mercury in food items in terrestrial and aquatic habitats (refer to Appendix D, Section D2.2.1). Methyl mercury is known to be more toxic to birds and mammals than inorganic mercury and therefore the use of TRVs for methyl mercury is protective.

Eco-SSL = Ecological Soil Screening Level; LOAEL = lowest observable adverse effect level; mg/kg/day = milligram per kilogram per day; NOAEL = no observable adverse effect level; NV = no value; ppm = parts per million; TRV = toxicity reference value; US EPA = United States Environmental Protection Agency.

F4 REFERENCES

- Dafalla R, Adam SE. 1986. Effects of various levels of dietary selenium on hybro-type chicks. *Vet Hum Toxicol* 28:105-108.
- El-Begearmi MM, Sunde ML, Ganther HE. 1977. A mutual protective effect of mercury and selenium in Japanese quail. *Poultry Sci*, 56, 313-322.
- Fimreite N. 1971. Effects of dietary methylmercury on ring-necked pheasants, with special reference to reproduction. Canadian Wildlife Service, Occasional Paper No. 9, 39 pp.
- Haegle MA, Tucker RK, Hudson RH. 1974. Effects of dietary mercury and lead on eggshell thickness in mallards. *Bull. Environ Contam Toxicol*, 11(1), 5-11.
- Heinz GH, Locke LN. 1975. Brain lesions in mallard ducklings from parents fed methylmercury. *Avian Diseases*, 20(1), 9-17.
- Heinz GH. 1974. Effects of low dietary levels of methyl mercury on mallard reproduction. *Bulletin of Environ Contam Toxicol*, 11(4), 386-392.
- Heinz GH. 1976a. Methylmercury: Second-year feeding effects on mallard reproduction and duckling behavior. *J Wildlife Manage*, 40(1), 82-90.
- Heinz GH. 1976b. Methylmercury: Second-generation reproductive and behavioral effects on mallard ducks. *J Wildlife Manage*, 40(4), 710-715.
- Heinz GH. 1979. Methylmercury: Reproductive and behavioral effects on three generations of mallard ducks. *J Wildlife Manage*, 43(2), 394-401.
- Howell GO, Hill CH. 1978. Biological interaction of selenium with other trace elements in chicks. *Environ Health Persp* 25:147-150.
- Lundholm CE. 1995. Effects of methyl mercury at different dose regimes on eggshell formation and some biochemical characteristics of the eggshell gland mucosa of the domestic fowl. *Comp Biochem Physiol*, 110C(1), 23-28.
- McEwen LC, Tucker RK, Ells JO, Haegle MA. 1973. Mercury-Wildlife Studies by the Denver Wildlife Research Center. In: *Mercury in the Western Environment*. DR Buhler, Ed. pp. 146-156.
- Mercado RC, Bibby BG, 1973. Trace element effects on enamel pigmentation incisor growth and molar morphology in rats. *Archives of Oral Biology* 18(5): 629-635.
- Nobunaga T, Satoh H, Suzuki T. 1979. Effects of sodium selenite on methyl mercury embryotoxicity and teratogenicity in mice. *Toxicol Appl Pharm* 47:79-88.
- Sample BE, Opresko DM, Suter II, GW. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. The Risk Assessment Program Health Sciences Research Division (ed.). Prepared for the US Department of Energy, Office of Environmental Management. ES/ER/TM. Oak Ridge, TN.

- Scheuhammer, A.M. 1988. Chronic dietary toxicity of methylmercury in the zebra finch, *Poephila guttata*. Bull. Environ. Contam. Toxicol. 40:123-130.
- US EPA (United States Environmental Protection Agency). 2005a. Ecological Soil Screening Level for Arsenic. Interim Final. US EPA, Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-62. March 2005.
- US EPA. 2005b. Ecological Soil Screening Level for Arsenic. Interim Final. US EPA, Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-62. March 2005.
- US EPA. 2007. Ecological Soil Screening Level for Selenium. Interim Final. US EPA, Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-76. July 2007.
- US EPA. 2008. Ecological Soil Screening Level for Chromium. Interim Final. US EPA, Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-66. April 2008.
- US EPA. 2010. Ecological Soil Screening Levels. US EPA, Office of Solid Waste and Emergency Response, Washington, DC. Last updated October 20, 2010. Available at: <http://www.epa.gov/ecotox/ecossl/>
- Wobeser G, Nielson NO, Schiefer B. 1976. Mercury and mink II. Experimental methyl mercury intoxication. Can J Comp Med, 34-45.

APPENDIX G

PARTICULATE MATTER LITERATURE REVIEW

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Abbreviations

Abbreviation	Definition
±	plus or minus
CI	confidence interval
DNA	deoxyribonucleic acid
Dominion Diamond	Dominion Diamond Ekati Corporation
e.g.	for example
et al.	and more than one additional author
i.e.	that is
NO	nitric oxide (gas)
NO ₂	nitrogen dioxide
O ₃	ozone
PAH	polycyclic aromatic hydrocarbons
PM _{2.5}	particulate matter with a mean aerodynamic diameter of 2.5 microns or smaller
PM ₁₀	particulate matter with a mean aerodynamic diameter of 10 microns or smaller
Project	Jay Project
SO ₂	sulphur dioxide
TSP	total suspended particulates
WHO	World Health Organisation

Units of Measure

Unit	Definition
%	percent
ug/m ³	micrograms per cubic metre
µm	micrometres
m/s	metres per second

G1 INTRODUCTION

This appendix provides the particulate matter literature review conducted in support of the human health risk assessment completed as part of the Environmental Assessment for the Dominion Diamond Ekati Corporation (Dominion Diamond) Jay Project (the Project).

G2 POTENTIAL HEALTH EFFECTS ASSOCIATED WITH PARTICULATE MATTER BASED ON TOXICOLOGY STUDIES

The primary toxicological responses to environmental exposure to airborne particulate matter are respiratory and cardiovascular effects (WHO 2006). A brief summary of the toxicological studies related to health effects associated with exposure to particulate matter is provided below. The World Health Organisation (WHO) states that the risk for various health outcomes increases with exposure, and that a threshold below which no adverse effects are expected is not likely to exist (WHO 2006). Given that a threshold has not been identified, WHO (2006) suggest that setting a standard needs to be aimed at achieving the lowest particulate matter concentration possible given the local context and priorities of the region. Further discussion of available information on local background particulate matter concentrations for the region are presented in the air quality assessment (Developer's Assessment Report [DAR] Section 7).

The toxicological mechanism associated with particulate matter is typically inflammation caused by a primary response of alveolar macrophages and pulmonary epithelial cells (Schwarze et al. 2006). The response involves the release of signalling (i.e., cytokines and chemokines) and adherence molecules, which mediate a complex interaction between the epithelial cells, the alveolar macrophages, and other immune cells such as neutrophils and T-cells (Schwarze et al. 2006). The type of cytokines and chemokines released as a result of exposure determines the resulting health effect. For example, allergic asthma caused by attraction of eosinophils involves different mediators than those that attract neutrophils involved in non-allergic inflammatory disease (Schwarze et al. 2006). The recruited immune cells may release secondary cytokines as well as reactive oxygen species, lipid mediators, and toxic proteases that can cause epithelial damage leading to the subsequent release of additional cytokines or chemokines; thus, increasing or prolonging the inflammatory reaction (Schwarze et al. 2006). The increased inflammatory reaction can ultimately cause chronic inflammation resulting in respiratory illness.

Particulate matter is also believed to be cytotoxic contributing to cell death, which can also cause inflammation, leading to the development of acute and chronic lung disease. Particulate matter that is generated from diesel exhaust has been shown to cause lung cancer. The mechanism by which the particulate matter causes cancer is related to direct interaction of the metabolized particle components and the oxidative stress products with deoxyribonucleic acid (DNA) and the subsequent formation of DNA adducts and mutations (Schwarze et al. 2006). The inflammatory process can also contribute to progression of lung cancer but the mechanism(s) by which this occurs are not yet fully understood.

Particulate matter can also cause cardiovascular disease, and several mechanisms for this are possible. One explanation is that the fine particulate matter and substances that are bound to it, such as metals and inflammatory products, enter the blood stream and interact with the heart (Schwarze et al. 2006). In addition, experimental studies have shown that inhalation of particulate matter components or induced substances can alter heart rate, increasing the likelihood of a heart attack (Schwarze et al. 2006).

Inflammatory pathways have been identified as being important in various aspects of the development of cardiac disease, but the critical pathway has not been identified.

Particle size and substance composition (i.e., metal content) have also been shown to be important drivers of the toxicological mechanism for particulate matter. Experimental studies have shown that ultrafine particles are particularly toxic due to their high surface area to mass ratio and surface reactivity. However, other experimental studies have also shown larger particles are equally and often more potent than fine fraction particles, and this may be due to the importance of particle composition (i.e., size effects may not override the potential for a higher concentration of toxic or inflammatory components present in larger particles). The available epidemiological studies indicate that there is greater evidence for particulate matter with a mean aerodynamic diameter of 2.5 microns or smaller ($PM_{2.5}$) and $PM_{2.5-10}$ to cause mortality than particulate matter with a mean aerodynamic diameter of 10 microns or smaller (PM_{10}). However, both the coarse and fine fractions seem to contribute to morbidity.

Schwarze et al. (2006) conclude that particle size alone is not the critical determinant of particulate matter induced health effects. The concentration of particulate matter component such as metals, soluble organic compounds, and sulphates are also important considerations, but their contribution to toxicological effects are generally not well understood. A recent study by Rohr and Wyzga (2012) examined the evidence from particulate matter component-based studies and found that most studies had significant findings for specific components of particulate matter but not for particulate matter concentrations. The authors indicate that this demonstrates that particulate matter alone does not drive health responses. Overall, the studies demonstrated the need to pay more attention to carbon-containing particulate matter components (elemental and organic carbon) because there is evidence to suggest that these components are strongly associated with adverse health outcomes.

A limited number of epidemiological studies indicate an association between metals content and air pollution-related mortality. The available data for particulate matter related morbidity indicate that iron, copper, nickel, vanadium, and zinc are the primary metals of concern (Schwarze 2006). The Rohr and Wyzga (2012) literature summary suggests that aluminum, silicon, nickel, and vanadium are closely associated with adverse health impacts of particulate matter, but it is also possible that other metals could contribute to health effects.

Evidence about the role of organic compounds in particulate matter induced disease for the general population based on epidemiological studies is insufficient. Information is available from occupational studies for carcinogenic effects associated with organic chemicals in particulate matter. Although experimental studies indicate that soluble organic compounds contribute to the inflammatory response related to exposure of particulate matter from diesel-related sources, information is not yet available about the specific organic compounds in particulate matter effects. Information about the relative contribution associated with soluble organic compounds and other components of particulate matter (i.e., metals) is also limited. Experimental and epidemiological studies are not currently consistent with respect to whether sulphates contribute to particulate matter induced health effects.

Biological agents such as mold and endotoxin are also known to cause allergic reactions. However, epidemiological studies associated with the biological components of particulate matter are limited (Schwarze et al. 2006). One study in California indicated that pollen present in particulate matter had an effect on people suffering from asthma. Schwarze et al. (2006) indicate that an experimental study has shown a greater cytokine reaction induced by PM_{10} relative to $PM_{2.5}$ and that it may be related to the higher endotoxin component of the coarse particulate matter.

Schwarze et al. (2006) indicate that epidemiological studies conducted in areas where crustal particles dominate have caused adverse health effects associated with respiratory morbidity. However, the authors indicate that the majority of the available experimental studies have been conducted with quartz and asbestos, and may not be completely representative of coarse particulate matter associated with windblown dust or road abrasion particles. Therefore, although epidemiological studies indicate potential health effects associated with crustal particles, the experimental studies are not yet available to determine the relative importance of the mineral components of particulate matter.

Overall, the mechanisms through which particulate matter influences health, and the role of particle size and composition in causing adverse health outcomes, are still not fully understood (Englert 2004). Current research generally suggests that the composition of particulate matter would be a better predictor of adverse health effects than the mass of particulate matter (Stanek et al. 2011). Lippmann and Chen (2009a,b) reach similar conclusions in their review of the literature, and state that combustion-driven components of particulate matter that have a high redox potential (e.g., metal and polycyclic aromatic hydrocarbons [PAH] components of particulate matter) are likely to be the primary drivers for adverse health effects.

G3 EPIDEMIOLOGICAL STUDIES ASSOCIATED WITH PARTICULATE MATTER FROM CRUSTAL DERIVED SOURCES

Air emission sources at the Project will include exhaust emissions from the mine fleet and fugitive emissions from roads, drilling, blasting, material handling, material movement, and storage activities. The mining activities related to transport that generate fugitive particulate matter emissions from crustal sources are expected to be major contributors to the particulate matter predictions for the Project. Therefore, a literature review of epidemiological studies was completed to determine if a quantitative relationship can be determined relating exposure to particulate matter from crustal sources and human health effects.

Epidemiological studies that evaluated crustal sources were most typically associated with dust storms or other natural events, such as, volcanic eruptions or geographic locations where there was an absence of industrial activities, thereby leading to the assumption that the particulate matter is generally from crustal rather than combustion sources.

Multiple studies suggest that mortality and morbidity are more closely linked to particulate matter from combustion rather than crustal sources (i.e., dust storms, re-suspended dust from road traffic, agriculture, and mining), unless the particulate is derived from geologic sources and contains high concentrations of metals. Dust events containing high coarse matter particulate as the result of high wind speeds tend to have reduced concentrations of fine particulate and other combustion-related particulate, and measurement of dust storm events allows the authors to attribute these events to a crustal source (i.e., non-pollution events). As a result, dust storms are often studied from the perspective of the effect of crustal sources on health effects (Schwartz et al. 1999; Staniswalis et al. 2005).

Evidence suggests that coarse particulate matter has an effect on mortality, most predominately in arid regions where concentrations of coarse particulate matter are high (Ostro et al. 1999; Staniswalis et al. 2005). Of the available studies on the effects of coarse particulate matter on health, few studies have analyzed coarse and fine particulate matter jointly. For studies that examined the effects of coarse and fine particulate matter, in association with gaseous pollutants, study results may need to be adjusted to reflect this influence.

In studies of morbidity, coarse particulate matter generally had a similar effect on asthma and respiratory admissions as fine particulate matter. The available evidence suggests that coarse particles have the potential to cause respiratory and cardiovascular morbidity. The majority of the studies conducted on the effects of coarse particulate matter derived from crustal sources indicate that its effect on mortality and morbidity is less than that of PM₁₀ originating from combustion sources. Stanek et. al. (2011) conducted a review of the existing health literature on PM_{2.5} to determine if there was any consistent association between adverse health outcomes and certain source factors, and concluded that the current state of research does not provide enough evidence to unequivocally relate specific health outcomes to isolated factors or sources.

The literature identified that relates mortality and morbidity associated with crustal sources of PM_{2.5} and PM₁₀ is summarized below.

G3.1 PM2.5

G3.1.1 Mortality

Information about mortality as the result of exposure to PM_{2.5} from crustal sources is summarized in Table G-1.

Epidemiological studies concerning particulate matter from crustal sources are limited. Laden et al. (2000) found that increased mortality was not associated with fine particulate matter from crustal material. Fine particulate matter from a variety of combustion and vehicular sources in addition to crustal material was categorized by determining the elemental composition of the fraction to identify source-related factors. Several factors were identified including a silicon factor in fine particulate matter from crustal material, a lead factor in fine particulate matter from vehicle exhaust, and a selenium factor in particulate matter from coal combustion. Mortality rates were compared to source factor concentrations for six eastern cities in the United States (Watertown, MA, Kingston-Harriman, TN, St. Louis, MO, Portage, WI, and Topeka, KS). The results showed that a 10 micrograms per cubic metre (µg/m³) increase in PM_{2.5} from mobile (i.e., vehicle) sources accounted for a 3.4 percent (%) increase in daily mortality, an equivalent increase in fine particles from coal combustion sources accounted for a 1.1% increase in mortality, and PM_{2.5} crustal particles were not associated with daily mortality.

Table G-1 Summary of Mortality Studies for PM_{2.5} Originating from Crustal Sources

Location	United States (Various Locations)
PM _{2.5} Concentration during Dust Storm Event (24-hour average) (µg/m ³)	NA
PM _{2.5} Concentration on Control days (24-hour average) (µg/m ³)	NA
Change in PM _{2.5} concentration (24-hour average) (µg/m ³)	10
Daily Increase in Mortality	4.5% ^(a)
All-cause (3-day lag)	NA
All-cause (2-day lag)	NA
Cardio-respiratory	NA
Reference	Fuentes et al. (2006)

a) Confidence intervals (2.5% and 97.5% are 4.2% and 4.7%, respectively).

NA = not assessed or not available; µg/m³ = micrograms per cubic metre; % = percent.

Fuentes et al. (2006) found a statistically significant positive association between crustal PM_{2.5} and incidence of mortality from natural causes (i.e., deaths other than from accident, violence, or suicide), independent of PM_{2.5} from other sources at various locations in the United States in June 2000. The attributable risk was 4.5% (95% confidence interval [CI]: 4.2% to 4.7%) per 10 µg/m³ increase in crustal PM_{2.5}. Other components of the speciated PM_{2.5} such as sulphate, nitrate, and ammonium also showed elevated increases in mortality ranging from 6.6% to 7.5% per 10 µg/m³ increase in crustal PM_{2.5}. Fuentes et al. (2006) indicated that in the Western United States, crustal particulate matter and nitrate had the greatest impact on mortality relative to the other components of PM_{2.5}.

Ostro et al. (2000) assessed 10 years (1989 to 1998) of daily data on mortality and PM₁₀ concentration for two locations (Palm Springs and Indio) in the Coachella Valley, California. In addition, during the final 2.5 years in this same period, daily data on PM_{2.5} were collected to allow for the assessment of size-specific impacts. An association between PM_{2.5} concentrations and cardiovascular mortality was not found; however, a less robust association between PM_{2.5} and all-cause mortality was found (Ostro et al. 2000). All-cause mortality was found to be statistically significant only on the fourth day after the dust storm (i.e., four day lag), and the authors suggest that the reduced number of PM_{2.5} samples in comparison to PM₁₀ samples and low PM_{2.5} concentrations during monitoring (24-hour PM_{2.5} concentrations ranged from 13 to 17 µg/m³ in the Coachella Valley) may have impacted statistical power (Ostro et al. 2000). The attributable risk was 4% (95% CI: 0% to 8%) per 9.0 µg/m³ increase in PM_{2.5}.

G3.2 PM₁₀

G3.2.1 Mortality

Information about mortality as the result of exposure to PM₁₀ from crustal sources is summarized in Table G-2.

A study by Schwartz et al. (1999) examined whether coarse particle concentrations are associated with mortality. Coarse particulate matter (PM₁₀) measurements were collected during 17 dust storm events in Spokane, Washington between 1989 and 1995, and these data were correlated with deaths in the same area. The source of the dust is arid agricultural areas and dust storms occur in the fall after crops have been harvested. Control days were chosen from the same day of the year in a previous year when a dust storm did not occur. The study found that mean 24-hour PM₁₀ concentrations were 263 µg/m³ on exposure days (i.e., dust storm events) compared to concentrations of approximately 42 µg/m³ on control days. The study found no evidence that mortality was elevated on dust storm days in Spokane as compared to control days, and concluded that control of airborne particles should focus on combustion particles not crustal particles if the goal is to reduce human health effects.

Table G-2 Summary of Mortality Studies for PM₁₀ Originating from Crustal Sources

Location	Spokane, Washington	Taipei, Taiwan	Coachella Valley, California	Coachella Valley, California	Taipei, Taiwan	El Paso, Texas
PM ₁₀ Concentration during Dust Storm Event (24-hour average) (µg/m ³)	263	101.1	NA	NA	NA	NA
PM ₁₀ Concentration on Control days (24-hour average) (µg/m ³)	42	73.3	NA	NA	NA	NA
Change in PM ₁₀ concentration (24-hour average) (µg/m ³)	221	27.8	10	10	64.1	10
Daily Increase in Mortality	NF	NA	1%	3%	NA	1.7% to 2.1%
All-cause (3-day lag)	NF	1.7%	NA	NA	NA	NA
All-cause (2-day lag)	NF	3.5% ^(a) , 5.3% ^(b)	NA	NA	7.7% ^(c)	NA
Cardio-respiratory	NF	3.7% ^(a)	1.2%	NA	2.6% ^(c)	NA
Reference	Schwartz et al. 1999	Kwon et al. 2002	Ostro et al. 1999	Ostro et al. 2000	Chen et al. 2004	Staniswalis et al. 2005

a) All age groups combined.

b) Over 65 years.

c) Not statistically significant.

NF = no association found between 24-hour PM₁₀ concentrations and mortality, NA = not assessed or not available; µg/m³ = micrograms per cubic metre; % = percent.

Slaughter et al. (2005) conducted a study to determine whether there is an association between different size fractions of particulate matter and cardiac and respiratory mortality and morbidity. The study examined the association between four fractions of particulate matter (PM_1 , $PM_{2.5}$, PM_{10} , and $PM_{2.5-10}$) and carbon monoxide and hospital visits or admissions in Spokane, Washington for respiratory and cardiac conditions and mortality between 1995 and 2001. The study did not find any associations with respiratory or cardiac hospital admissions or deaths with any fraction of particulate matter. However, the study did note a greater effect on respiratory health from fine versus coarse particulate matter.

Kwon et al. (2002) studied the effects of wind-blown dust originating from the arid deserts of China and Mongolia on daily mortality for people aged under 65 years and in elderly people (greater than or equal to 65 years) in Seoul, Korea from 1995 to 1998. The dust is composed primarily of crustal sources and ranges between 1.35 micrometres (μm) and 10 μm in size, but may also contain chemicals from combustion sources in Eastern China. The association between dust storm events and daily death counts was assessed using regression analysis, which was adjusted for temporal trends and weather variables.

The assessment was based on 28 dust storm days observed in Seoul, Korea between 1995 and 1998. The average 24-hour PM_{10} concentration observed during the dust storm was 101.1 $\mu g/m^3$ compared to 73.3 $\mu g/m^3$ on control days (i.e., non-dust storm days). For all-cause mortality (all ages combined) an increase of 1.7% (95% CI: -2.8% to 6.5%) was observed with the 3-day moving average. The risk was highest two days after the event as an increase of 3.5% (95% CI: -0.5% to 7.4%) was observed. The results are based on an increase of 27.8 $\mu g/m^3$ in 24-hour PM_{10} concentration. The analysis of subjects older than 65 years indicated a higher risk 5.3% (95% CI: 0.3% to 10.5%) 2-days after exposure to the dust storm event, which was considered to be significant. For all ages combined, the association with cardio-respiratory mortality was highest on the event day (3.7%; 95% CI: -2.7% to 10.5%) and decreased thereafter. For all other non-accidental causes of mortality, negative and non-statistically significant associations were found with exposure to the dust storm events.

Ostro et al. (1999) examined the role of PM_{10} in relation to daily mortality in the Coachella Valley, California, where geological particles comprise a significant percentage of the total particulate mass throughout much of the year, especially during wind storms. Analyses were conducted using daily data on mortality from 1989 to 1992 for several pollutants and meteorological variables. Outcome variables included several measures of daily mortality, including all-cause, cardiovascular, and respiratory mortality, and counts of death for those above age 50. The study noted statistically significant associations between PM_{10} (two- or three-day lags) and each measure of mortality. A 10 $\mu g/m^3$ change in daily PM_{10} was associated with an approximately 1% increase in mortality, which is of similar magnitude to particle-associated impacts identified in urban areas.

Ostro et al. (2000) repeated the earlier investigation conducted by Ostro et al. (1999) using 10 years (1989 to 1998) of daily data on mortality and PM_{10} for two locations (Palm Springs and Indio) in the Coachella Valley, California. Outcome variables included several measures of daily mortality, including all case (minus accidents and homicides), cardiovascular, and respiratory mortality. The average 24-hour PM_{10} concentrations were 29.8 and 47.4 $\mu g/m^3$ for Palm Springs and Indio, respectively. Ostro et al. (2000) found an association between PM_{10} and cardiovascular mortality. Ostro et al. (2000) found a statistically significant positive association between PM_{10} and incidence of death from cardiovascular disease. The attributable risk percent was 3% (95% CI: 1% to 5%) per 24.6 $\mu g/m^3$ increase in PM_{10} .

The authors concluded that although this study was carried out in an area in which PM_{10} is strongly correlated with the coarse fraction, the magnitudes of the associations are similar to those observed in numerous areas in which variability in particle concentration is due primarily to changes in combustion-related fine particles.

Staniswalis et al. (2005) performed a study in El Paso, Texas to determine if the mortality that occurred during 1992 and 1995 was associated with the temporal variability of PM_{10} levels within a 24-hour period. In addition, the researchers investigated the association of PM_{10} with total mortality in relation to wind speed, assuming that at high speeds wind was composed primarily of coarse particulate matter from re-suspended dust, whereas at low wind speeds it was mostly fine particulate matter from urban sources. The 24-hour average PM_{10} concentration ranged from 0.2 and $133.4 \mu\text{g}/\text{m}^3$. In this area, $PM_{2.5}$ is about 25% of the total PM_{10} concentrations and hourly PM_{10} concentrations have been noted to peak in the evenings during still-air conditions. Between 1992 and 1995, the daily death rate for the area ranged from 1 to 21 deaths/day with an average 8.5 deaths/day.

A principal component analysis showed that 40% of the total variation in daily PM_{10} concentration was explained by a peak occurring near 8 pm (20:00) and that the daily average only accounts for 28% of this variation. Using the results of the principal component analysis (hourly data), an increase of 2.06% total mortality per $10 \mu\text{g}/\text{m}^3$ increase in PM_{10} concentrations three days after the event (3-day lag) was found. In contrast, a non-significant increase of 1.7% in total mortality for $10 \mu\text{g}/\text{m}^3$ increase in the 24-hour mean PM_{10} concentration (3-day lag) was found using 24-hour average PM_{10} levels. This study therefore suggests that using average PM_{10} over a 24-hour period can result in an underestimation of the health effects.

The mortality risk was derived based on high wind speed and low to mid wind speed conditions, and the differences between those wind conditions were examined. A high wind speed at night (greater than 7.6 metres per second [m/s]) was significantly associated with a 10% lower risk of mortality in the three days following high wind speed event as compared to low and mid wind speed conditions. This suggests that crustal particles may have a weaker negative impact on health outcomes as compared with ultrafine particle exposure. Coarse particles in El Paso are believed to contain deposited metals from historic mining and smelting, and the mineral content of the coarse particulate matter may affect the mortality results presented here, when compared to crustal particulate matter from other locations.

Pope et al. (1999) examined the weak association between particulate matter (PM_{10}) concentrations and mortality in Salt Lake City, Utah; however, a reasonably strong association was found in a neighbouring community (Provo, Utah). The study found that Salt Lake City is subject to significantly more episodes of dust storms than Provo. Exclusion of data (24-hour PM_{10} measurements) that were associated with dust storm events and the use of particulate matter measurements from multiple monitors resulted in a revised association that was similar to that for Provo, Utah. The study concluded that particulate matter from combustion sources was more closely associated with increased mortality than wind-blown particulate matter, which is high in coarse crustal material.

Chen et al. (2004) also studied the effects of Asian dust storm events from 1995 to 2000 on daily mortality in Taipei, Taiwan. The mean number of deaths due to non-accidental causes was 27, while the mean numbers of deaths due to cardiovascular and respiratory causes were respectively 7.31 and 2.8. Increases of 4.92% and 2.59% per $64.1 \mu\text{g}/\text{m}^3$ increase in PM_{10} were observed for all-cause mortality and cardiovascular mortality, respectively, two days after the dust event, which had caused an increase of $68.14 \mu\text{g}/\text{m}^3$ in PM_{10} . The highest effect was found for respiratory mortality with an increase of 7.66% per $64.1 \mu\text{g}/\text{m}^3$ increase in PM_{10} one day after the event. However, all estimates were non-statistically significant.

In Finland, PM_{10} particles originate from re-suspended coarse road dust and the spreading of sand on streets in the spring. Penttinen et al. (2004) examined the association between air particulate concentrations in air in the greater Helsinki area for all-cause, respiratory, and cardiovascular mortality between 1988 and 1996. A measure of the blackness of total suspended particulates (TSP) was used as a surrogate for fine and combustion-derived particles to evaluate the impact of fine particulate, $\text{PM}_{2.5}$, on mortality. The TSP blackness was also highly correlated with carbon monoxide indicating that combustion-derived particles were a major contributor to this measure. The study identified positive but non-significant relationships between PM_{10} and total and cardiovascular mortality for all age groups. Median 24-hour average concentrations for TSP, PM_{10} , and $\text{PM}_{2.5}$ were found to be 57, 28, and $15 \mu\text{g}/\text{m}^3$, respectively, while maximum concentrations ranged from 234, 122, and $55 \mu\text{g}/\text{m}^3$, respectively. Positive and significant associations were identified for PM_{10} and respiratory mortality. Increases of respiratory mortality of 3.94% (95% CI: 0.01% to 7.87%) on the same day of measurement, 3.96% (95% CI: 0.11% to 7.81%) on 1-day after measurement (1-day lag), and 2.13% (95% CI: 0.03% to 4.22%) on four days after measurement (4-day lag) were noted. Results were not consistent for the association with TSP concentrations and TSP blackness with mortality. Overall, this study provided little evidence of a role for coarse particulate matter from re-suspended road dust in increased mortality; results suggested that combustion-derived particles are more strongly associated with mortality than crustal-derived particles.

G3.2.2 Morbidity

Information about morbidity health outcomes as the result of exposure to PM_{10} from crustal sources is summarized in Table G-3.

Several authors conducted studies to assess the possible effects of windblown dust storms originating in the deserts of Mongolia and China (Asian Dust Storm) on hospital admissions for various health conditions for residents in Taipei, Taiwan, during the period from 1996 to 2001. Mean concentrations of 24-hour PM_{10} during dust storms was $111.68 \pm 38.32 \mu\text{g}/\text{m}^3$ compared to the mean concentration during comparison days (usually the same day of the week, but a week before and a week after a dust storm) of $55.43 \pm 24.66 \mu\text{g}/\text{m}^3$. The study authors found that there may not have been enough statistical power to detect associations resulting from inadequate sample size of hospital admissions for the various health endpoints on dust storm event days. The studies are summarized below in greater detail.

Chen and Yang (2005) conducted a study to assess the possible effects of Asian Dust Storm on hospital cardiovascular disease admissions of residents in Taipei, Taiwan, during the period from 1996 to 2001. A 3.65% increase in the risk of cardiovascular disease admissions during the Asian Dust Storm events (1 day following the day of the Asian Dust Storm) was observed; however, this increase was not statistically significant.

Andersen et al. (2007) found a statistically significant positive association between crustal PM₁₀ and the incidence of hospital admission for cardiovascular disease, independent of PM₁₀ from all other sources in Copenhagen. The attributable increased risk of cardiovascular disease was 5.1% (95% CI: 1.8% to 8.4%) per 25 µg/m³ increase in crustal PM₁₀.

Yang et al. (2005a) conducted a study to assess the possible associations of Asian Dust Storm on the hospital asthma admissions of residents in Taipei, Taiwan, during the period from 1996 to 2001. The association between dust storms and asthma admission was prominent two days after the Asian Dust Storm event. The estimated relative risk was 1.08 (95% CI: 0.97% to 8.76%); however, this increase was not statistically significant.

Yang et al. (2005b) designed a study to assess the possible associations of Asian Dust Storm on the hospital stroke admissions of residents in Taipei, Taiwan, during the period from 1996 to 2001. The study results indicated a statistically significant association between Asian Dust Storm events and daily primary intracerebral hemorrhagic stroke admissions three days after the event (relative risk of 1.15; CI: 1.01 to 10.10). Yang et al. (2005b) also found a positive but not significant association between Asian Dust Storm events and ischemic stroke admissions three days following the dust storms, which was due primarily to PM₁₀.

Yang et al. (2009) conducted a study to assess the possible associations of Asian Dust Storm on the hospital admissions for congestive heart failure for residents in Taipei, Taiwan, during the period from 1996 to 2001. The association between dust storms and congestive heart failure admission was prominent one day after the Asian Dust Storm event. The estimated relative risk was 1.11 (95% CI: 0.99% to 1.25%); however, this increase was not statistically significant.

Chang et al. (2006) conducted a study to assess the possible effects of windblown dust storms originating in the deserts of Mongolia and China on the daily clinical visits for allergic rhinitis of residents in Taipei, Taiwan, during the period of 1997 to 2001. The study found that the mean concentration of PM₁₀ during dust storms was 110.37 ± 37.86 µg/m³ compared to the mean concentration during comparison days (usually the same day of the week, but a week before and a week after a dust storm) of 61.73 ± 30.22 µg/m³. A 19% increase in the risk of clinical visits for allergic rhinitis during the dust storm events (two days following the Asian Dust Storm) was observed; however, this increase was not statistically significant.

Gordian et al. (1996) examined the effects of average 24-hour PM₁₀ concentrations and carbon monoxide and temperature on the number of daily outpatient visits for respiratory disease (asthma, bronchitis, and upper respiratory tract illnesses) in Anchorage, Alaska between 1992 and 1994. Particulate matter less than 10 µm (PM₁₀) in the Anchorage area is composed primarily of material from crustal sources (unpaved roads, road sanding) and volcanic ash due to the lack of industrial sources of pollution.

A volcanic eruption occurred during the study (Mount Spurr on August 18, 1992) and the 24-hour average PM₁₀ concentration was 565 µg/m³ on the day after the eruption. The composition of the volcanic ash was analyzed by electron microscopy and it was determined that the majority of the particle mass (greater than 80%) was composed of particles between 2.5 and 10 µm containing primarily silica and silica-aluminum mixture. The assessment of the volcanic ash composition was consistent with a previous investigation that showed the TSP in the Anchorage area was composed primarily of material from crustal sources. The mean 24-hour PM₁₀ concentration measured during the study was 45.54 µg/m³ and the maximum was the 565 µg/m³ as the result of a volcanic eruption.

Vehicular emissions are a source of benzene and carbon monoxide, which have been attributed to incomplete combustion of Alaskan gasoline, which is high in benzene content. Carbon monoxide was only measured in the winter in this study. Based on the available information, PM_{10} and carbon monoxide concentrations were not correlated.

The study found statistically significant positive associations between PM_{10} and incidence of outpatient medical visits due to respiratory illnesses, independent of the outdoor temperature. For asthma, the attributable risk was 4.2% per $10 \mu\text{g}/\text{m}^3$ increase in PM_{10} . For bronchitis, the attributable risk was 2.3% per $10 \mu\text{g}/\text{m}^3$ increase in PM_{10} . For upper respiratory tract infections, the attributable risk was 2.7% per $10 \mu\text{g}/\text{m}^3$ increase in PM_{10} . Temperature is a marker for season, which could influence PM_{10} levels and respiratory illness. The association of PM_{10} and increased incidences of outpatient visits was higher and only statistically significant during the period of time following the volcanic eruption. Winter carbon monoxide concentrations were found to be correlated with bronchitis and upper respiratory illnesses but not asthma.

Another study from Washington State (Hefflin et al. 1991) found a small increase in hospital admissions for respiratory illness following dust storms where maximum concentrations exceeded $1,000 \mu\text{g}/\text{m}^3$ over a 24-hour period. Hefflin et al. (1991) found positive associations between PM_{10} and incidence of hospital emergency room visits for bronchitis (attributable risk was 0.35% per $10 \mu\text{g}/\text{m}^3$), and for sinusitis (attributable risk was 0.45% per $10 \mu\text{g}/\text{m}^3$ PM_{10}).

A study conducted after the eruption of Mount St. Helens looked at potential health effects to children attending a camp in the vicinity of the eruption who were exposed to elevated concentrations of dust ($10,000 \mu\text{g}/\text{m}^3$). Although the dust levels measured during the camp were above the particulate matter standard at that time ($260 \mu\text{g}/\text{m}^3$), the authors did not find strong evidence to suggest either a within-day or between-day effect from the dust on lung function in the children (Buist et al. 1983).

The Concentration Response Factors (Jin and Demarchi 2010) derived from epidemiological studies, which demonstrated a significant positive association between exposure to crustal particulate matter and health effects, are summarized in Table G-3.

Table G-3 Summary of Morbidity Studies from PM₁₀ Originating from Crustal Sources

Location	Taipei, Taiwan						Anchorage, Alaska
PM ₁₀ Concentration during Dust Storm Event (24-hour average) (µg/m ³)	111.68	111.68	111.68	111.68	111.68	110.37	NA
PM ₁₀ Concentration on Control days (24-hour average) (µg/m ³)	55.43	55.43	55.43	55.43	55.43	61.73	NA
Change in PM ₁₀ concentration (24-hour average) (µg/m ³)	38.32	38.32	38.32	38.32	38.32	48.64	10
Daily Increase in Morbidity							
Cardiovascular Disease Hospital Admissions	3.65% (1-day lag)	NA	NA	NA	NA	NA	NA
Asthma Hospital Admissions	NA	1.1% ^(a)	NA	NA	NA	NA	4.2%
Stroke Hospital Admissions	NA	NA	NA	1.2% (2-day lag)	NA	NA	NA
Congestive Heart Failure Hospital Admissions	NA	NA	NA	NA	11% (1-day lag) ^a	NA	NA
Allergic Rhinitis Hospital/Clinic Visits	NA	NA	19% (2-day lag) ^a	NA	NA	NA	NA
Clinic Visits for Conjunctivitis	NA	NA	NA	NA	NA	11% (4-day lag) ^a	NA
Upper Respiratory Hospital Admissions	NA	NA	NA	NA	NA	NA	2.7% ^(b)
Reference	Chen and Yang (2005)	Yang et al. (2005a)	Chang et al. (2006)	Yang et al. (2005b)	Yang et al. (2009)	Yang (2006)	Gordian et al. (1996)

a) Not statistically significant.

b) Correlated with carbon monoxide concentrations from vehicular traffic.

NA = not assessed or not available; µg/m³ = micrograms per cubic metre; % = percent.

G3.3 Other Health Effects

G3.3.1 Ophthalmic Effects

Three studies are summarized below on the effects of particulate matter on eyes.

The first study by Gupta et al. (2007) completed a case study on the impact of air pollution in India on eyes. The study examined a total of 520 subjects and was designed to investigate the impact of air pollution on eyes from vehicular pollution. The study group commuted daily via highly polluted areas for at least two years. The control group was comprised of people residing on campus and travelling from home to workplace through the campus. The subjects provided a detailed history including history of ophthalmic conditions. The results showed a significantly larger number of subjects in the study group were suffering from ophthalmic symptoms compared to control. Symptoms included redness, watering, irritation, strain, blurring, and photophobia. No significant difference was observed in visual acuity in the two groups. The study did not break down air pollutant effects into individual components (e.g., nitrogen dioxide [NO₂] or particulate matter).

The second study by Bourcier et al. (2003) examined the effects of air pollution and climatic conditions on the frequency of ophthalmological emergency examinations. The pollutants measured in the study included nitric oxide (gas) (NO), NO₂, ozone (O₃), sulphur dioxide (SO₂), and PM₁₀. Data were collected on the number of daily examinations completed in ophthalmological emergency departments in a Paris hospital over a one-year period. Based on a linear regression model, the study looked at correlations between air pollution and climatic conditions and the intake of patients for ocular emergencies. The study found a strong relationship between conjunctivitis and related ocular surface problems and air pollution; however, the relationship was between NO₂ and the maximum temperature of the day. No relationship was found between the other covariates (e.g., particulate matter in the air) and trauma or surgical emergencies.

The third study by Yang (2006) assessed the possible effects of exposure to windblown dust storms originating in the deserts of Mongolia and China on the clinical visits for conjunctivitis in residents of Taipei, Taiwan during the period from 1997 to 2001. The study found that the mean concentration of PM₁₀ during dust storms was $110.37 \pm 37.86 \mu\text{g}/\text{m}^3$ compared to the mean concentration during comparison days (usually the same day of the week, but a week before and a week after a dust storm) of $61.73 \pm 30.22 \mu\text{g}/\text{m}^3$. An 11% increase in the risk of clinical visits for conjunctivitis during the dust storm events (4 days following the day of the storm event) was observed; however, this increase was not statistically significant. There may not have been enough statistical power to detect associations resulting from inadequate sample size of conjunctivitis visits on dust storm event days.

G4 REFERENCES

- Andersen ZJ, Wahlin P, Raaschou-Nielsen O, Scheike, TS Loft. 2007. Ambient Particle Source Apportionment and Daily Hospital Admissions Among Children and Elderly in Copenhagen. *J Expo Sci Env Epi* 17: 625-636.
- Bourcier T, Viboud C, Cohen JC, Thomas F, Bury T, Cadiot L, Mestre O, Flahault, A. Borderie V, Laroche L. 2003. Effects of Air Pollution and Climatic Conditions on the Frequency of Ophthalmological Emergency Examinations. *Brit J Ophthamology* 87: 809-811.
- Buist AS, Johnson LR, Vollmer WM, Sexton GJ, Kanarek PH. 1983. Acute Effects of Volcanic Ash from Mount St. Helens on Lung Function in Children. *Am Rev Respir Dis* 127: 714-719.
- Chang C, Lee I, Tsai S, Yang C. 2006. Correlation of Asian Storm Events with Daily Clinic Visits for Allergic Rhinitis in Taipei, Taiwan. *J Toxicol Env Heal A* 69: 229-235.
- Chen YS, Sheen PC, Chen ER, Liu YK, Wu TN, Yang CY. 2004. Effects of Asian Dust Storm Events on Daily Mortality in Taipei, Taiwan. *Environ Res* 95: 151–155.
- Chen Y, Yang C. 2005. Effects of Asian Dust Storm Events on the Daily Hospital Admission for Cardiovascular Disease in Taipei, Taiwan. *J Toxicol Env Heal A* 68: 1457-1464.
- Englert 2004. Fine Particles and Human Health-a review of epidemiological studies. *Toxicology Letters* 149 (1): 235-242.
- Fuentes M, Song HR, Ghosh SK, Holland DM, Davis JM. 2006. Spatial association between speciated fine particles and mortality. *Biometrics* 62: 855-63.
- Gordian ME, Ozkaynak H, Xue J, Morris S, Spengler JD. 1996. Particulate Air Pollution and Respiratory Disease in Anchorage, Alaska. *Environ Health Persp* 104: 290-297.
- Gupta SK, Gupta SC, Agarwal R, Sushma S, Agrawal SS, Rohit S. 2007. A Multicentric Case-control Study on the Impact of Air Pollution on Eyes in a Metropolitan City of India. *Indian J Occup Environ Med* 11: 37-40.
- Hefflin BJ, Jalaludin B, McClure E. 1991. Surveillance for Dust Storms and Respiratory Diseases in Washington State. *Arch Environ Health* 49: 170-174.
- Jin A, Demarchi M. 2010. Health Canada Epidemiologist (Jin) and Senior Wildlife Ecologist (Demarchi). BC, Canada. E-mail. June 15, 2010.
- Kwon HJ, Cho SH, Chun Y, Lagarde F, Pershagen G. 2002. Effects of the Asian Dust Events on Daily Mortality in Seoul, Korea. *Environ Res Section A* 90: 1-5.
- Laden F, Neas LM, Dockery DW, Schwartz J. 2000. Association of Fine Particulate Matter from Different Sources with Daily Mortality in Six U.S. Cities. *Environ Health Persp* 108: 941-947.
- Lippmann M, Chen LC. 2009a. Health Effects of Concentrated Ambient Air Particulate Matter (CAPs) and its Components. *Crit Rev Toxicol*. 39: 865-913.

- Lippmann M, Chen LC. 2009b. Effects of metals within ambient air particulate matter (PM) on human health. *Inhal Toxicol*. 21:1-31.
- Ostro BD, Hurley S, Lipsett M. 1999. Air Pollution and Daily Mortality in the Coachella Valley, California: A Study of PM₁₀ Dominated by Coarse Particles. *Environ Res, Section A* 81: 231-238.
- Ostro BD, Broadwin R, Lipsett MJ. 2000. Coarse and Fine Particles and Daily Mortality in the Coachella Valley California: A Follow-up Study. *J Expo Anal Env Epid* 10: 412-419.
- Penttinen P, Tiittanen P, Pekkanen J. 2004. Mortality and Air Pollution in Metropolitan Helsinki, 1988-1996. *Scandinavian J Expo Anal Env Epid* 30: 19-27.
- Pope CA., Hill RW, Villegas GM. 1999. Particulate Air Pollution and Daily Mortality on Utah's Wasatch Front. *Environ Health Persp* 107: 567-573.
- Rohr AC, Wyzga RE. 2012. Attributing health effects to individual particulate matter constituents. *Atmos Environ* 62: 130-152.
- Schwartz J, Norris G, Larson T, Sheppard L, Claiborne C, Koenig J. 1999. Episodes of High Coarse Particle Concentrations Are Not Associated with Increased Mortality. *Environ Health Persp* 107: 339-342.
- Schwarze PE, Ovrevik J, Lag M, Refsnes M, Nafstad P, Hetland RB, Dybing E. 2006. Particulate matter properties and health effects: consistency of epidemiological and toxicological studies. *Hum Exp Toxicol* 25: 559-579.
- Slaughter JC, Kim E, Sheppard L, Sullivan JH, Larson T, Claiborn C. 2005. Association between Particulate Matter and Emergency Room Visits, Hospital Admissions, and Mortality in Spokane, Washington. *J Expo Anal Env Epid* 15: 153-159.
- Stanek LW, Sacks JD, Dutton SJ, Dubois JJB. 2011. Attributing health effects to apportioned components and sources of particulate matter: An evaluation of collective results. *Atmos Environ* 45(32): 5655-5663.
- Staniswalis JG, Parks NJ, Bader JO, Maldonado YM. 2005. Temporal Analysis of Airborne Particulate Matter Reveals a Dose-rate Effect on Mortality in El Paso: Indications of Differential Toxicity for Different Particle Mixtures. *J Air Waste Manage* 55 (7): 893-902.
- WHO (World Health Organization). 2006. Air Quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Geneva, Switzerland.
- Yang C, Tsai S, Chang C, Ho S. 2005a. Effects of Asian Dust Storm Events on Daily Admissions for Asthma in Taipei, Taiwan. *Inhal Toxicol* 17: 817-821.
- Yang C, Chen Y, Chiu H, Goggins W. 2005b. Effects of Asian Dust Storm Events on Daily Stroke Admissions in Taipei, Taiwan. *Environ Res* 99: 79-84.
- Yang C. 2006. Effects of Asian Dust Storm Events on Daily Clinical Visits for Conjunctivitis in Taipei, Taiwan. *J Toxicol Env Heal A* 69: 1673-1680.



Yang C, Cheng M, Chen C. 2009. Effects of the Asian Dust Storm Events on Hospital Admissions for Congestive Heart Failure in Taipei, Taiwan. *J Toxicol Env Heal A* 72: 324-328.

APPENDIX H

HUMAN AND WILDLIFE HEALTH MODEL RESULTS

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Abbreviations

Abbreviation	Definition
COPC	Constituent of potential concern
HQ	Hazard quotient
ILCR	Incremental lifetime cancer risk
TRV	Toxicity reference value

Units of Measure

Unit	Definition
%	Percent
dw	dry weight basis
kg/d (ww)	Kilograms per day (in wet weight)
L/d	Litres per day
mg/d	Milligram per day
mg/kg bw/day	Milligram per kilogram body weight per day
mg/kg/day	Milligram per kilogram per day

H1 INTRODUCTION

This appendix provides the model output results of the multimedia modelling described in Appendix C and D for the human and wildlife health multimedia risk assessment in support of the overall environmental assessment for Jay Project (the Project).

Predicted concentrations in environmental media that are utilized in the human and wildlife health multimedia risk assessment are provided in Appendix C. A description of the exposure pathways assessed and exposure parameters utilized in the assessment are provided in Appendix D.

H2 MODEL OUTPUTS FOR THE HUMAN HEALTH MULTIMEDIA RISK ASSESSMENT

Tables H2.1-1 to H2.1-5 present the exposure estimates, hazard quotients (HQs), and incremental lifetime cancer risks (ILCRs) for the constituents of potential concern (COPCs) under the Base Case for the infant, toddler, child, teen, and adult receptor, respectively. Tables H2.1-6 to H2.1-10 present the exposure estimates, HQs and ILCRs for the COPCs under the Application Case for the infant, toddler, child, teen, and adult receptor, respectively.

Table H2.1-11 presents the summed ILCRs for the composite receptor.

Table H2.1-1 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Infant - Base Case

Exposure Dose																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m ³	mg/kg/day	mg/kg/day
Arsenic	1.3E-05	3.9E-08	NA	NA	NA	1.4E-06	NA	NA	NA	NA	NA	NA	NA	2.4E-04	1.4E-05	8.1E-07	1.9E-09	9.3E-09	2.7E-04	NA
Chromium	6.2E-06	3.8E-08	NA	NA	NA	7.3E-06	NA	NA	NA	NA	NA	NA	NA	9.0E-04	8.5E-05	1.6E-05	1.1E-08	1.2E-07	1.0E-03	NA
Mercury (inorganic)	3.7E-07	1.1E-09	NA	NA	NA	4.4E-07	NA	NA	NA	NA	NA	NA	NA	4.8E-06	2.2E-07	4.2E-07	2.9E-11	6.4E-09	6.2E-06	NA
Methyl Mercury ^(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-05	NA	NA	NA	NA	1.4E-05	NA
Selenium	1.8E-06	5.5E-09	NA	NA	NA	7.3E-06	NA	NA	NA	NA	NA	NA	NA	4.9E-03	7.3E-07	1.4E-08	9.5E-11	2.3E-08	4.9E-03	NA
Hazard Quotients (HQs)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	4.3E-02	1.3E-04	NA	NA	NA	4.6E-03	NA	NA	NA	NA	NA	NA	NA	8.0E-01	4.8E-02	2.7E-03	1.9E-06	9.3E-06	9.0E-01	NA
Chromium	2.1E-03	1.3E-05	NA	NA	NA	2.4E-03	NA	NA	NA	NA	NA	NA	NA	3.0E-01	2.8E-02	5.3E-03	1.1E-04	1.2E-03	3.4E-01	NA
Mercury (inorganic)	1.2E-03	3.7E-06	NA	NA	NA	1.5E-03	NA	NA	NA	NA	NA	NA	NA	1.6E-02	7.5E-04	1.4E-03	9.7E-08	2.1E-05	2.1E-02	NA
Methyl Mercury ^(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.2E-02	NA	NA	NA	NA	6.2E-02	NA
Selenium	3.3E-04	1.0E-06	NA	NA	NA	1.3E-03	NA	NA	NA	NA	NA	NA	NA	8.9E-01	1.3E-04	2.5E-06	NA	NA	8.9E-01	NA
Carcinogenic Exposure Doses																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation		
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m ³		
Arsenic	2.0E-08	6.0E-11	NA	NA	NA	8.6E-09	NA	NA	NA	NA	NA	NA	NA	1.5E-06	2.2E-08	1.3E-09	2.9E-12	1.5E-11	1.6E-06	NA
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7E-11	1.9E-10	2.1E-10	NA
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	3.6E-08	1.1E-10	NA	NA	NA	1.5E-08	NA	NA	NA	NA	NA	NA	NA	2.7E-06	4.0E-08	2.3E-09	1.9E-11	9.3E-11	2.8E-06	NA
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.3E-09	1.5E-08	1.6E-08	NA
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.3E-09	1.5E-08	1.6E-08	NA

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-2 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Toddler - Base Case

Exposure Dose																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day
Arsenic	1.3E-05	3.3E-08	NA	NA	1.7E-05	6.8E-07	6.7E-07	4.4E-08	1.6E-07	NA	NA	NA	NA	1.9E-04	2.9E-05	5.6E-07	1.9E-09	9.3E-09	2.5E-04	NA	
Chromium	6.2E-06	3.2E-08	NA	NA	2.9E-04	3.6E-06	3.6E-06	5.7E-04	2.2E-04	NA	NA	NA	NA	1.0E-03	1.7E-04	1.1E-05	1.1E-08	1.2E-07	2.3E-03	NA	
Mercury (inorganic)	3.6E-07	9.3E-10	NA	NA	2.9E-04	2.2E-07	5.3E-07	5.8E-06	3.4E-06	NA	NA	NA	NA	7.5E-06	4.5E-07	2.9E-07	2.9E-11	6.4E-09	3.1E-04	NA	
Methyl Mercury (a)	NA	NA	NA	NA	6.9E-05	NA	NA	1.7E-05	1.0E-05	NA	NA	NA	NA	2.3E-05	NA	NA	NA	NA	1.2E-04	NA	
Selenium	1.8E-06	4.6E-09	NA	NA	6.7E-04	3.6E-06	1.6E-06	6.7E-05	2.2E-05	NA	NA	NA	NA	5.1E-03	1.5E-06	9.4E-09	9.5E-11	2.3E-08	5.9E-03	NA	
Hazard Quotients (HQs)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	4.2E-02	1.1E-04	NA	NA	5.7E-02	2.3E-03	2.2E-03	1.5E-04	5.2E-04	NA	NA	NA	NA	6.3E-01	9.5E-02	1.9E-03	1.9E-06	9.3E-06	8.3E-01	NA	
Chromium	2.1E-03	1.1E-05	NA	NA	9.7E-02	1.2E-03	1.2E-03	1.9E-01	7.4E-02	NA	NA	NA	NA	3.3E-01	5.7E-02	3.7E-03	1.1E-04	1.2E-03	7.6E-01	NA	
Mercury (inorganic)	1.2E-03	3.1E-06	NA	NA	9.8E-01	7.3E-04	1.8E-03	1.9E-02	1.1E-02	NA	NA	NA	NA	2.5E-02	1.5E-03	9.6E-04	9.7E-08	2.1E-05	1.0E+00	NA	
Methyl Mercury (a)	NA	NA	NA	NA	3.0E-01	NA	NA	7.6E-02	4.4E-02	NA	NA	NA	NA	9.8E-02	NA	NA	NA	NA	5.2E-01	NA	
Selenium	2.9E-04	7.5E-07	NA	NA	1.1E-01	5.9E-04	2.5E-04	1.1E-02	3.5E-03	NA	NA	NA	NA	8.2E-01	2.3E-04	1.5E-06	NA	NA	9.5E-01	NA	
Carcinogenic Exposure Doses																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation			
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	1.8E-07	4.6E-10	NA	NA	9.5E-07	3.8E-08	3.8E-08	2.5E-09	8.7E-09	NA	NA	NA	NA	1.1E-05	4.0E-07	7.8E-09	2.6E-11	1.3E-10	1.2E-05	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-10	1.7E-09	1.9E-09	NA	
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	3.2E-07	8.2E-10	NA	NA	1.7E-06	6.9E-08	6.8E-08	4.5E-09	1.6E-08	NA	NA	NA	NA	1.9E-05	7.2E-07	1.4E-08	1.7E-10	8.4E-10	2.2E-05	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2E-08	1.3E-07	1.4E-07	NA	
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2E-08	1.3E-07	1.4E-07	NA	

Note:

a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.

b) Used to calculate the ILCRs for the aggregate receptor.

Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)

Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)

NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-3 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Child - Base Case

Exposure Dose																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day
Arsenic	8.5E-06	2.7E-08	NA	NA	1.4E-05	3.4E-07	3.3E-07	3.3E-08	1.1E-07	NA	NA	NA	NA	1.1E-04	3.6E-06	4.0E-07	1.9E-09	9.3E-09	1.4E-04	NA
Chromium	4.1E-06	2.6E-08	NA	NA	2.4E-04	1.8E-06	1.8E-06	4.2E-04	1.6E-04	NA	NA	NA	NA	7.0E-04	2.1E-05	7.9E-06	1.1E-08	1.2E-07	1.6E-03	NA
Mercury (inorganic)	2.4E-07	7.7E-10	NA	NA	2.4E-04	1.1E-07	2.6E-07	4.3E-06	2.5E-06	NA	NA	NA	NA	8.0E-06	5.6E-08	2.1E-07	2.9E-11	6.4E-09	2.6E-04	NA
Methyl Mercury ^(a)	NA	NA	NA	NA	5.7E-05	NA	NA	1.3E-05	7.4E-06	NA	NA	NA	NA	2.4E-05	NA	NA	NA	NA	1.0E-04	NA
Selenium	1.2E-06	3.9E-09	NA	NA	5.5E-04	1.8E-06	7.9E-07	4.9E-05	1.6E-05	NA	NA	NA	NA	4.0E-03	1.8E-07	6.7E-09	9.5E-11	2.3E-08	4.6E-03	NA
Hazard Quotients (HQs)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	2.8E-02	9.0E-05	NA	NA	4.7E-02	1.1E-03	1.1E-03	1.1E-04	3.8E-04	NA	NA	NA	NA	3.7E-01	1.2E-02	1.3E-03	1.9E-06	9.3E-06	4.6E-01	NA
Chromium	1.4E-03	8.7E-06	NA	NA	8.0E-02	6.1E-04	6.1E-04	1.4E-01	5.5E-02	NA	NA	NA	NA	2.3E-01	7.1E-03	2.6E-03	1.1E-04	1.2E-03	5.2E-01	NA
Mercury (inorganic)	8.1E-04	2.6E-06	NA	NA	8.1E-01	3.6E-04	8.8E-04	1.4E-02	8.3E-03	NA	NA	NA	NA	2.7E-02	1.9E-04	6.9E-04	9.7E-08	2.1E-05	8.6E-01	NA
Methyl Mercury ^(a)	NA	NA	NA	NA	2.5E-01	NA	NA	5.6E-02	3.2E-02	NA	NA	NA	NA	1.0E-01	NA	NA	NA	NA	4.4E-01	NA
Selenium	1.9E-04	6.1E-07	NA	NA	8.8E-02	2.9E-04	1.3E-04	7.8E-03	2.6E-03	NA	NA	NA	NA	6.3E-01	2.9E-05	1.1E-06	NA	NA	7.3E-01	NA
Carcinogenic Exposure Doses																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation		
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	1.9E-07	5.9E-10	NA	NA	1.2E-06	3.0E-08	2.9E-08	2.9E-09	1.0E-08	NA	NA	NA	NA	9.6E-06	7.8E-08	8.7E-09	4.1E-11	2.0E-10	1.1E-05	NA
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.4E-10	2.7E-09	2.9E-09	NA
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	3.4E-07	1.1E-09	NA	NA	2.2E-06	5.4E-08	5.3E-08	5.1E-09	1.8E-08	NA	NA	NA	NA	1.7E-05	1.4E-07	1.6E-08	2.6E-10	1.3E-09	2.0E-05	NA
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8E-08	2.0E-07	2.2E-07	NA
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9E-08	2.1E-07	2.2E-07	NA

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk



Table H2.1-4 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Teen - Base Case

Exposure Dose																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day
Arsenic	5.9E-06	2.3E-08	1.5E-05	9.1E-06	9.4E-06	1.9E-07	5.5E-07	2.5E-08	8.8E-08	2.6E-06	9.4E-08	1.3E-08	4.4E-08	6.0E-05	2.0E-06	3.0E-07	1.9E-09	9.3E-09	1.0E-04	9.5E-05
Chromium	2.8E-06	2.2E-08	2.0E-05	4.0E-05	1.6E-04	1.0E-06	3.0E-06	3.2E-04	1.3E-04	4.4E-05	5.0E-07	1.6E-04	6.3E-05	3.0E-04	1.2E-05	6.0E-06	1.1E-08	1.2E-07	1.0E-03	6.5E-04
Mercury (inorganic)	1.7E-07	6.5E-10	7.0E-09	1.4E-07	1.6E-04	6.0E-08	4.4E-07	3.3E-06	1.9E-06	4.5E-05	3.0E-08	1.6E-06	9.6E-07	7.0E-06	3.1E-08	1.6E-07	2.9E-11	6.4E-09	1.8E-04	5.5E-05
Methyl Mercury ^(a)	NA	NA	NA	NA	3.8E-05	NA	NA	9.9E-06	5.7E-06	1.1E-05	NA	4.9E-06	2.9E-06	2.1E-05	NA	NA	NA	NA	7.5E-05	3.9E-05
Selenium	8.4E-07	3.2E-09	7.4E-08	1.4E-08	3.7E-04	1.0E-06	1.3E-06	3.8E-05	1.2E-05	1.0E-04	5.0E-07	1.9E-05	6.2E-06	1.9E-03	1.0E-07	5.1E-09	9.5E-11	2.3E-08	2.3E-03	2.0E-03
Hazard Quotients (HQs)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	2.0E-02	7.6E-05	5.1E-02	3.0E-02	3.1E-02	6.3E-04	1.8E-03	8.4E-05	2.9E-04	8.6E-03	3.1E-04	4.2E-05	1.5E-04	2.0E-01	6.6E-03	1.0E-03	1.9E-06	9.3E-06	3.4E-01	3.2E-01
Chromium	9.5E-04	7.3E-06	6.8E-03	1.3E-02	5.4E-02	3.4E-04	1.0E-03	1.1E-01	4.2E-02	1.5E-02	1.7E-04	5.4E-02	2.1E-02	1.0E-01	3.9E-03	2.0E-03	1.1E-04	1.2E-03	3.3E-01	2.2E-01
Mercury (inorganic)	5.6E-04	2.2E-06	2.3E-05	4.6E-04	5.4E-01	2.0E-04	1.5E-03	1.1E-02	6.4E-03	1.5E-01	1.0E-04	5.5E-03	3.2E-03	2.3E-02	1.0E-04	5.3E-04	9.7E-08	2.1E-05	5.9E-01	1.8E-01
Methyl Mercury ^(a)	NA	NA	NA	NA	1.7E-01	NA	NA	4.3E-02	2.5E-02	4.6E-02	NA	2.2E-02	1.2E-02	9.1E-02	NA	NA	NA	NA	3.3E-01	1.7E-01
Selenium	1.4E-04	5.2E-07	1.2E-05	2.3E-06	5.9E-02	1.6E-04	2.1E-04	6.1E-03	2.0E-03	1.6E-02	8.1E-05	3.1E-03	1.0E-03	3.1E-01	1.6E-05	8.3E-07	NA	NA	3.7E-01	3.3E-01
Carcinogenic Exposure Doses																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation		
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	1.5E-07	5.7E-10	3.9E-07	2.3E-07	9.4E-07	1.9E-08	5.5E-08	2.5E-09	8.8E-09	2.6E-07	9.4E-09	1.3E-09	4.4E-09	6.0E-06	4.9E-08	7.6E-09	4.7E-11	2.3E-10	7.8E-06	7.1E-06
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8E-10	3.1E-09	3.3E-09	3.3E-09
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	2.6E-07	1.0E-09	6.9E-07	4.1E-07	1.7E-06	3.4E-08	9.9E-08	4.5E-09	1.6E-08	4.6E-07	1.7E-08	2.3E-09	8.0E-09	1.1E-05	8.9E-08	1.4E-08	3.0E-10	1.5E-09	1.4E-05	1.28E-05
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-08	2.3E-07	2.5E-07	2.5E-07
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-08	2.3E-07	2.56E-07	2.6E-07

Note:

a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.

b) Used to calculate the ILCRs for the aggregate receptor.

Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)

Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)

NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-5 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Adult - Base Case

Exposure Dose																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day
Arsenic	7.4E-06	2.2E-08	1.3E-05	8.5E-06	7.9E-06	6.0E-07	4.7E-07	3.3E-08	1.2E-07	2.2E-06	3.0E-07	1.6E-08	5.8E-08	6.0E-05	1.7E-06	2.9E-07	1.9E-09	9.3E-09	1.0E-04	9.3E-05
Chromium	3.6E-06	2.1E-08	1.7E-05	3.8E-05	1.4E-04	3.2E-06	2.5E-06	4.2E-04	1.6E-04	3.7E-05	1.6E-06	2.1E-04	8.2E-05	3.0E-04	9.9E-06	5.6E-06	1.1E-08	1.2E-07	1.1E-03	7.1E-04
Mercury (inorganic)	2.1E-07	6.2E-10	5.9E-09	1.3E-07	1.4E-04	1.9E-07	3.7E-07	4.3E-06	2.5E-06	3.8E-05	9.5E-08	2.1E-06	1.2E-06	7.0E-06	2.6E-08	1.5E-07	2.9E-11	6.4E-09	1.5E-04	4.9E-05
Methyl Mercury ^(a)	NA	NA	NA	NA	3.2E-05	NA	NA	1.3E-05	7.5E-06	8.9E-06	NA	6.4E-06	3.7E-06	2.1E-05	NA	NA	NA	NA	7.4E-05	4.0E-05
Selenium	1.1E-06	3.1E-09	6.2E-08	1.4E-08	3.1E-04	3.2E-06	1.1E-06	5.0E-05	1.6E-05	8.6E-05	1.6E-06	2.5E-05	8.1E-06	1.9E-03	8.5E-08	4.8E-09	9.5E-11	2.3E-08	2.3E-03	2.0E-03
Hazard Quotients (HQs)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	2.5E-02	7.3E-05	4.3E-02	2.8E-02	2.6E-02	2.0E-03	1.6E-03	1.1E-04	3.8E-04	7.3E-03	9.9E-04	5.5E-05	1.9E-04	2.0E-01	5.6E-03	9.5E-04	1.9E-06	9.3E-06	3.3E-01	3.1E-01
Chromium	1.2E-03	7.1E-06	5.8E-03	1.3E-02	4.5E-02	1.1E-03	8.5E-04	1.4E-01	5.5E-02	1.2E-02	5.3E-04	7.0E-02	2.7E-02	1.0E-01	3.3E-03	1.9E-03	1.1E-04	1.2E-03	3.7E-01	2.4E-01
Mercury (inorganic)	7.1E-04	2.1E-06	2.0E-05	4.3E-04	4.6E-01	6.4E-04	1.2E-03	1.4E-02	8.3E-03	1.3E-01	3.2E-04	7.2E-03	4.2E-03	2.3E-02	8.7E-05	4.9E-04	9.7E-08	2.1E-05	5.1E-01	1.6E-01
Methyl Mercury ^(a)	NA	NA	NA	NA	1.4E-01	NA	NA	5.6E-02	3.3E-02	3.9E-02	NA	2.8E-02	1.6E-02	9.1E-02	NA	NA	NA	NA	3.2E-01	1.7E-01
Selenium	1.9E-04	5.5E-07	1.1E-05	2.4E-06	5.5E-02	5.6E-04	1.9E-04	8.7E-03	2.8E-03	1.5E-02	2.8E-04	4.4E-03	1.4E-03	3.3E-01	1.5E-05	8.5E-07	NA	NA	4.0E-01	3.5E-01
Carcinogenic Exposure Doses																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation		
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	1.4E-06	4.1E-09	2.4E-06	1.6E-06	5.9E-06	4.5E-07	3.5E-07	2.5E-08	8.6E-08	1.6E-06	2.2E-07	1.2E-08	4.3E-08	4.5E-05	3.1E-07	5.4E-08	3.5E-10	1.8E-09	5.8E-05	5.3E-05
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-09	2.3E-08	2.5E-08	2.5E-08
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	2.5E-06	7.4E-09	4.4E-06	2.9E-06	1.1E-05	8.0E-07	6.3E-07	4.4E-08	1.6E-07	2.9E-06	4.0E-07	2.2E-08	7.8E-08	8.1E-05	5.6E-07	9.6E-08	2.2E-09	1.1E-08	1.0E-04	9.5E-05
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-07	1.7E-06	1.9E-06	1.9E-06
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-07	1.8E-06	1.9E-06	1.9E-06

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-6 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Infant - Application Case

Exposure Dose																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day
Arsenic	1.5E-05	4.6E-08	NA	NA	NA	1.5E-06	NA	NA	NA	NA	NA	NA	NA	2.4E-04	1.4E-05	8.1E-07	1.9E-09	9.9E-09	2.7E-04	NA	
Chromium	9.5E-06	5.7E-08	NA	NA	NA	1.1E-05	NA	NA	NA	NA	NA	NA	NA	9.0E-04	8.5E-05	1.6E-05	1.1E-08	1.4E-07	1.0E-03	NA	
Mercury (inorganic)	4.4E-07	1.3E-09	NA	NA	NA	7.3E-07	NA	NA	NA	NA	NA	NA	NA	4.8E-06	2.3E-07	4.3E-07	2.9E-11	7.0E-09	6.6E-06	NA	
Methyl Mercury ^(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4E-05	NA	NA	NA	NA	1.4E-05	NA	
Selenium	5.5E-06	1.7E-08	NA	NA	NA	7.3E-06	NA	NA	NA	NA	NA	NA	NA	4.9E-03	7.3E-07	1.4E-08	9.5E-11	2.3E-08	4.9E-03	NA	
Hazard Quotients (HQs)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	5.1E-02	1.5E-04	NA	NA	NA	4.9E-03	NA	NA	NA	NA	NA	NA	NA	8.0E-01	4.8E-02	2.7E-03	1.9E-06	9.9E-06	9.1E-01	NA	
Chromium	3.2E-03	1.9E-05	NA	NA	NA	3.7E-03	NA	NA	NA	NA	NA	NA	NA	3.0E-01	2.8E-02	5.3E-03	1.1E-04	1.4E-03	3.4E-01	NA	
Mercury (inorganic)	1.5E-03	4.4E-06	NA	NA	NA	2.4E-03	NA	NA	NA	NA	NA	NA	NA	1.6E-02	7.6E-04	1.4E-03	9.8E-08	2.3E-05	2.2E-02	NA	
Methyl Mercury ^(a)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.2E-02	NA	NA	NA	NA	6.2E-02	NA	
Selenium	1.0E-03	3.0E-06	NA	NA	NA	1.3E-03	NA	NA	NA	NA	NA	NA	NA	8.9E-01	1.3E-04	2.5E-06	NA	NA	8.9E-01	NA	
Carcinogenic Exposure Doses																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation			
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	2.4E-08	7.2E-11	NA	NA	NA	9.1E-09	NA	NA	NA	NA	NA	NA	NA	1.5E-06	2.2E-08	1.3E-09	2.9E-12	1.5E-11	1.6E-06	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7E-11	2.2E-10	2.4E-10	NA	
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	4.3E-08	1.3E-10	NA	NA	NA	1.6E-08	NA	NA	NA	NA	NA	NA	NA	2.7E-06	4.0E-08	2.3E-09	1.9E-11	9.9E-11	2.8E-06	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.3E-09	1.7E-08	1.8E-08	NA	
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.3E-09	1.7E-08	1.8E-08	NA	

Note:

a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.

b) Used to calculate the ILCRs for the aggregate receptor.

Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)

Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)

NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

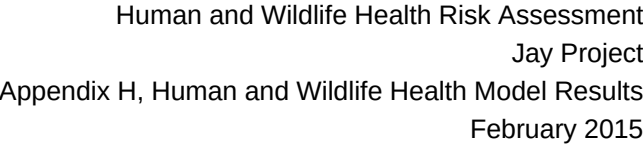


Table H2.1-7 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Toddler - Application Case

[illegible]

Note:

a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.

b) Used to calculate the ILCRs for the aggregate receptor.

Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)

Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)

NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-8 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Child - Application Case

Exposure Dose																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day	
Arsenic	1.0E-05	3.2E-08	NA	NA	1.6E-05	3.6E-07	4.0E-07	3.3E-08	1.1E-07	NA	NA	NA	NA	1.1E-04	3.6E-06	4.0E-07	1.9E-09	9.9E-09	1.4E-04	NA	
Chromium	6.3E-06	4.0E-08	NA	NA	3.7E-04	2.8E-06	2.8E-06	4.2E-04	1.8E-04	NA	NA	NA	NA	7.0E-04	2.1E-05	7.9E-06	1.1E-08	1.4E-07	1.7E-03	NA	
Mercury (inorganic)	2.9E-07	9.2E-10	NA	NA	3.0E-04	1.8E-07	3.6E-07	5.6E-06	2.9E-06	NA	NA	NA	NA	8.0E-06	5.7E-08	2.1E-07	2.9E-11	7.0E-09	3.2E-04	NA	
Methyl Mercury ^(a)	NA	NA	NA	NA	7.1E-05	NA	NA	1.7E-05	8.7E-06	NA	NA	NA	NA	2.4E-05	NA	NA	NA	NA	1.2E-04	NA	
Selenium	3.6E-06	1.2E-08	NA	NA	1.6E-03	1.8E-06	7.9E-07	5.3E-05	2.7E-05	NA	NA	NA	NA	4.0E-03	1.8E-07	6.7E-09	9.5E-11	2.3E-08	5.7E-03	NA	
Hazard Quotients (HQs)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	3.4E-02	1.1E-04	NA	NA	5.3E-02	1.2E-03	1.3E-03	1.1E-04	3.8E-04	NA	NA	NA	NA	3.7E-01	1.2E-02	1.3E-03	1.9E-06	9.9E-06	4.7E-01	NA	
Chromium	2.1E-03	1.3E-05	NA	NA	1.2E-01	9.3E-04	9.2E-04	1.4E-01	5.9E-02	NA	NA	NA	NA	2.3E-01	7.1E-03	2.6E-03	1.1E-04	1.4E-03	5.7E-01	NA	
Mercury (inorganic)	9.7E-04	3.1E-06	NA	NA	1.0E+00	6.1E-04	1.2E-03	1.9E-02	9.7E-03	NA	NA	NA	NA	2.7E-02	1.9E-04	7.0E-04	9.8E-08	2.3E-05	1.1E+00	NA	
Methyl Mercury ^(a)	NA	NA	NA	NA	3.1E-01	NA	NA	7.3E-02	3.8E-02	NA	NA	NA	NA	1.0E-01	NA	NA	NA	NA	5.2E-01	NA	
Selenium	5.8E-04	1.8E-06	NA	NA	2.5E-01	2.9E-04	1.3E-04	8.4E-03	4.3E-03	NA	NA	NA	NA	6.3E-01	2.9E-05	1.1E-06	NA	NA	9.0E-01	NA	
Carcinogenic Exposure Doses																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation			
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³		
Arsenic	2.2E-07	7.1E-10	NA	NA	1.4E-06	3.2E-08	3.5E-08	2.9E-09	1.0E-08	NA	NA	NA	NA	9.6E-06	7.8E-08	8.7E-09	4.1E-11	2.2E-10	1.1E-05	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.4E-10	3.1E-09	3.3E-09	NA	
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil				Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	4.0E-07	1.3E-09	NA	NA	2.5E-06	5.7E-08	6.2E-08	5.1E-09	1.8E-08	NA	NA	NA	NA	1.7E-05	1.4E-07	1.6E-08	2.6E-10	1.4E-09	2.1E-05	NA	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8E-08	2.3E-07	2.5E-07	NA	
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9E-08	2.3E-07	2.5E-07	NA	

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-9 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Teen - Application Case

Exposure Dose																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure		
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³	mg/kg/day	mg/kg/day	
Arsenic	7.0E-06	2.7E-08	1.5E-05	9.1E-06	1.1E-05	2.0E-07	6.5E-07	2.5E-08	8.8E-08	2.9E-06	1.0E-07	1.3E-08	4.4E-08	6.0E-05	2.0E-06	3.0E-07	1.9E-09	9.9E-09	1.1E-04	9.7E-05	
Chromium	4.4E-06	3.4E-08	2.0E-05	4.0E-05	2.5E-04	1.5E-06	4.6E-06	3.2E-04	1.4E-04	6.8E-05	7.7E-07	1.6E-04	6.9E-05	3.0E-04	1.2E-05	6.0E-06	1.1E-08	1.4E-07	1.1E-03	6.8E-04	
Mercury (inorganic)	2.0E-07	7.8E-10	7.0E-09	1.4E-07	2.0E-04	1.0E-07	6.0E-07	4.3E-06	2.2E-06	5.5E-05	5.0E-08	2.2E-06	1.1E-06	7.0E-06	3.1E-08	1.6E-07	2.9E-11	7.0E-09	2.2E-04	6.6E-05	
Methyl Mercury ^(a)	NA	NA	NA	NA	4.7E-05	NA	NA	1.3E-05	6.7E-06	1.3E-05	NA	6.5E-06	3.4E-06	2.1E-05	NA	NA	NA	NA	8.8E-05	4.4E-05	
Selenium	2.5E-06	9.7E-09	7.4E-08	1.4E-08	1.1E-03	1.0E-06	1.3E-06	4.1E-05	2.1E-05	2.9E-04	5.0E-07	2.1E-05	1.0E-05	1.9E-03	1.0E-07	5.1E-09	9.5E-11	2.3E-08	3.0E-03	2.2E-03	
Hazard Quotients (HQs)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ		
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	2.3E-02	9.1E-05	5.1E-02	3.0E-02	3.6E-02	6.7E-04	2.2E-03	8.4E-05	2.9E-04	9.8E-03	3.3E-04	4.2E-05	1.5E-04	2.0E-01	6.6E-03	1.0E-03	1.9E-06	9.9E-06	3.5E-01	3.2E-01	
Chromium	1.5E-03	1.1E-05	6.8E-03	1.3E-02	8.3E-02	5.1E-04	1.5E-03	1.1E-01	4.6E-02	2.3E-02	2.6E-04	5.4E-02	2.3E-02	1.0E-01	3.9E-03	2.0E-03	1.1E-04	1.4E-03	3.7E-01	2.3E-01	
Mercury (inorganic)	6.7E-04	2.6E-06	2.3E-05	4.6E-04	6.7E-01	3.4E-04	2.0E-03	1.4E-02	7.5E-03	1.8E-01	1.7E-04	7.2E-03	3.7E-03	2.3E-02	1.0E-04	5.3E-04	9.8E-08	2.3E-05	7.2E-01	2.2E-01	
Methyl Mercury ^(a)	NA	NA	NA	NA	2.0E-01	NA	NA	5.6E-02	2.9E-02	5.6E-02	NA	2.8E-02	1.5E-02	9.1E-02	NA	NA	NA	NA	3.8E-01	1.9E-01	
Selenium	4.1E-04	1.6E-06	1.2E-05	2.3E-06	1.7E-01	1.6E-04	2.1E-04	6.6E-03	3.4E-03	4.8E-02	8.1E-05	3.3E-03	1.7E-03	3.1E-01	1.6E-05	8.3E-07	NA	NA	4.9E-01	3.6E-01	
Carcinogenic Exposure Doses																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation			
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m³			
Arsenic	1.8E-07	6.8E-10	3.9E-07	2.3E-07	1.1E-06	2.0E-08	6.5E-08	2.5E-09	8.8E-09	2.9E-07	1.0E-08	1.3E-09	4.4E-09	6.0E-06	4.9E-08	7.6E-09	4.7E-11	2.5E-10	8.0E-06	7.2E-06	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8E-10	3.5E-09	3.8E-09	3.8E-09	
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																					
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR		
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal	
Arsenic	3.2E-07	1.2E-09	6.9E-07	4.1E-07	1.9E-06	3.6E-08	1.2E-07	4.5E-09	1.6E-08	5.3E-07	1.8E-08	2.3E-09	8.0E-09	1.1E-05	8.9E-08	1.4E-08	3.0E-10	1.6E-09	1.44E-05	1.29E-05	
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-08	2.7E-07	2.87E-07	2.9E-07	
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-08	2.7E-07	2.9E-07	2.9E-07	

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-10 Non-Carcinogenic Exposure Doses and Hazard Quotients (HQs), and Carcinogenic Exposure Doses and Incremental Lifetime Cancer Risk (ILCRs) for the Adult - Application Case

Exposure Dose																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total Exposure	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m ³	mg/kg/day	mg/kg/day
Arsenic	8.9E-06	2.6E-08	1.3E-05	8.5E-06	9.1E-06	6.3E-07	5.5E-07	3.3E-08	1.2E-07	2.5E-06	3.2E-07	1.6E-08	5.8E-08	6.0E-05	1.7E-06	2.9E-07	1.9E-09	9.9E-09	1.0E-04	9.5E-05
Chromium	5.5E-06	3.2E-08	1.7E-05	3.8E-05	2.1E-04	4.9E-06	3.9E-06	4.2E-04	1.8E-04	5.8E-05	2.4E-06	2.1E-04	8.9E-05	3.0E-04	9.9E-06	5.6E-06	1.1E-08	1.4E-07	1.2E-03	7.4E-04
Mercury (inorganic)	2.5E-07	7.5E-10	5.9E-09	1.3E-07	1.7E-04	3.2E-07	5.1E-07	5.6E-06	2.9E-06	4.7E-05	1.6E-07	2.8E-06	1.5E-06	7.0E-06	2.6E-08	1.5E-07	2.9E-11	7.0E-09	1.9E-04	5.9E-05
Methyl Mercury ^(a)	NA	NA	NA	NA	4.0E-05	NA	NA	1.7E-05	8.8E-06	1.1E-05	NA	8.4E-06	4.4E-06	2.1E-05	NA	NA	NA	NA	8.6E-05	4.5E-05
Selenium	3.2E-06	9.4E-09	6.2E-08	1.4E-08	9.1E-04	3.2E-06	1.1E-06	5.3E-05	2.7E-05	2.5E-04	1.6E-06	2.7E-05	1.4E-05	1.9E-03	8.5E-08	4.8E-09	9.5E-11	2.3E-08	2.9E-03	2.2E-03
Hazard Quotients (HQs)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total HQ	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Seasonal	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	3.0E-02	8.7E-05	4.3E-02	2.8E-02	3.0E-02	2.1E-03	1.8E-03	1.1E-04	3.8E-04	8.3E-03	1.1E-03	5.5E-05	1.9E-04	2.0E-01	5.6E-03	9.5E-04	1.9E-06	9.9E-06	3.4E-01	3.2E-01
Chromium	1.8E-03	1.1E-05	5.8E-03	1.3E-02	7.0E-02	1.6E-03	1.3E-03	1.4E-01	6.0E-02	1.9E-02	8.1E-04	7.0E-02	3.0E-02	1.0E-01	3.3E-03	1.9E-03	1.1E-04	1.4E-03	4.0E-01	2.5E-01
Mercury (inorganic)	8.5E-04	2.5E-06	2.0E-05	4.3E-04	5.7E-01	1.1E-03	1.7E-03	1.9E-02	9.7E-03	1.6E-01	5.3E-04	9.4E-03	4.9E-03	2.3E-02	8.8E-05	5.0E-04	9.8E-08	2.3E-05	6.2E-01	2.0E-01
Methyl Mercury ^(a)	NA	NA	NA	NA	1.7E-01	NA	NA	7.3E-02	3.8E-02	4.8E-02	NA	3.7E-02	1.9E-02	9.1E-02	NA	NA	NA	NA	3.8E-01	1.9E-01
Selenium	5.6E-04	1.6E-06	1.1E-05	2.4E-06	1.6E-01	5.6E-04	1.9E-04	9.4E-03	4.8E-03	4.4E-02	2.8E-04	4.7E-03	2.4E-03	3.3E-01	1.5E-05	8.5E-07	NA	NA	5.1E-01	3.8E-01
Carcinogenic Exposure Doses																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total - Seasonal Aboriginal	Total - Seasonal non-Aboriginal
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation		
unit	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/m3	mg/m ³		
Arsenic	1.7E-06	4.9E-09	2.4E-06	1.6E-06	6.8E-06	4.8E-07	4.1E-07	2.5E-08	8.6E-08	1.9E-06	2.4E-07	1.2E-08	4.3E-08	4.5E-05	3.1E-07	5.4E-08	3.5E-10	1.9E-09	5.9E-05	5.3E-05
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1E-09	2.6E-08	2.8E-08	2.8E-08
Incremental Lifetime Cancer Risks (ILCRs) ^(b)																				
Parameter	Drinking Water		Sediment		Country Foods (High Consumer / Aboriginal)					Country Foods (Non-Aboriginal)				Average Dietary Intake (Background)	Soil			Air	Total ILCR	
	Ingestion	Dermal	Ingestion	Dermal	Fish Ingestion	Berry Ingestion	Traditional plant ingestion	Snowshoe hare ingestion	Caribou Ingestion	Fish Ingestion	Berry Ingestion	Snowshoe hare ingestion	Caribou Ingestion	Ingestion	Ingestion	Dermal	Inhalation	Inhalation	Seasonal Aboriginal	Seasonal non-Aboriginal
Arsenic	3.0E-06	8.8E-09	4.4E-06	2.9E-06	1.2E-05	8.6E-07	7.4E-07	4.4E-08	1.6E-07	3.4E-06	4.3E-07	2.2E-08	7.8E-08	8.1E-05	5.6E-07	9.6E-08	2.2E-09	1.2E-08	1.1E-04	9.6E-05
Chromium (inhalation only)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-07	2.0E-06	2.2E-06	2.2E-06
Target organ: Lungs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6E-07	2.0E-06	2.17E-06	2.2E-06

Note:
a) Methyl mercury was assessed as part of the fish ingestion pathway, game ingestion (snowshoe hare and caribou) pathway, and through background intake.
b) Used to calculate the ILCRs for the aggregate receptor.
Bold Indicates that risk estimate exceeds target hazard quotient or index (HQ or HI>1)
Bold italic Indicates that risk estimate exceeds ILCR value (ILCR >1E-5)
NA - not assessed; HQ - Hazard Quotient; ILCR - Incremental lifetime cancer risk

Table H2.1-11 Sum of Incremental Lifetime Cancer Risks (ILCR) by COPC and by Target Effect for the Composite Receptor – Base and Application Case

COPC/Organ	Base Case		Application Case	
	Aboriginal	non-Aboriginal	Aboriginal	non-Aboriginal
By COPC				
Arsenic	1.6E-04	1.1E-04	1.7E-04	1.1E-04
Chromium	2.5E-06	2.2E-06	2.9E-06	2.4E-06
By Target Effect				
Lung Tumours	2.6E-06	2.2E-06	2.9E-06	2.5E-06

Note:

Bold Indicates that risk estimate exceeds target ILCR value of 1.0E-05

H3 MODEL OUTPUTS FOR THE WILDLIFE HEALTH MULTIMEDIA RISK ASSESSMENT

Tables H3.3-1 to H3.3-2 present, for the Base and Application Case, respectively, the exposure concentration inputs for the food items and COPCs used in the wildlife health multimedia risk assessment. Tables H3.1-3 to H3.1-10 present the daily dose calculations (mg/kg/d), toxicity reference value (TRV) for each COPC, and the HQs for each of the wildlife receptors under the Base Case. Tables H3.1-11 to H3.1-18 present the daily dose (mg/d) and TRV for each COPC and the HQs for each of the wildlife receptors under the Application Case. Upper-TRVs were used for non-listed species (muskrat, caribou, semi-palmated sandpiper, common merganser, green-winged teal, and bald eagle) and lower-TRVs were used for listed species (grizzly bear and rusty blackbird).

Table H3.1-1 Exposure Concentrations used in the Wildlife Multimedia Model – Base Case

ENVIRONMENTAL CONCENTRATIONS						
Constituents of Potential Concern		Arsenic	Chromium	Methyl mercury	Selenium	FRACTION OF MOISTURE
Item	Units					
Berry	mg/kg w w	0.03	0.59	0.01	0.02	0.846
Fish	mg/kg w w	0.14	0.24	0.30	0.55	NA
Willow /Birch Leaves	mg/kg w w	0.08	1.60	0.04	0.03	0.60
Aquatic Insects	mg/kg w w	0.03	0.19	0.05	0.08	0.83
Aquatic Plants	mg/kg w w	0.10	0.75	0.25	0.09	NA
Insects	mg/kg w w	0.14	1.82	0.06	0.06	0.84
Lichen	mg/kg w w	0.68	5.01	0.26	0.05	0.16
Small Mammals	mg/kg w w	0.01	1.06	0.04	0.13	0.68
Grasses	mg/kg w w	0.09	1.54	0.04	0.022	0.61
Caribou	mg/kg w w	0.005	0.12	0.007	0.005	NA
Soil	mg/kg dw	5.98	37.26	0.13	0.30	NA
Water	mg/L	0.00035	0.00017	0.00001	0.00005	NA
Sediment	mg/kg dw	46.20	60.80	0.02	0.20	NA
Environmental Concentrations for Caribou only (Human Health)						
Willow /Birch Leaves	mg/kg w w	0.012	0.058	0.004	0.026	NA
Lichen	mg/kg w w	0.52	1.71	0.067	0.048	NA
Soil	mg/kg dw	5.89	35.3	0.092	0.30	NA

Table H3.1-2 Exposure Concentrations used in the Wildlife Multimedia Model – Application Case

ENVIRONMENTAL CONCENTRATIONS						
Constituents of Potential Concern		Arsenic	Chromium	Methyl mercury	Selenium	FRACTION OF MOISTURE
Item	Units					
Berry	mg/kg w w	0.11	2.30	0.05	0.02	0.846
Fish	mg/kg w w	0.16	0.37	0.37	1.63	NA
Willow /Birch Leaves	mg/kg w w	0.29	6.15	0.14	0.04	0.60
Aquatic Insects	mg/kg w w	0.03	0.25	0.05	0.14	0.83
Aquatic Plants	mg/kg w w	0.12	1.15	0.30	0.28	NA
Insects	mg/kg w w	0.14	1.92	0.07	0.06	0.84
Lichen	mg/kg w w	1.12	14.61	0.59	0.07	0.16
Small Mammals	mg/kg w w	0.01	1.10	0.06	0.14	0.68
Grasses	mg/kg w w	0.29	5.95	0.13	0.030	0.61
Caribou	mg/kg w w	0.009	0.31	0.014	0.009	NA
Soil	mg/kg dw	6.07	39.24	0.18	0.30	NA
Water	mg/L	0.00042	0.00026	0.00001	0.00015	NA
Sediment	mg/kg dw	46.20	60.80	0.02	0.20	NA
Environmental Concentrations for Caribou only (Human Health)						
Willow /Birch Leaves	mg/kg w w	0.013	0.082	0.006	0.027	NA
Lichen	mg/kg w w	0.52	1.76	0.073	0.049	NA
Soil	mg/kg dw	5.89	35.4	0.093	0.30	NA

Table H3.1-3 Model Output for the Muskrat – Base Case

Muskrat			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.05	Fish		5.69E-04	1.01E-03	1.24E-03	2.26E-03
0.05	Aquatic Insects		1.06E-04	7.94E-04	2.24E-04	3.21E-04
0.80	Aquatic Plants		6.79E-03	4.96E-02	1.64E-02	6.11E-03
0.10	Grasses		7.68E-04	1.27E-02	2.90E-04	1.85E-04
Food Dose (mg/d)			8.24E-03	6.41E-02	1.82E-02	8.88E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			8.24E-03	6.41E-02	1.82E-02	8.88E-03
Sediment Dose (mg/d)			1.13E-01	1.49E-01	5.03E-05	4.90E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.13E-01	1.49E-01	5.03E-05	4.90E-04
Water Dose (mg/d)			3.78E-05	1.83E-05	1.08E-06	5.39E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.78E-05	1.83E-05	1.08E-06	5.39E-06
Food + Soil + Water (mg/d)			1.22E-01	2.13E-01	1.82E-02	9.37E-03
BW Adjusted (mg/kg/d)			1.10E-01	1.94E-01	1.66E-02	8.52E-03
HR Adjusted (mg/kg/d)			1.10E-01	1.94E-01	1.66E-02	8.52E-03
SC Adjusted (mg/kg/d)			1.10E-01	1.94E-01	1.66E-02	8.52E-03
Final Daily Dose (mg/kg/day)			1.10E-01	1.94E-01	1.66E-02	8.52E-03
TRV (mg/kg/d)			1.66E+00	2.82E+00	1.60E-01	1.45E-01
HAZARD QUOTIENT			6.7E-02	6.9E-02	1.0E-01	5.9E-02

Model Parameters

Body Weight (BW; kg)	1.10E+00
Fraction of Moisture in Diet	1.03E-01
Food Ingestion (kg/d w w)	8.28E-02
Water Ingestion (L/d)	1.08E-01
Sediment Ingestion Rate (proportion; dw basis)	3.30E-02
Sediment Ingestion (kg/d; dw)	2.45E-03
Habitat Range (ha)	1.70E-01
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-4 Model Output for the Caribou – Base Case

Caribou			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.30	Willow /Birch Leaves		1.41E-01	2.73E+00	6.55E-02	4.97E-02
0.20	Aquatic Plants		1.17E-01	8.54E-01	2.82E-01	1.05E-01
0.50	Lichen		1.93E+00	1.43E+01	7.32E-01	1.54E-01
Food Dose (mg/d)			2.19E+00	1.78E+01	1.08E+00	3.09E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.19E+00	1.78E+01	1.08E+00	3.09E-01
Soil Dose (mg/d)			5.05E-01	3.15E+00	1.12E-02	2.55E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			5.05E-01	3.15E+00	1.12E-02	2.55E-02
Water Dose (mg/d)			3.15E-03	1.53E-03	9.00E-05	4.50E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.15E-03	1.53E-03	9.00E-05	4.50E-04
Food + Soil + Water (mg/d)			2.69E+00	2.10E+01	1.09E+00	3.35E-01
BW Adjusted (mg/kg/d)			1.80E-02	1.40E-01	7.27E-03	2.23E-03
HR Adjusted (mg/kg/d)			1.80E-02	1.40E-01	7.27E-03	2.23E-03
SC Adjusted (mg/kg/d)			1.80E-02	1.40E-01	7.27E-03	2.23E-03
Final Daily Dose (mg/kg/day)			1.80E-02	1.40E-01	7.27E-03	2.23E-03
TRV (mg/kg/d)			1.66E+00	2.82E+00	1.60E-01	1.45E-01
HAZARD QUOTIENT			1.08E-02	4.96E-02	4.55E-02	1.54E-02

Model Parameters

Body Weight (BW; kg)	1.50E+02
Fraction of Moisture in Diet	2.59E-01
Food Ingestion (kg/d w w)	5.70E+00
Water Ingestion (L/d)	9.00E+00
Soil Ingestion Rate (proportion; dw basis)	2.00E-02
Soil Ingestion (kg/d; dw)	8.45E-02
Habitat Range (ha)	2.31E+07
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-5 Model Output for the Grizzly Bear – Base Case

<u>Grizzly bear</u>			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.15	Berry		2.43E-02	4.41E-01	9.98E-03	1.24E-02
0.05	Fish		3.41E-02	6.02E-02	7.44E-02	1.35E-01
0.15	Aquatic Plants		7.63E-02	5.57E-01	1.84E-01	6.86E-02
0.05	Small Mammals		2.66E-03	2.62E-01	1.10E-02	3.33E-02
0.15	Grasses		6.90E-02	1.14E+00	2.61E-02	1.66E-02
0.45	Caribou		1.20E-02	2.58E-01	1.46E-02	1.12E-02
Food Dose (mg/d)			2.18E-01	2.72E+00	3.20E-01	2.78E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.18E-01	2.72E+00	3.20E-01	2.78E-01
Soil Dose (mg/d)			4.43E-01	2.76E+00	9.87E-03	2.24E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.43E-01	2.76E+00	9.87E-03	2.24E-02
Water Dose (mg/d)			2.73E-03	1.33E-03	7.80E-05	3.90E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.73E-03	1.33E-03	7.80E-05	3.90E-04
Food + Soil + Water (mg/d)			6.65E-01	5.49E+00	3.30E-01	3.00E-01
BW Adjusted (mg/kg/d)			5.19E-03	4.29E-02	2.58E-03	2.35E-03
HR Adjusted (mg/kg/d)			5.19E-03	4.29E-02	2.58E-03	2.35E-03
SC Adjusted (mg/kg/d)			5.19E-03	4.29E-02	2.58E-03	2.35E-03
Final Daily Dose (mg/kg/day)			5.19E-03	4.29E-02	2.58E-03	2.35E-03
TRV (mg/kg/d)			1.04E+00	2.40E+00	3.20E-02	1.43E-01
HAZARD QUOTIENT			5.0E-03	1.8E-02	8.1E-02	1.6E-02

Model Parameters

Body Weight (BW; kg)	1.28E+02
Fraction of Moisture in Diet	2.52E-01
Food Ingestion (kg/d w w)	4.96E+00
Water Ingestion (L/d)	7.80E+00
Soil Ingestion Rate (proportion; dw basis)	2.0%
Soil/Sediment Ingestion (kg/d; dw)	7.42E-02
Habitat Range (ha)	4.40E+05
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Note: Underline denotes a listed species.

Table H3.1-6 Model Output for the Rusty Blackbird – Base Case

<u>Rusty blackbird</u>			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.10	Berry		9.67E-05	1.75E-03	3.97E-05	4.91E-05
0.10	Fish		4.07E-04	7.18E-04	8.87E-04	1.61E-03
0.10	Willow /Birch Leaves		2.44E-04	4.72E-03	1.13E-04	8.60E-05
0.60	Aquatic Insects		4.53E-04	3.40E-03	9.58E-04	1.38E-03
0.10	Grasses		2.74E-04	4.55E-03	1.04E-04	6.60E-05
Food Dose (mg/d)			1.47E-03	1.51E-02	2.10E-03	3.19E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.47E-03	1.51E-02	2.10E-03	3.19E-03
Sediment Dose (mg/d)			4.05E-02	5.33E-02	1.80E-05	1.75E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.05E-02	5.33E-02	1.80E-05	1.75E-04
Water Dose (mg/d)			2.94E-06	1.43E-06	8.41E-08	4.20E-07
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.94E-06	1.43E-06	8.41E-08	4.20E-07
Food + Soil + Water (mg/d)			4.20E-02	6.84E-02	2.12E-03	3.37E-03
BW Adjusted (mg/kg/d)			7.69E-01	1.25E+00	3.88E-02	6.17E-02
HR Adjusted (mg/kg/d)			7.69E-01	1.25E+00	3.88E-02	6.17E-02
SC Adjusted (mg/kg/d)			7.69E-01	1.25E+00	3.88E-02	6.17E-02
Final Daily Dose (mg/kg/day)			7.69E-01	1.25E+00	3.88E-02	6.17E-02
TRV (mg/kg/d)			2.24E+00	2.66E+00	6.40E-02	2.90E-01
HAZARD QUOTIENT			0.34	0.47	0.61	0.21

Model Parameters

Body Weight (BW; kg)	5.46E-02
Fraction of Moisture in Diet	7.03E-01
Food Ingestion (kg/d w w)	2.96E-02
Water Ingestion (L/d)	8.41E-03
Sediment Ingestion Rate (proportion; dw basis)	1.00E-01
Sediment Ingestion (kg/d; dw)	8.77E-04
Habitat Range (ha)	0.00E+00
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Note: Underline denotes a listed species.

Table H3.1-7 Model Output for the Semi-palmated Sandpiper – Base Case

Semi-palmated sandpiper					
Fraction of Diet	Dose (mg/d)	Arsenic	Chromium	Methyl mercury	Selenium
1.00	Aquatic Insects	8.23E-04	6.18E-03	1.74E-03	2.50E-03
Food Dose (mg/d)		8.23E-04	6.18E-03	1.74E-03	2.50E-03
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		8.23E-04	6.18E-03	1.74E-03	2.50E-03
Sediment Dose (mg/d)		7.59E-02	9.99E-02	3.37E-05	3.29E-04
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		7.59E-02	9.99E-02	3.37E-05	3.29E-04
Water Dose (mg/d)		1.81E-06	8.81E-07	5.18E-08	2.59E-07
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		1.81E-06	8.81E-07	5.18E-08	2.59E-07
Food + Soil + Water (mg/d)		7.67E-02	1.06E-01	1.77E-03	2.83E-03
BW Adjusted (mg/kg/d)		2.90E+00	4.00E+00	6.69E-02	1.07E-01
HR Adjusted (mg/kg/d)		2.90E+00	4.00E+00	6.69E-02	1.07E-01
SC Adjusted (mg/kg/d)		2.90E+00	4.00E+00	6.69E-02	1.07E-01
Final Daily Dose (mg/kg/day)		2.90E+00	4.00E+00	6.69E-02	1.07E-01
TRV (mg/kg/d)		3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT		8.2E-01	1.4E+00	5.1E-01	3.4E-01

Model Parameters

Body Weight (BW; kg)	2.65E-02
Fraction of Moisture in Diet	8.30E-01
Food Ingestion (kg/d w w)	3.22E-02
Water Ingestion (L/d)	5.18E-03
Sediment Ingestion Rate (proportion; dw basis)	3.00E-01
Sediment Ingestion (kg/d; dw)	1.64E-03
Habitat Range (ha)	2.50E-01
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Shaded and Bolded indicates a Hazard Quotient (HQ) greater than 1.0

Table H3.1-8 Model Output for the Common Merganser – Base Case

Common merganser			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.60	Fish		8.44E-03	1.49E-02	1.84E-02	3.35E-02
0.30	Aquatic Insects		7.83E-04	5.88E-03	1.66E-03	2.38E-03
0.10	Aquatic Plants		1.05E-03	7.66E-03	2.53E-03	9.43E-04
Food Dose (mg/d)			1.03E-02	2.84E-02	2.26E-02	3.68E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.03E-02	2.84E-02	2.26E-02	3.68E-02
Sediment Dose (mg/d)			9.22E-02	1.21E-01	4.09E-05	3.99E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			9.22E-02	1.21E-01	4.09E-05	3.99E-04
Water Dose (mg/d)			2.75E-05	1.33E-05	7.85E-07	3.92E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.75E-05	1.33E-05	7.85E-07	3.92E-06
Food + Soil + Water (mg/d)			1.03E-01	1.50E-01	2.26E-02	3.72E-02
BW Adjusted (mg/kg/d)			6.70E-02	9.79E-02	1.48E-02	2.43E-02
HR Adjusted (mg/kg/d)			6.70E-02	9.79E-02	1.48E-02	2.43E-02
SC Adjusted (mg/kg/d)			6.70E-02	9.79E-02	1.48E-02	2.43E-02
Final Daily Dose (mg/kg/day)			6.70E-02	9.79E-02	1.48E-02	2.43E-02
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			1.9E-02	3.5E-02	1.1E-01	7.8E-02

Model Parameters

Body Weight (BW; kg)	1.53E+00
Fraction of Moisture in Diet	2.49E-01
Food Ingestion (kg/d w w)	1.02E-01
Water Ingestion (L/d)	7.85E-02
Sediment Ingestion Rate (proportion; dw basis)	2.60E-02
Sediment Ingestion (kg/d; dw)	2.00E-03
Habitat Range (ha)	5.80E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-9 Model Output for the Green-winged Teal – Base Case

Green-winged teal			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.10	Aquatic Insects		7.72E-05	5.80E-04	1.63E-04	2.35E-04
0.90	Aquatic Plants		2.79E-03	2.04E-02	6.74E-03	2.51E-03
Food Dose (mg/d)			2.87E-03	2.10E-02	6.90E-03	2.74E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.87E-03	2.10E-02	6.90E-03	2.74E-03
Sediment Dose (mg/d)			2.56E-02	3.37E-02	1.14E-05	1.11E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.56E-02	3.37E-02	1.14E-05	1.11E-04
Water Dose (mg/d)			9.62E-06	4.67E-06	2.75E-07	1.37E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			9.62E-06	4.67E-06	2.75E-07	1.37E-06
Food + Soil + Water (mg/d)			2.85E-02	5.47E-02	6.91E-03	2.86E-03
BW Adjusted (mg/kg/d)			8.90E-02	1.71E-01	2.16E-02	8.93E-03
HR Adjusted (mg/kg/d)			8.90E-02	1.71E-01	2.16E-02	8.93E-03
SC Adjusted (mg/kg/d)			8.90E-02	1.71E-01	2.16E-02	8.93E-03
Final Daily Dose (mg/kg/day)			8.90E-02	1.71E-01	2.16E-02	8.93E-03
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			2.5E-02	6.1E-02	1.7E-01	2.9E-02

Model Parameters

Body Weight (BW; kg)	3.20E-01
Fraction of Moisture in Diet	8.30E-02
Food Ingestion (kg/d w w)	3.02E-02
Water Ingestion (L/d)	2.75E-02
Sediment Ingestion Rate (proportion; dw basis)	2.00E-02
Sediment Ingestion (kg/d; dw)	5.54E-04
Habitat Range (ha)	2.43E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-10 Model Output for the Bald Eagle – Base Case

Bald eagle			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.50	Fish		1.65E-02	2.91E-02	3.60E-02	6.55E-02
0.50	Small Mammals		1.29E-03	1.27E-01	5.34E-03	1.61E-02
Food Dose (mg/d)			1.78E-02	1.56E-01	4.13E-02	8.16E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.78E-02	1.56E-01	4.13E-02	8.16E-02
Soil Dose (mg/d)			0.00E+00	0.00E+00	0.00E+00	0.00E+00
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Water Dose (mg/d)			5.78E-05	2.81E-05	1.65E-06	8.26E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			5.78E-05	2.81E-05	1.65E-06	8.26E-06
Food + Soil + Water (mg/d)			1.78E-02	1.56E-01	4.13E-02	8.16E-02
BW Adjusted (mg/kg/d)			3.84E-03	3.35E-02	8.89E-03	1.76E-02
HR Adjusted (mg/kg/d)			3.84E-03	3.35E-02	8.89E-03	1.76E-02
SC Adjusted (mg/kg/d)			3.84E-03	3.35E-02	8.89E-03	1.76E-02
Final Daily Dose (mg/kg/day)			3.84E-03	3.35E-02	8.89E-03	1.76E-02
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			1.1E-03	1.2E-02	6.8E-02	5.7E-02

Model Parameters

Body Weight (BW; kg)	4.65E+00
Fraction of Moisture in Diet	3.40E-01
Food Ingestion (kg/d w w)	2.40E-01
Water Ingestion (L/d)	1.65E-01
Soil Ingestion Rate (proportion; dw basis)	0.00E+00
Soil Ingestion (kg/d; dw)	0.00E+00
Habitat Range (ha)	2.00E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-11 Model Output for the Muskrat – Application Case

Muskrat			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.05	Fish		6.78E-04	1.55E-03	1.52E-03	6.75E-03
0.05	Aquatic Insects		1.26E-04	1.04E-03	2.24E-04	5.90E-04
0.80	Aquatic Plants		8.09E-03	7.65E-02	2.01E-02	1.82E-02
0.10	Grasses		2.44E-03	4.92E-02	1.07E-03	2.51E-04
Food Dose (mg/d)			1.13E-02	1.28E-01	2.30E-02	2.58E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.13E-02	1.28E-01	2.30E-02	2.58E-02
Sediment Dose (mg/d)			1.13E-01	1.49E-01	5.03E-05	4.90E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.13E-01	1.49E-01	5.03E-05	4.90E-04
Water Dose (mg/d)			4.49E-05	2.83E-05	1.32E-06	1.61E-05
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.49E-05	2.83E-05	1.32E-06	1.61E-05
Food + Soil + Water (mg/d)			1.25E-01	2.77E-01	2.30E-02	2.63E-02
BW Adjusted (mg/kg/d)			1.13E-01	2.52E-01	2.09E-02	2.39E-02
HR Adjusted (mg/kg/d)			1.13E-01	2.52E-01	2.09E-02	2.39E-02
SC Adjusted (mg/kg/d)			1.13E-01	2.52E-01	2.09E-02	2.39E-02
Final Daily Dose (mg/kg/day)			1.13E-01	2.52E-01	2.09E-02	2.39E-02
TRV (mg/kg/d)			1.66E+00	2.82E+00	1.60E-01	1.45E-01
HAZARD QUOTIENT			6.8E-02	8.9E-02	1.3E-01	1.7E-01

Model Parameters	
Body Weight (BW; kg)	1.10E+00
Fraction of Moisture in Diet	1.03E-01
Food Ingestion (kg/d w w)	8.28E-02
Water Ingestion (L/d)	1.08E-01
Sediment Ingestion Rate (proportion; dw basis)	3.30E-02
Sediment Ingestion (kg/d; dw)	2.45E-03
Habitat Range (ha)	1.70E-01
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-12 Model Output for the Caribou – Application Case

Caribou			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.30	Willow /Birch Leaves		4.97E-01	1.05E+01	2.34E-01	6.39E-02
0.20	Aquatic Plants		1.39E-01	1.32E+00	3.46E-01	3.14E-01
0.50	Lichen		3.19E+00	4.16E+01	1.68E+00	2.03E-01
Food Dose (mg/d)			3.82E+00	5.35E+01	2.26E+00	5.81E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.82E+00	5.35E+01	2.26E+00	5.81E-01
Soil Dose (mg/d)			5.13E-01	3.32E+00	1.48E-02	2.58E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			5.13E-01	3.32E+00	1.48E-02	2.58E-02
Water Dose (mg/d)			3.75E-03	2.36E-03	1.10E-04	1.34E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.75E-03	2.36E-03	1.10E-04	1.34E-03
Food + Soil + Water (mg/d)			4.34E+00	5.68E+01	2.27E+00	6.08E-01
BW Adjusted (mg/kg/d)			2.89E-02	3.79E-01	1.51E-02	4.05E-03
HR Adjusted (mg/kg/d)			2.89E-02	3.79E-01	1.51E-02	4.05E-03
SC Adjusted (mg/kg/d)			2.89E-02	3.79E-01	1.51E-02	4.05E-03
Final Daily Dose (mg/kg/day)			2.89E-02	3.79E-01	1.51E-02	4.05E-03
TRV (mg/kg/d)			1.66E+00	2.82E+00	1.60E-01	1.45E-01
HAZARD QUOTIENT			1.74E-02	1.34E-01	9.46E-02	2.79E-02

Model Parameters

Body Weight (BW; kg)	1.50E+02
Fraction of Moisture in Diet	2.59E-01
Food Ingestion (kg/d w w)	5.70E+00
Water Ingestion (L/d)	9.00E+00
Soil Ingestion Rate (proportion; dw basis)	2.00E-02
Soil Ingestion (kg/d; dw)	8.45E-02
Habitat Range (ha)	2.31E+07
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-13 Model Output for the Grizzly Bear – Application Case

<u>Grizzly bear</u>			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.15	Berry		8.24E-02	1.71E+00	3.73E-02	1.47E-02
0.05	Fish		4.06E-02	9.28E-02	9.13E-02	4.04E-01
0.15	Aquatic Plants		9.08E-02	8.59E-01	2.26E-01	2.05E-01
0.05	Small Mammals		2.69E-03	2.72E-01	1.46E-02	3.35E-02
0.15	Grasses		2.19E-01	4.42E+00	9.66E-02	2.26E-02
0.45	Caribou		1.94E-02	6.97E-01	3.04E-02	2.03E-02
Food Dose (mg/d)			4.55E-01	8.06E+00	4.96E-01	7.00E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.55E-01	8.06E+00	4.96E-01	7.00E-01
Soil Dose (mg/d)			4.50E-01	2.91E+00	1.30E-02	2.26E-02
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.50E-01	2.91E+00	1.30E-02	2.26E-02
Water Dose (mg/d)			3.25E-03	2.04E-03	9.58E-05	1.16E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.25E-03	2.04E-03	9.58E-05	1.16E-03
Food + Soil + Water (mg/d)			9.08E-01	1.10E+01	5.09E-01	7.24E-01
BW Adjusted (mg/kg/d)			7.10E-03	8.57E-02	3.98E-03	5.66E-03
HR Adjusted (mg/kg/d)			7.10E-03	8.57E-02	3.98E-03	5.66E-03
SC Adjusted (mg/kg/d)			7.10E-03	8.57E-02	3.98E-03	5.66E-03
Final Daily Dose (mg/kg/day)			7.10E-03	8.57E-02	3.98E-03	5.66E-03
TRV (mg/kg/d)			1.04E+00	2.40E+00	3.20E-02	1.43E-01
HAZARD QUOTIENT			6.8E-03	3.6E-02	1.2E-01	4.0E-02

Model Parameters

Body Weight (BW; kg)	1.28E+02
Fraction of Moisture in Diet	2.52E-01
Food Ingestion (kg/d w w)	4.96E+00
Water Ingestion (L/d)	7.80E+00
Soil Ingestion Rate (proportion; dw basis)	2.0%
Soil/Sediment Ingestion (kg/d; dw)	7.42E-02
Habitat Range (ha)	4.40E+05
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Note: Underline denotes a listed species.

Table H3.1-14 Model Output for the Rusty Blackbird – Application Case

<u>Rusty blackbird</u>			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.10	Berry		3.27E-04	6.80E-03	1.48E-04	5.85E-05
0.10	Fish		4.84E-04	1.11E-03	1.09E-03	4.82E-03
0.10	Willow /Birch Leaves		8.59E-04	1.82E-02	4.05E-04	1.10E-04
0.60	Aquatic Insects		5.40E-04	4.44E-03	9.61E-04	2.53E-03
0.10	Grasses		8.70E-04	1.76E-02	3.84E-04	8.98E-05
Food Dose (mg/d)			3.08E-03	4.81E-02	2.99E-03	7.61E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.08E-03	4.81E-02	2.99E-03	7.61E-03
Sediment Dose (mg/d)			4.05E-02	5.33E-02	1.80E-05	1.75E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			4.05E-02	5.33E-02	1.80E-05	1.75E-04
Water Dose (mg/d)			3.50E-06	2.20E-06	1.03E-07	1.25E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.50E-06	2.20E-06	1.03E-07	1.25E-06
Food + Soil + Water (mg/d)			4.36E-02	1.01E-01	3.00E-03	7.78E-03
BW Adjusted (mg/kg/d)			7.98E-01	1.86E+00	5.50E-02	1.43E-01
HR Adjusted (mg/kg/d)			7.98E-01	1.86E+00	5.50E-02	1.43E-01
SC Adjusted (mg/kg/d)			7.98E-01	1.86E+00	5.50E-02	1.43E-01
Final Daily Dose (mg/kg/day)			7.98E-01	1.86E+00	5.50E-02	1.43E-01
TRV (mg/kg/d)			2.24E+00	2.66E+00	6.40E-02	2.90E-01
HAZARD QUOTIENT			0.36	0.70	0.86	0.49

Model Parameters

Body Weight (BW; kg)	5.46E-02
Fraction of Moisture in Diet	7.03E-01
Food Ingestion (kg/d w w)	2.96E-02
Water Ingestion (L/d)	8.41E-03
Sediment Ingestion Rate (proportion; dw basis)	1.00E-01
Sediment Ingestion (kg/d; dw)	8.77E-04
Habitat Range (ha)	0.00E+00
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Note: Underline denotes a listed species.

Table H3.1-15 Model Output for the Semi-palmated Sandpiper – Application Case

Semi-palmated sandpiper					
Fraction of Diet	Dose (mg/d)	Arsenic	Chromium	Methyl mercury	Selenium
1.00	Aquatic Insects	9.80E-04	8.06E-03	1.74E-03	4.59E-03
Food Dose (mg/d)		9.80E-04	8.06E-03	1.74E-03	4.59E-03
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		9.80E-04	8.06E-03	1.74E-03	4.59E-03
Sediment Dose (mg/d)		7.59E-02	9.99E-02	3.37E-05	3.29E-04
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		7.59E-02	9.99E-02	3.37E-05	3.29E-04
Water Dose (mg/d)		2.16E-06	1.36E-06	6.36E-08	7.73E-07
x Bioavailability Factor		1.00	1.00	1.00	1.00
= Adjusted Dose		2.16E-06	1.36E-06	6.36E-08	7.73E-07
Food + Soil + Water (mg/d)		7.69E-02	1.08E-01	1.78E-03	4.92E-03
BW Adjusted (mg/kg/d)		2.90E+00	4.07E+00	6.71E-02	1.86E-01
HR Adjusted (mg/kg/d)		2.90E+00	4.07E+00	6.71E-02	1.86E-01
SC Adjusted (mg/kg/d)		2.90E+00	4.07E+00	6.71E-02	1.86E-01
Final Daily Dose (mg/kg/day)		2.90E+00	4.07E+00	6.71E-02	1.86E-01
TRV (mg/kg/d)		3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT		8.2E-01	1.5E+00	5.2E-01	6.0E-01

Model Parameters

Body Weight (BW; kg)	2.65E-02
Fraction of Moisture in Diet	8.30E-01
Food Ingestion (kg/d w w)	3.22E-02
Water Ingestion (L/d)	5.18E-03
Sediment Ingestion Rate (proportion; dw basis)	3.00E-01
Sediment Ingestion (kg/d; dw)	1.64E-03
Habitat Range (ha)	2.50E-01
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Shaded and Bolded indicates a Hazard Quotient (HQ) greater than 1.0

Table H3.1-16 Model Output for the Common Merganser – Application Case

Common merganser			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.60	Fish		1.00E-02	2.30E-02	2.26E-02	1.00E-01
0.30	Aquatic Insects		9.33E-04	7.67E-03	1.66E-03	4.37E-03
0.10	Aquatic Plants		1.25E-03	1.18E-02	3.11E-03	2.81E-03
Food Dose (mg/d)			1.22E-02	4.24E-02	2.74E-02	1.07E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.22E-02	4.24E-02	2.74E-02	1.07E-01
Sediment Dose (mg/d)			9.22E-02	1.21E-01	4.09E-05	3.99E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			9.22E-02	1.21E-01	4.09E-05	3.99E-04
Water Dose (mg/d)			3.27E-05	2.06E-05	9.63E-07	1.17E-05
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.27E-05	2.06E-05	9.63E-07	1.17E-05
Food + Soil + Water (mg/d)			1.04E-01	1.64E-01	2.74E-02	1.08E-01
BW Adjusted (mg/kg/d)			6.83E-02	1.07E-01	1.79E-02	7.03E-02
HR Adjusted (mg/kg/d)			6.83E-02	1.07E-01	1.79E-02	7.03E-02
SC Adjusted (mg/kg/d)			6.83E-02	1.07E-01	1.79E-02	7.03E-02
Final Daily Dose (mg/kg/day)			6.83E-02	1.07E-01	1.79E-02	7.03E-02
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			1.9E-02	3.9E-02	1.4E-01	2.3E-01

Model Parameters

Body Weight (BW; kg)	1.53E+00
Fraction of Moisture in Diet	2.49E-01
Food Ingestion (kg/d w w)	1.02E-01
Water Ingestion (L/d)	7.85E-02
Sediment Ingestion Rate (proportion; dw basis)	2.60E-02
Sediment Ingestion (kg/d; dw)	2.00E-03
Habitat Range (ha)	5.80E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-17 Model Output for the Green-winged Teal – Application Case

Green-winged teal			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.10	Aquatic Insects		9.20E-05	7.56E-04	1.64E-04	4.31E-04
0.90	Aquatic Plants		3.32E-03	3.14E-02	8.27E-03	7.49E-03
Food Dose (mg/d)			3.41E-03	3.22E-02	8.43E-03	7.92E-03
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			3.41E-03	3.22E-02	8.43E-03	7.92E-03
Sediment Dose (mg/d)			2.56E-02	3.37E-02	1.14E-05	1.11E-04
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.56E-02	3.37E-02	1.14E-05	1.11E-04
Water Dose (mg/d)			1.15E-05	7.20E-06	3.38E-07	4.10E-06
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			1.15E-05	7.20E-06	3.38E-07	4.10E-06
Food + Soil + Water (mg/d)			2.90E-02	6.59E-02	8.44E-03	8.03E-03
BW Adjusted (mg/kg/d)			9.07E-02	2.06E-01	2.64E-02	2.51E-02
HR Adjusted (mg/kg/d)			9.07E-02	2.06E-01	2.64E-02	2.51E-02
SC Adjusted (mg/kg/d)			9.07E-02	2.06E-01	2.64E-02	2.51E-02
Final Daily Dose (mg/kg/day)			9.07E-02	2.06E-01	2.64E-02	2.51E-02
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			2.6E-02	7.4E-02	2.0E-01	8.1E-02

Model Parameters

Body Weight (BW; kg)	3.20E-01
Fraction of Moisture in Diet	8.30E-02
Food Ingestion (kg/d w w)	3.02E-02
Water Ingestion (L/d)	2.75E-02
Sediment Ingestion Rate (proportion; dw basis)	2.00E-02
Sediment Ingestion (kg/d; dw)	5.54E-04
Habitat Range (ha)	2.43E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00

Table H3.1-18 Model Output for the Bald Eagle – Application Case

Bald eagle			Arsenic	Chromium	Methyl mercury	Selenium
Fraction of Diet	Dose (mg/d)					
0.50	Fish		1.96E-02	4.49E-02	4.42E-02	1.95E-01
0.50	Small Mammals		1.30E-03	1.32E-01	7.04E-03	1.62E-02
Food Dose (mg/d)			2.09E-02	1.77E-01	5.12E-02	2.12E-01
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			2.09E-02	1.77E-01	5.12E-02	2.12E-01
Soil Dose (mg/d)			0.00E+00	0.00E+00	0.00E+00	0.00E+00
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			0.00E+00	0.00E+00	0.00E+00	0.00E+00
Water Dose (mg/d)			6.88E-05	4.33E-05	2.03E-06	2.46E-05
x Bioavailability Factor			1.00	1.00	1.00	1.00
= Adjusted Dose			6.88E-05	4.33E-05	2.03E-06	2.46E-05
Food + Soil + Water (mg/d)			2.10E-02	1.77E-01	5.12E-02	2.12E-01
BW Adjusted (mg/kg/d)			4.52E-03	3.80E-02	1.10E-02	4.55E-02
HR Adjusted (mg/kg/d)			4.52E-03	3.80E-02	1.10E-02	4.55E-02
SC Adjusted (mg/kg/d)			4.52E-03	3.80E-02	1.10E-02	4.55E-02
Final Daily Dose (mg/kg/day)			4.52E-03	3.80E-02	1.10E-02	4.55E-02
TRV (mg/kg/d)			3.55E+00	2.78E+00	1.30E-01	3.10E-01
HAZARD QUOTIENT			1.3E-03	1.4E-02	8.5E-02	1.5E-01

Model Parameters

Body Weight (BW; kg)	4.65E+00
Fraction of Moisture in Diet	3.40E-01
Food Ingestion (kg/d w w)	2.40E-01
Water Ingestion (L/d)	1.65E-01
Soil Ingestion Rate (proportion; dw basis)	0.00E+00
Soil Ingestion (kg/d; dw)	0.00E+00
Habitat Range (ha)	2.00E+02
Habitat Range (HR) Factor	1.00
Soil Cap (SC) Factor	1.00



APPENDIX I

CONTOUR MAPS FOR CONCENTRATION DISTRIBUTIONS OF SELECTED COPCs



Maps

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 20 (BLANK)
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- > 80

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

**BASE CASE MAXIMUM 1-HOUR
ALUMINIUM CONCENTRATIONS**

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PROJECT	1407256		FILE No. PDAR_Air_001_GIS	
DESIGN	DC	15/01/15	SCALE AS SHOWN	REV 0
GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-1

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

< 20 (BLANK)
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
> 80

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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SCALE 1:250,000

PROJECT	JAY PROJECT NORTHWEST TERRITORIES, CANADA			
TITLE	CONSTRUCTION CASE MAXIMUM 1-HOUR ALUMINIUM CONCENTRATIONS			
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	GIS	SBM	26/01/15	REV 0
	CHECK	GD	30/01/15	MAP I-2
REVIEW	TZ	30/01/15		

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 20 (BLANK)
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- > 80

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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SCALE 1:250,000

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

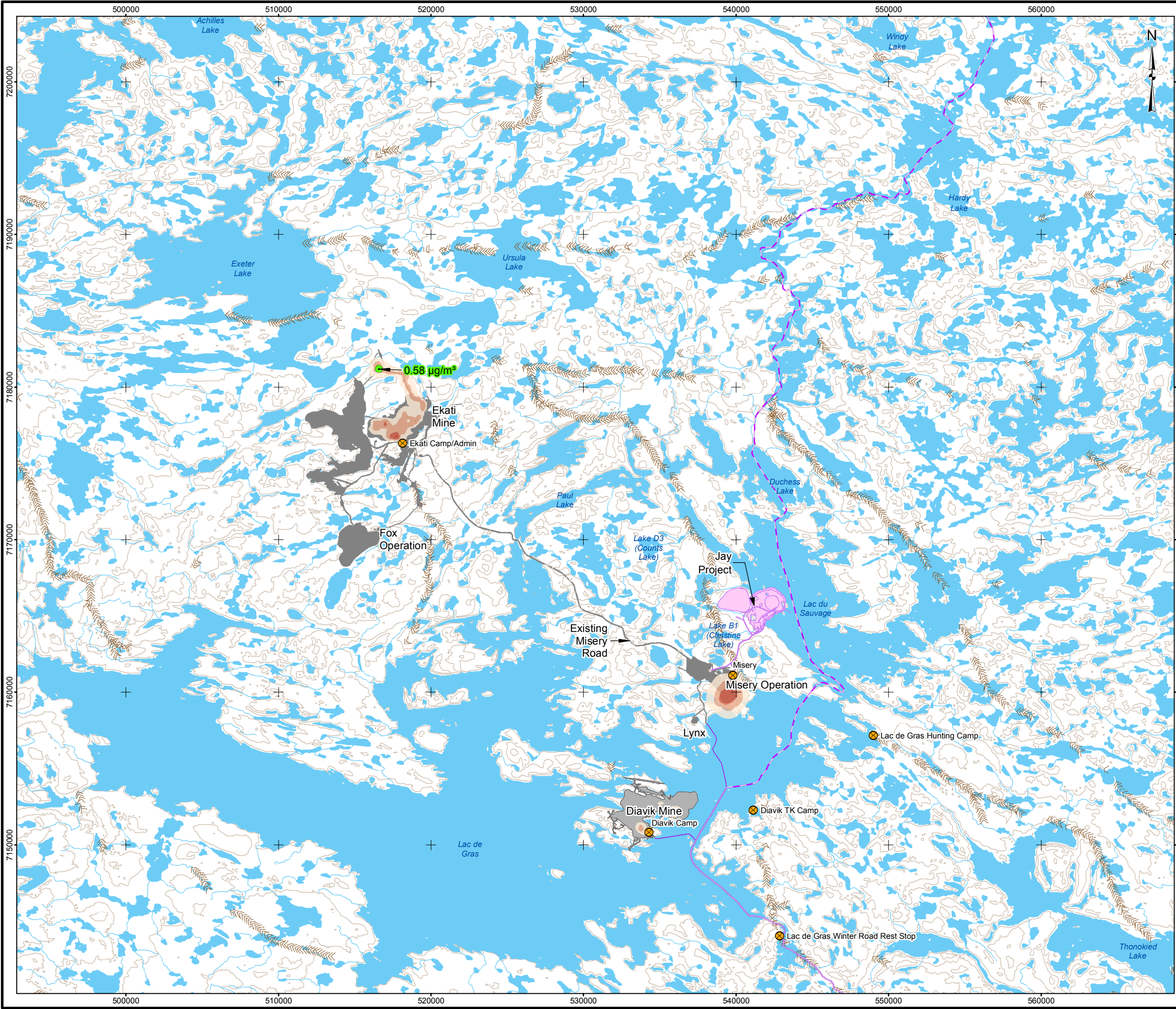
APPLICATION CASE MAXIMUM 1-HOUR ALUMINIUM CONCENTRATIONS

Golder Associates

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GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-3

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LEGEND

- EKATI MINE FOOTPRINT
- DIAMIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY
- CONCENTRATION (µg/m³)**
 - < 0.1 (BLANK)
 - 0.1 - 0.2
 - 0.2 - 0.4
 - 0.4 - 1
 - >1
- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000 KILOMETRES

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	GIS	SBM	26/01/15	MAP I-4		
	CHECK	GD	30/01/15			
	REVIEW	TZ	30/01/15			

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY
- CONCENTRATION ($\mu\text{g}/\text{m}^3$)
 - < 0.1 (BLANK)
 - 0.1 - 0.2
 - 0.2 - 0.4
 - 0.4 - 1
 - >1
- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

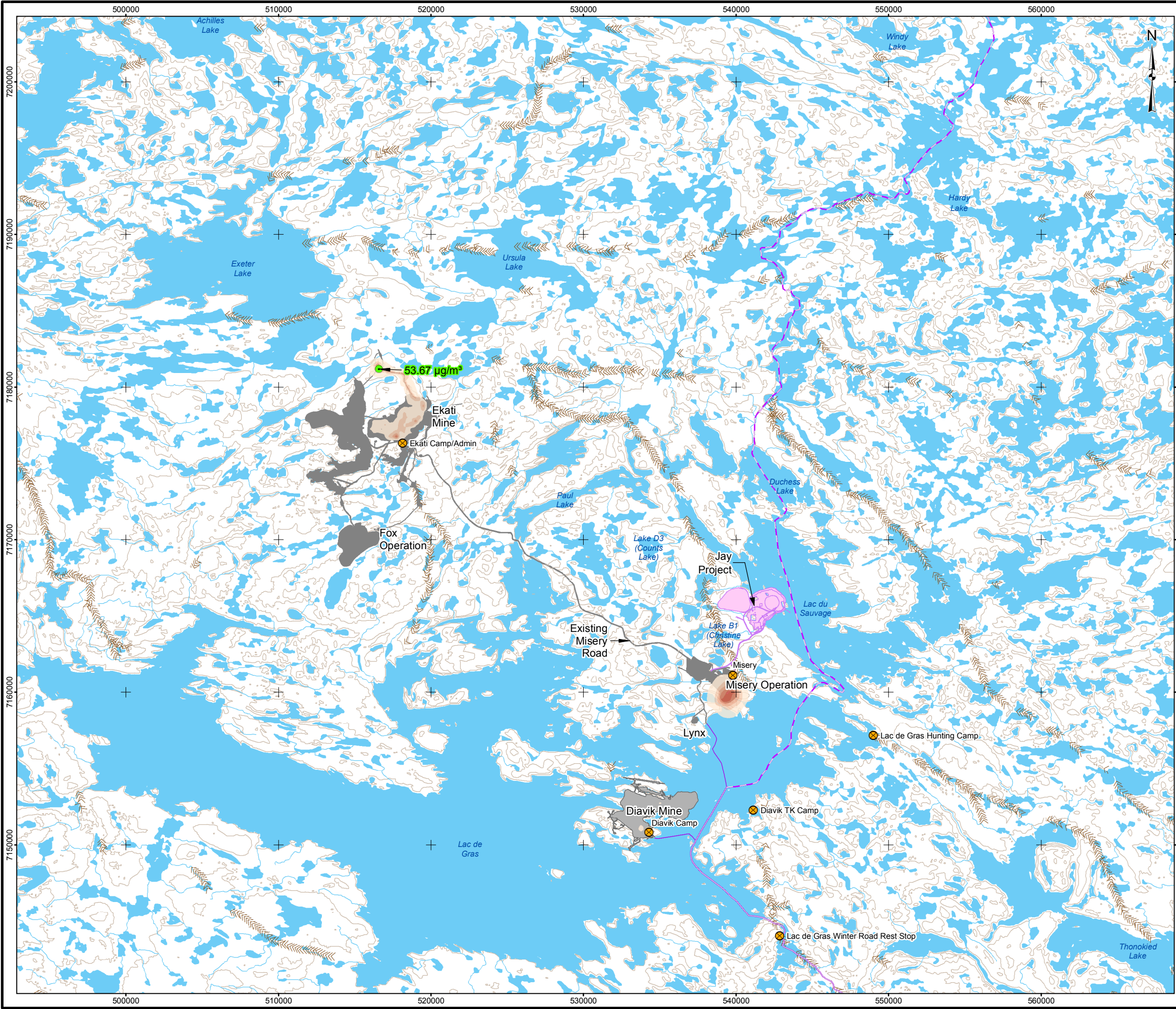
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PROJECT		1407256		FILE No. PDAR_Air_001_GIS	
 DOMINION DIAMOND		JAY PROJECT NORTHWEST TERRITORIES, CANADA			
TITLE					
CONSTRUCTION CASE MAXIMUM 1-HOUR CHROMIUM CONCENTRATIONS					
		DESIGN		DC	15/01/15
		GIS		SBM	26/01/15
		CHECK		GD	30/01/15
		REVIEW		TZ	30/01/15
		MAP I-5			

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

< 10 (BLANK)
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000

PROJECT	JAY PROJECT NORTHWEST TERRITORIES, CANADA			
TITLE	BASE CASE MAXIMUM 1-HOUR IRON CONCENTRATIONS			
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	DESIGN	DC	15/01/15	SCALE AS SHOWN
	GIS	SBM	26/01/15	REV 0
	CHECK	GD	30/01/15	MAP I-7
REVIEW	TZ	30/01/15		

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 10 (BLANK)
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000

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	CHECK	GD	30/01/15			
	REVIEW	TZ	30/01/15			

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 10 (BLANK)
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- > 70

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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SCALE 1:250,000

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

APPLICATION CASE MAXIMUM 1-HOUR IRON CONCENTRATIONS

Golder Associates

PROJECT	1407256		FILE No. PDAR_Air_001_GIS	
DESIGN	DC	15/01/15	SCALE AS SHOWN	REV 0
GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-9

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 4 (BLANK)
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- > 16

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

CONSTRUCTION CASE MAXIMUM 24-HOUR IRON CONCENTRATIONS

Golder Associates

PROJECT	1407256		FILE No. PDAR_Air_001_GIS	
DESIGN	DC	15/01/15	SCALE AS SHOWN	REV 0
GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-11

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 4 (BLANK)
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- > 16

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

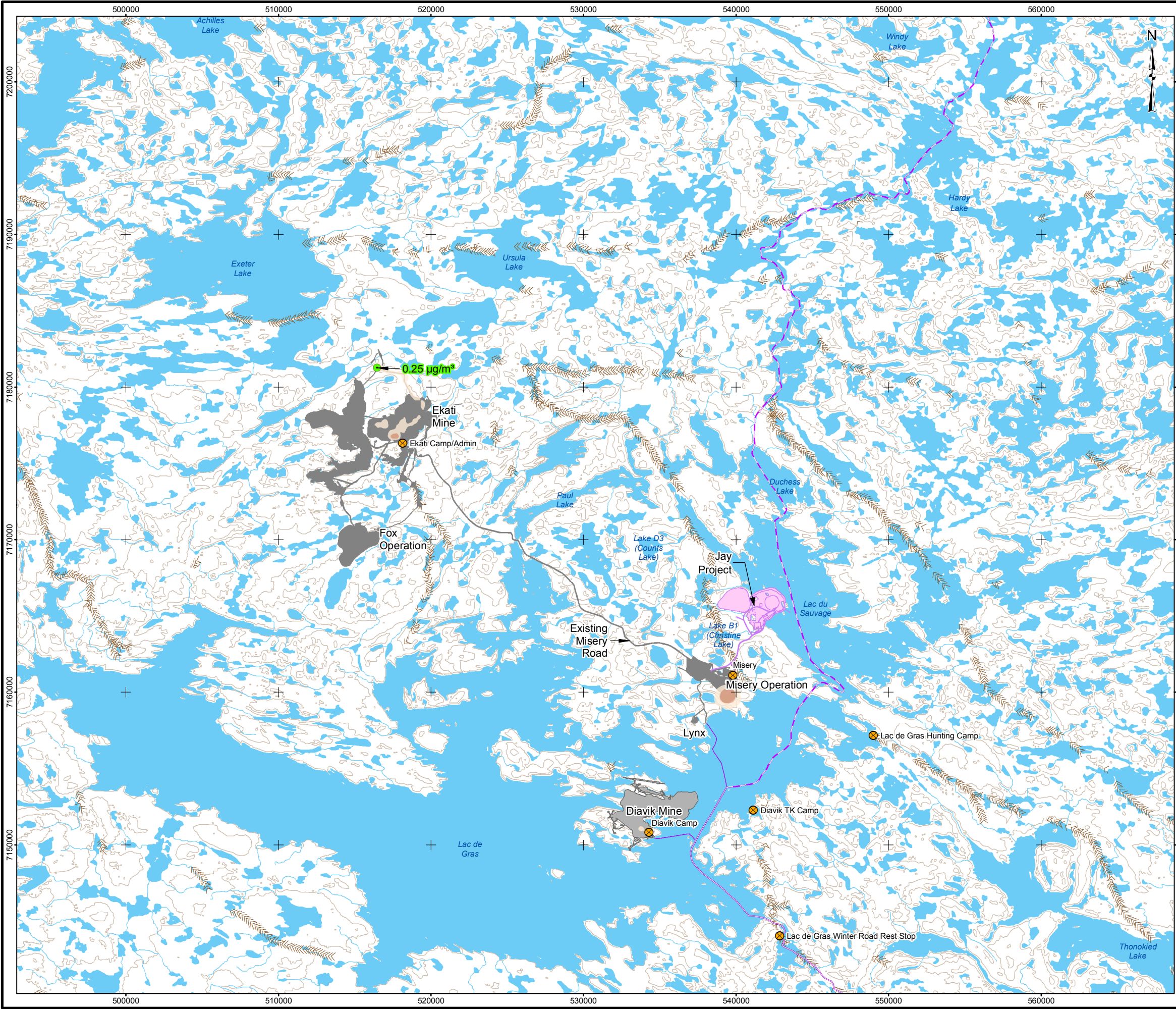
**APPLICATION CASE MAXIMUM 24-HOUR
IRON CONCENTRATIONS**

Golder Associates

PROJECT	1407256		FILE No. PDAR_Air_001_GIS	
DESIGN	DC	15/01/15	SCALE AS SHOWN	REV 0
GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-12

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY
- CONCENTRATION ($\mu\text{g}/\text{m}^3$)
 - < 0.1 (BLANK)
 - 0.1 - 0.2
 - 0.2 - 0.4
- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N



PROJECT		1407256		FILE No. PDAR_Air_001_GIS	
DESIGN		DC	15/01/15	SCALE AS SHOWN	
GIS		SBM	26/01/15	REV 0	
CHECK		GD	30/01/15	MAP I-13	
REVIEW		TZ	30/01/15		

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LEGEND

- EKATI MINE FOOTPRINT
- DIAMIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATION (µg/m³)

- < 0.1 (BLANK)
- 0.1 - 0.2
- 0.2 - 0.4
- 0.4 - 1

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DATUM: NAD83 PROJECTION: UTM ZONE 12N

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SCALE 1:250,000 KILOMETRES

PROJECT

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

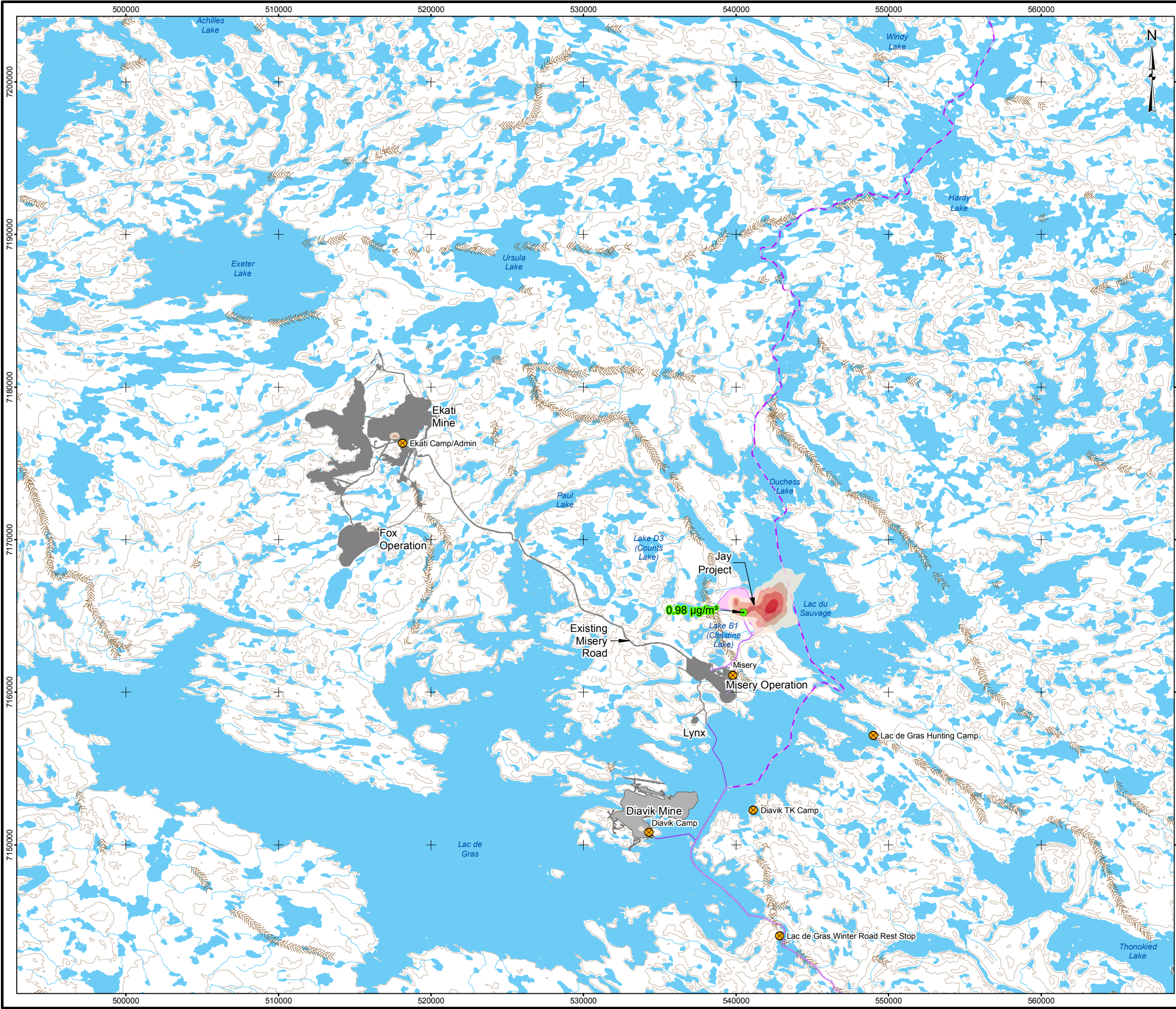
TITLE

CONSTRUCTION CASE MAXIMUM 24-HOUR MANGANESE CONCENTRATIONS

PROJECT	1407256		FILE No. PDAR_Air_001_GIS	
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GIS	SBM	26/01/15		
CHECK	GD	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-14

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LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY
- CONCENTRATION ($\mu\text{g}/\text{m}^3$)**
 - < 0.1 (BLANK)
 - 0.1 - 0.2
 - 0.2 - 0.4
 - 0.4 - 1
 - > 1
- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

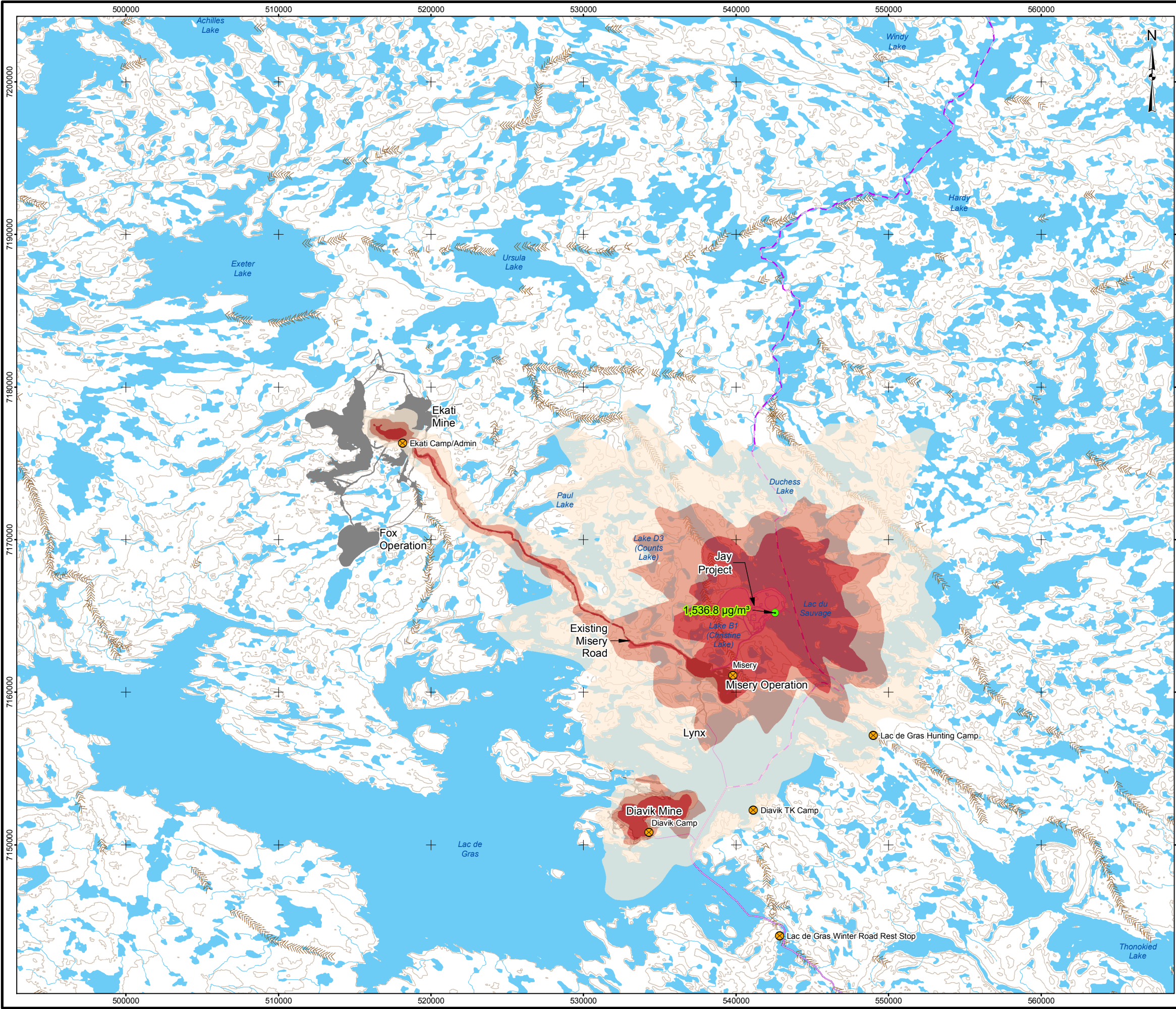
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DATUM: NAD83 PROJECTION: UTM ZONE 12N



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DESIGN		DC	15/01/15	SCALE AS SHOWN	
GIS		SBM	26/01/15	REV 0	
CHECK		GD	30/01/15	MAP I-15	
REVIEW		TZ	30/01/15		

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATIONS (µg/m³)

- 0 to < 12.5 (BLANK)
- 12.5 to < 25
- 25 to 50
- > 50

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

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DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

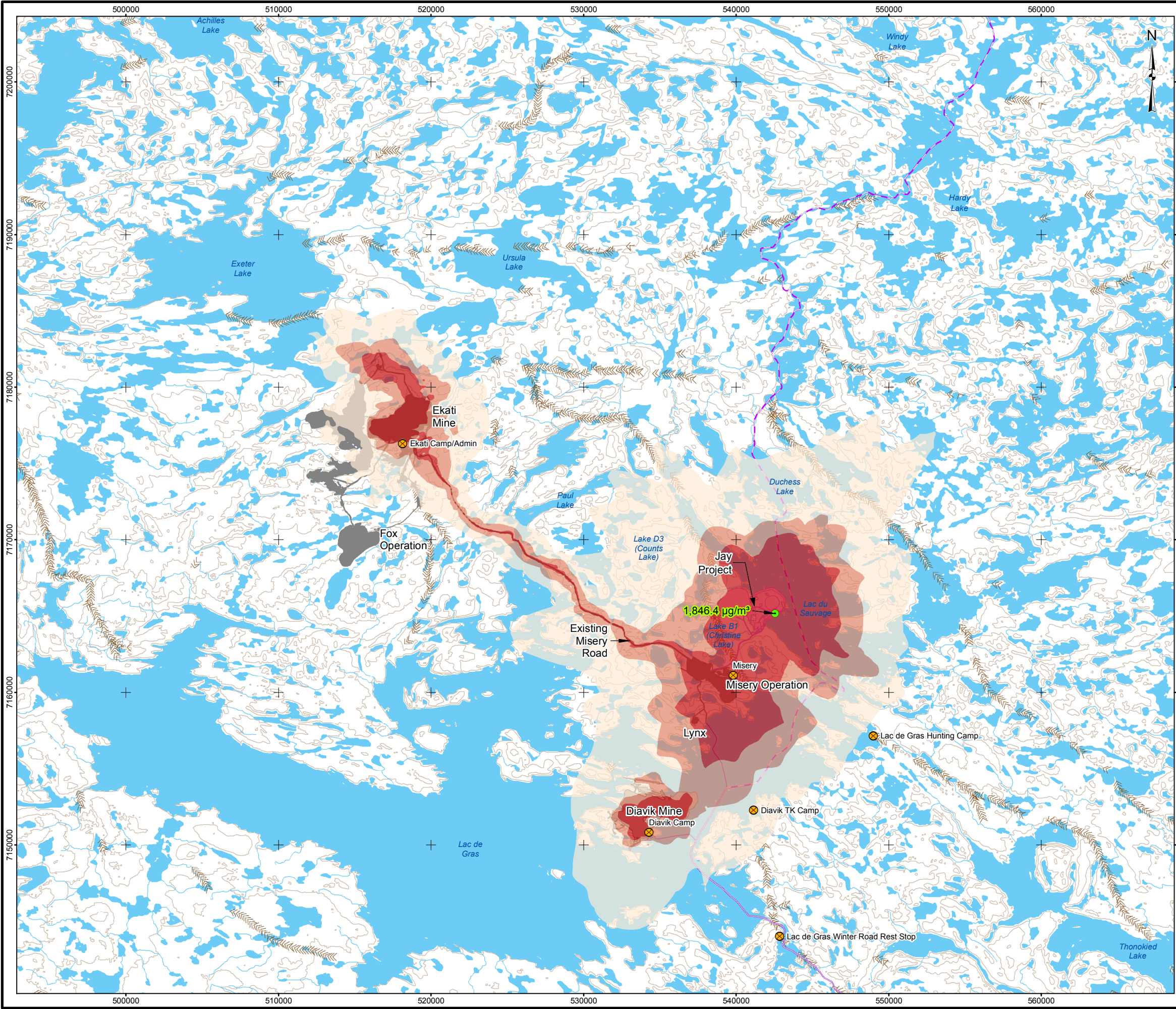
APPLICATION CASE MAXIMUM 24-HOUR PM₁₀ CONCENTRATIONS

Golder Associates

PROJECT	1407256		FILE No. PDAR_Air_002_GIS	
DESIGN	DC	27/08/14	SCALE AS SHOWN	REV 3
GIS	SBM	28/01/15		
CHECK	AN	30/01/15		
REVIEW	TZ	30/01/15		

MAP I-17

G:\CLIENTS\DOMINION\DEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EAA\AirPost DAR\PDAR_Air_002_GIS.mxd



LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATIONS (µg/m³)

- 0 to < 12.5 (BLANK)
- 12.5 to < 25
- 25 to 50
- > 50

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000 KILOMETRES

PROJECT		1407256		FILE No. PDAR_Air_002_GIS	
DESIGN	DC	27/08/14		SCALE AS SHOWN	REV 3
GIS	SBM	28/01/15			
CHECK	AN	30/01/15			
REVIEW	TZ	30/01/15			

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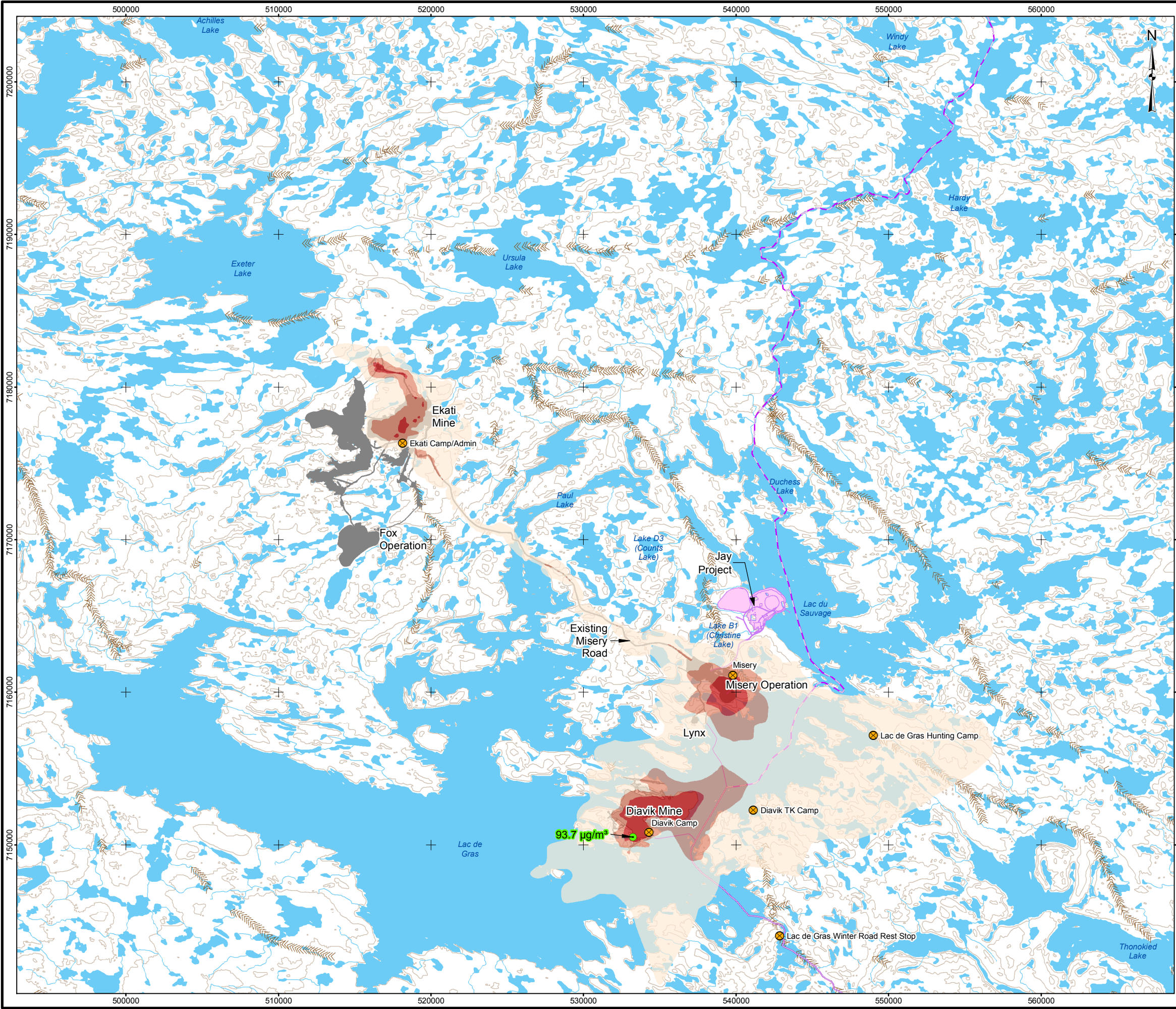
MAP I-18

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

CONSTRUCTION CASE MAXIMUM 24-HOUR PM₁₀ CONCENTRATIONS

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LEGEND

- EKATI MINE FOOTPRINT
- DIABIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

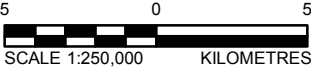
CONCENTRATIONS (µg/m³)

- 0 to < 7 (BLANK)
- 7 to < 14
- 14 to < 28
- > 28

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

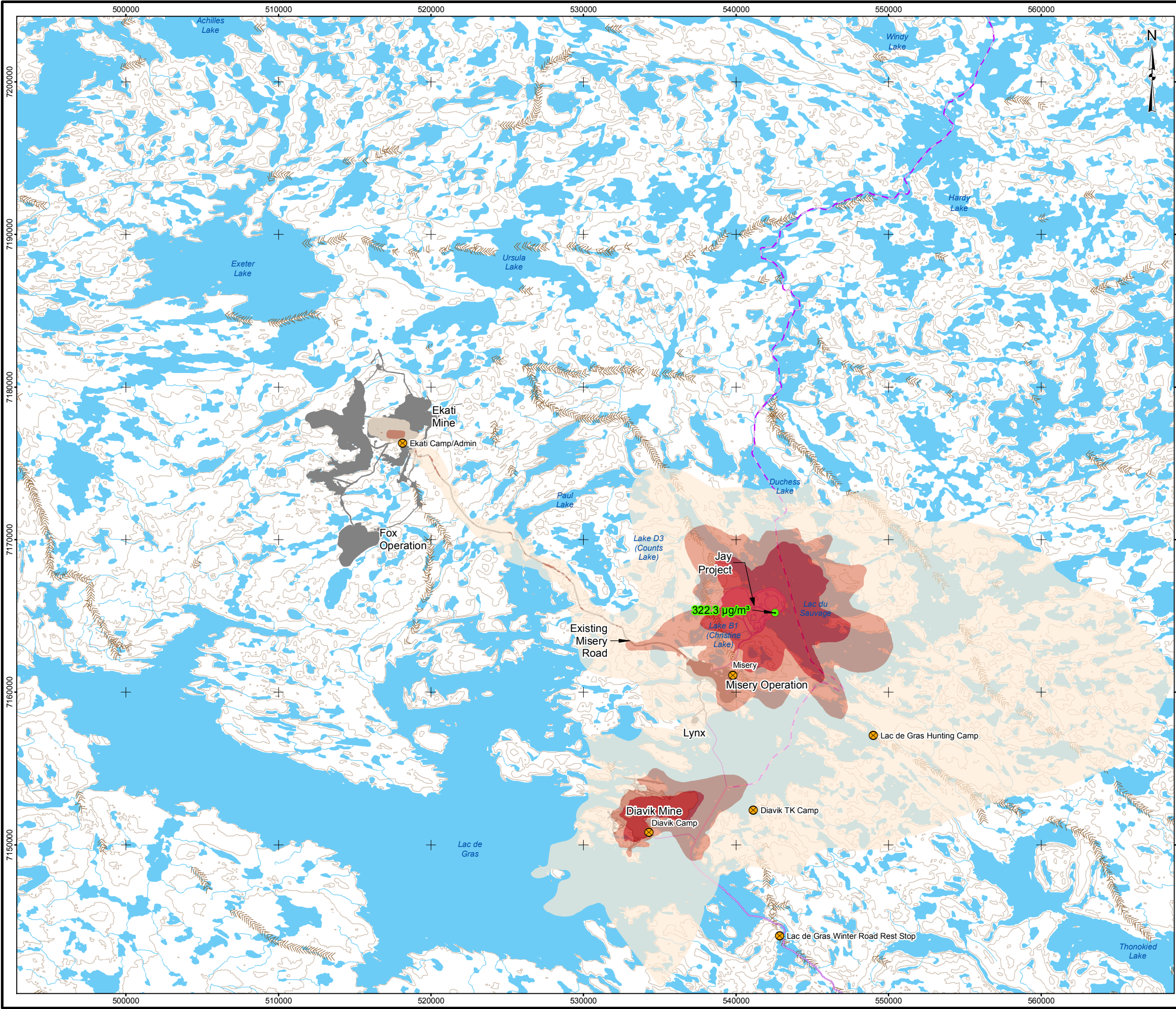
NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N



PROJECT		1407256		FILE No. PDAR_Air_002_GIS	
DESIGN		DC	27/08/14	SCALE AS SHOWN	
GIS		SBM	28/01/15	REV 3	
CHECK		AN	30/01/15	MAP I-19	
REVIEW		TZ	30/01/15		

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LEGEND

- EKATI MINE FOOTPRINT
- DIAMIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

CONCENTRATIONS (µg/m³)

- 0 to < 7 (BLANK)
- 7 to < 14
- 14 to < 28
- > 28

- MAXIMUM POINT OF IMPINGEMENT
- RECEPTOR LOCATION

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
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NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

SCALE 1:250,000 KILOMETRES

PROJECT		1407256		FILE No. PDAR_Air_002_GIS	
DESIGN	DC	27/08/14		SCALE AS SHOWN	REV 3
GIS	SBM	28/01/15			
CHECK	AN	30/01/15			
REVIEW	TZ	30/01/15			

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MAP I-20

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

APPLICATION CASE MAXIMUM 24-HOUR PM_{2.5} CONCENTRATIONS

