

Date

Name & Address

Dear Mr/Ms XXX:

Thank you for participating in the University of Michigan Dioxin Exposure Study. You indicated that you wished to receive the results of chemical analyses of the dioxins and dioxin-like compounds in soil and vegetation collected from your property. This letter summarizes these analyses.

There are hundreds of different dioxin-like chemicals. We selected 29 of these chemicals because they are believed to have the most potential for affecting health. The total dioxin toxicity equivalence (TEQ) concentration is the most important index of the combined effect of these 29 compounds, and is expressed in parts per trillion (ppt). Calculation of the TEQ is explained in the attached Technical Details.

There were XX/was one soil sample(s) collected from your property that were/was chemically analyzed. The number of soil samples obtained from properties, their locations, and the manner in which they were combined and selected for analysis is described in the Technical Details (see below). Full details of the analysis/analyses from soil analyzed on your property are shown in the table(s) at the end of this letter. The TEQ(s) (the index/ices of the combined effect of the 29 dioxin-like compounds) is/are shown in the following table:

Table A: Soil and Vegetation Sample Result(s) for your property

<b>Sample</b>	<b>Total TEQ (parts per trillion)</b>	<b>Complete Results</b>
House perimeter 0-1 inch composite		Table 1
House perimeter 1-6 inch composite		Table 2
House perimeter surface vegetation		Table 3
Soil contact zone 0-6 inch composite		Table 4
Soil contact zone surface vegetation		Table 5
Floodplain 0-1 inch composite		Table 6
Floodplain 1-6 inch composite		Table 7
Floodplain surface vegetation		Table 8

[note: this table, and the table numbers, will vary depending on the number of samples analyzed for each property, as will the corresponding tables displayed at the end – there will be no blank rows here and no blank tables at the end]

What do these numbers mean? We can tell you that finding dioxins in your soil does not

necessarily mean that you or your family will become ill. Almost all soil in Michigan is believed to have measurable levels of dioxins, even in areas that are not known to have industrial contamination. The background levels of dioxins in soil vary across the state. The Michigan Department of Environmental Quality (MDEQ) has performed limited testing for dioxins in soil in the lower peninsula of Michigan (See Technical Details below for a summary of the MDEQ results).

For regulatory purposes the MDEQ currently has a combined standard for dioxins, furans and PCBs in soil of 90 ppt. The United States Environmental Protection Agency (USEPA) has a combined standard of 1,000 ppt.

Overall, results of analyses of your soil samples are [insert proper ending]

- in the background range for soils in Michigan.
- above the background range for soils in Michigan, but below the MDEQ regulatory standard of 90 ppt.
- above the MDEQ regulatory standard of 90 ppt but below the USEPA standard of 1,000 ppt.
- above the USEPA standard of 1,000 ppt.

As stated in the consent document, knowledge of levels of dioxins, furans and PCBs in soil on your property could affect the value of the property. For example, at the time of the sale of your home you may be obligated to share these results with potential buyers. In addition, the MDEQ currently has a combined standard for dioxins, furans and PCBs in soil of 90 ppt. MDEQ considers any property with values at or above this threshold to be a “facility” for the purposes of state regulations. If you know that your property is a “facility,” and you caused the contamination, there are a number of regulatory requirements you must comply with to address the contamination. If you did not cause the contamination, but it migrated onto your property, you have no obligation to notify the MDEQ or clean it up. However, in either case, you may not move the contaminated soil in such a manner that it would spread the contamination. Additional information about state regulations can be found on the MDEQ website:  
<http://www.michigan.gov/deq>.

The University of Michigan Dioxin Exposure Study seeks to understand how people are exposed to dioxin-like chemicals. It will examine the impact of where people have lived, what they eat, their jobs, their hobbies, and their environment, including their soil and household dust, on levels of dioxins in their blood. In order to have scientifically valid results about the relationship between levels of dioxins in soil, household dust and blood, the entire study must be completed and analyzed. Individual or partial results do not permit scientists to make valid conclusions about the population. This means that it is not possible at this time to make any judgments about the association between levels of dioxins in soil and household dust and levels of dioxins in your blood. We anticipate that the full results of the study will be available in late 2006. The University of Michigan Dioxin Exposure Study will not look at the effects of dioxins on people’s health. For more details about the study please see our website, [www.umdioxin.org](http://www.umdioxin.org).

You also may have given a blood sample or had dust sampled from your home. If you indicated that you wanted to receive the results of analyses from those samples, you will receive (or may have received) separate letters containing those results.

We greatly appreciate your participation in the University of Michigan Dioxin Exposure Study. If you have any questions or would like more information, you can visit our web site, or contact us using the information shown below.

Sincerely,

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## TECHNICAL DETAILS

### **Chemical Analyses:**

There are hundreds of different dioxin-like chemicals. They fall into three broad classes that share similar chemical structures: dioxins, furans and polychlorinated biphenyls (PCBs). Within each class the individual members are called ‘congeners.’ Your soil was analyzed for 29 different PCBs, furans, and dioxins. These 29 congeners were chosen because they have been identified by the World Health Organization (WHO), the United States Environmental Protection Agency (USEPA), and the Michigan Department of Environmental Quality (MDEQ) as having dioxin-like toxicity, and are believed to be the most important in terms of potential health effects. The attached table/s provide/s the concentration of each of the 29 congeners found in your soil. If the level of a congener in a soil sample was below the level at which the laboratory can reliably provide a measurement, one half of the reliably measurable level is shown in the table.

Scientists have assigned relative potency values, or Toxicity Equivalence Factors (TEFs), to each of the 29 dioxin-like compounds; the TEFs are also listed in the table/s. The TEF for each congener relates its toxicity to that of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), the congener about which scientists have the most information. The total dioxin toxicity equivalence (TEQ) concentration is calculated by multiplying the concentration of each congener by its TEF and adding up the products. The TEQ is the most important index of the combined effect of these 29 compounds, and is expressed in parts per trillion (ppt). Parts per trillion is the same as picograms per gram. One picogram is one trillionth of a gram.

### **Soil Sampling:**

Properties were sampled in multiple locations using a push core sampler that collected a core of soil from the surface to about six inches below the surface. Surface vegetation, such as grass or weeds, at the site of the core was also collected except in situations where garden plants might be damaged. The protocol identified three possible locations on each property for sampling: around the house (known as the house perimeter set), vegetable or flower gardens on the property where skin contact is likely (known as the soil contact zone), and areas in or near the floodplain of the Tittabawassee River (known as the flood plain set). Since some properties do not have gardens or are not in the floodplain, the number of samples varied across properties. The locations of sampling stations are illustrated in Figure 1.

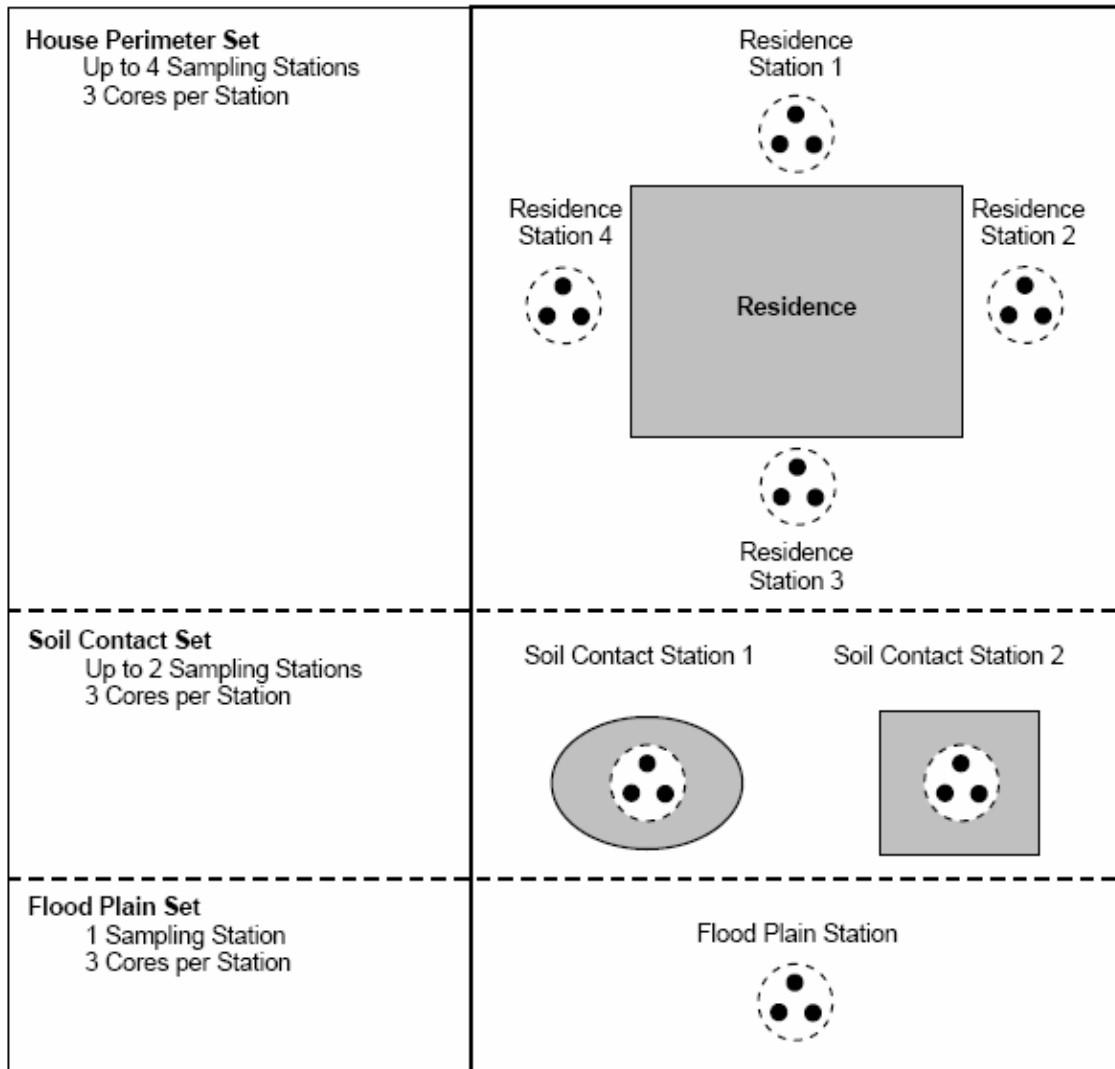


Figure 1. Soil sample locations

Previous analyses done by MDEQ and other researchers have shown that levels of dioxins may vary by how deep the soil is from the surface. To account for this variation, the cores from the house perimeter and the floodplain stations were separated into two groups, known as strata: the 0-1 inch (i.e., the top one inch) stratum and 1-6 inch stratum (i.e., the bottom five inches) for each core. Since people mix soil when they garden, the cores from the soil contact stations were not separated into strata. If the core had vegetation (such as grass or weeds), this part was separated from the 0-1 inch stratum. To have one representative soil sample for each property, all of the soil from each stratum within sets for that property was combined or mixed together, a process known as compositing. For example, all of the soil collected from the top one inch of soil around the house, known as the house perimeter set, was systematically combined for analysis. The soil from the bottom five inches of the house perimeter set was also, separately, combined for analysis. The collected vegetation was composited separately from the soil. Ultimately, each residence yielded the following composite samples for analysis:

- House perimeter set 0-1 inch composite;
- House perimeter set 1-6 inch composite; and
- House perimeter set surface vegetation composite (if available).

If there was a soil contact station or stations, the residence yielded the following additional samples:

- Soil contact set 0-6 inch composite; and
- Soil contact set surface vegetation composite (if available).

In addition, residences that were determined to be in the Tittabawassee River floodplain yielded the following samples:

- Floodplain set 0-1 inch composite;
- Floodplain set 1-6 inch composite; and
- Floodplain set surface vegetation composite (if available).

The number of soil samples available for chemical analyses from each property varied, depending on the property location, and whether there was gardening with potential skin contact. However, not all soil samples were necessarily analyzed. All properties had analyses conducted on the 0-1 inch house perimeter composite sample. If any part of the property was determined to be in the Tittabawassee River floodplain, then all remaining composites (1-6 inch and vegetation house perimeter; 0-1 inch, 1-6 inch and vegetation floodplain; and 0-6 inch and vegetation soil contact) were also submitted for chemical analysis. If the property was not part of the floodplain, but the study participant had a vegetable garden, or worked in a flower garden, then all of the composites from the soil contact zone (the 0-6 inch and vegetation soil contact composites) also were analyzed.

Analyses of the house perimeter 1-6 inch composite and of the house perimeter vegetation stratum were triggered by the TEQ of the 0-1 inch house perimeter composite. If the TEQ of the 0-1 inch house perimeter composite for any property outside the floodplain was greater than 8 ppt, then the 1-6 inch and vegetation house perimeter composites were also analyzed. The trigger value of 8 ppt TEQ represents the 75<sup>th</sup> percentile (Table B) of the background distribution for the lower peninsula of Michigan. This means that for any area in the lower peninsula of Michigan, it would be expected that 25% of soil samples would be above 8 ppt. For quality control purposes, a random subset of properties outside of the floodplain had the 1-6 inch house perimeter composite analyzed even if the 0-1 inch house perimeter composite was below 8 ppt.

Almost all soil in Michigan is believed to have measurable levels of dioxins, even in areas that are not known to have industrial contamination. The background levels of dioxins in soil vary across the state. The Michigan Department of Environmental Quality has performed limited testing for dioxins in soil in the lower peninsula of Michigan. A summary of the MDEQ results is shown in the following table.

Table B: Summary of Background Levels of Dioxins in Soil in the Lower Peninsula of Michigan

(in ppt TEQ)

Number of soil samples (n)	52
Minimum value	0.4
25 <sup>th</sup> percentile	2.18
Median or 50 <sup>th</sup> percentile	4.60
Mean value	6.73
75 <sup>th</sup> percentile	7.88
97.5 <sup>th</sup> percentile	34.4
Maximum value	34.7

Full details of the University of Michigan Dioxin Exposure Study protocol, including soil sampling and compositing procedures, can be found at the study website: [www.umdioxin.org](http://www.umdioxin.org)

Table 1: Concentrations of Dioxin-like Compounds in House Perimeter 0-1 inch Composite

Congener	TEF	Soil Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5'-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5'-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5'-PentaCB (114)	0.0005		
2,3',4,4',5'-PentaCB (118)	0.0001		
2',3,4,4',5'-PentaCB (123)	0.0001		
2,3,3',4,4',5'-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of soil, which is the same as picograms per gram (pg/g) of dry mass of soil.

\*\* The level of this congener in your soil was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

- CDD - chlorinated dibenzodioxins
- CDF - chlorinated dibenzofurans
- CB - chlorinated biphenyls
- TEF – toxicity equivalence factor
- TEQ – toxicity equivalence

Table 2: Concentrations of Dioxin-like Compounds in House Perimeter 1-6 inch Composite

Congener	TEF	Soil Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5'-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5'-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5'-PentaCB (114)	0.0005		
2,3',4,4',5'-PentaCB (118)	0.0001		
2',3,4,4',5'-PentaCB (123)	0.0001		
2,3,3',4,4',5'-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of soil, which is the same as picograms per gram (pg/g) of dry mass of soil.

\*\* The level of this congener in your soil was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

CDD - chlorinated dibenzodioxins

CDF - chlorinated dibenzofurans

CB - chlorinated biphenyls

TEF – toxicity equivalence factor

TEQ – toxicity equivalence

Table 3: Concentrations of Dioxin-like Compounds in House Perimeter Surface Vegetation

Congener	TEF	Vegetation Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5-PentaCB (114)	0.0005		
2,3',4,4',5-PentaCB (118)	0.0001		
2',3,4,4',5-PentaCB (123)	0.0001		
2,3,3',4,4',5-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of vegetation, which is the same as picograms per gram (pg/g) of dry mass of vegetation.

\*\* The level of this congener in your vegetation was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

- CDD - chlorinated dibenzodioxins
- CDF - chlorinated dibenzofurans
- CB - chlorinated biphenyls
- TEF – toxicity equivalence factor
- TEQ – toxicity equivalence

Table 4: Concentrations of Dioxin-like Compounds in Soil Contact Zone 0-6 inch Composite

Congener	TEF	Soil Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5-PentaCB (114)	0.0005		
2,3',4,4',5-PentaCB (118)	0.0001		
2',3,4,4',5-PentaCB (123)	0.0001		
2,3,3',4,4',5-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of soil, which is the same as picograms per gram (pg/g) of dry mass of soil.

\*\* The level of this congener in your soil was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

CDD - chlorinated dibenzodioxins

CDF - chlorinated dibenzofurans

CB - chlorinated biphenyls

TEF – toxicity equivalence factor

TEQ – toxicity equivalence

Table 5: Concentrations of Dioxin-like Compounds in Soil Contact Zone Surface Vegetation

Congener	TEF	Vegetation Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5-PentaCB (114)	0.0005		
2,3',4,4',5-PentaCB (118)	0.0001		
2',3,4,4',5-PentaCB (123)	0.0001		
2,3,3',4,4',5-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of vegetation, which is the same as picograms per gram (pg/g) of dry mass of vegetation.

\*\* The level of this congener in your vegetation was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

- CDD - chlorinated dibenzodioxins
- CDF - chlorinated dibenzofurans
- CB - chlorinated biphenyls
- TEF – toxicity equivalence factor
- TEQ – toxicity equivalence

Table 6: Concentrations of Dioxin-like Compounds in Floodplain 0-1 inch Composite

Congener	TEF	Soil Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5-PentaCB (114)	0.0005		
2,3',4,4',5-PentaCB (118)	0.0001		
2',3,4,4',5-PentaCB (123)	0.0001		
2,3,3',4,4',5-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of soil, which is the same as picograms per gram (pg/g) of dry mass of soil.

\*\* The level of this congener in your soil was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

CDD - chlorinated dibenzodioxins

CDF - chlorinated dibenzofurans

CB - chlorinated biphenyls

TEF – toxicity equivalence factor

TEQ – toxicity equivalence

Table 7: Concentrations of Dioxin-like Compounds in Floodplain 1-6 inches Composite

Congener	TEF	Soil Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5'-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5'-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5'-PentaCB (114)	0.0005		
2,3',4,4',5'-PentaCB (118)	0.0001		
2',3,4,4',5'-PentaCB (123)	0.0001		
2,3,3',4,4',5'-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of soil, which is the same as picograms per gram (pg/g) of dry mass of soil.

\*\* The level of this congener in your soil was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

CDD - chlorinated dibenzodioxins

CDF - chlorinated dibenzofurans

CB - chlorinated biphenyls

TEF – toxicity equivalence factor

TEQ – toxicity equivalence

Table 8: Concentrations of Dioxin-like Compounds in Floodplain Surface Vegetation

Congener	TEF	Vegetation Concentration*	Contribution to TEQ
<b>Dioxins:</b>			
2,3,7,8-TCDD	1		
1,2,3,7,8-PentaCDD	1		
1,2,3,4,7,8-HexaCDD	0.1		
1,2,3,6,7,8-HexaCDD	0.1		
1,2,3,7,8,9-HexaCDD	0.1		
1,2,3,4,6,7,8-HeptaCDD	0.01		
OctaCDD	0.0001		
<b>Furans:</b>			
2,3,7,8-TetraCDF	0.1		
1,2,3,7,8-PentaCDF	0.05		
2,3,4,7,8-PentaCDF	0.5		
1,2,3,4,7,8-HexaCDF	0.1		
1,2,3,6,7,8-HexaCDF	0.1		
1,2,3,7,8,9-HexaCDF	0.1		
2,3,4,6,7,8-HexaCDF	0.1		
1,2,3,4,6,7,8-HeptaCDF	0.01		
1,2,3,4,7,8,9-HeptaCDF	0.01		
OctaCDF	0.0001		
<b>Polychlorinated biphenyls (PCBs):</b>			
3,4,4',5-TetraCB (81)	0.0001		
3,3',4,4'-TetraCB (77)	0.0001		
3,3',4,4',5-PentaCB (126)	0.1		
3,3',4,4',5,5'-HexaCB (169)	0.01		
2,3,3',4,4'-PentaCB (105)	0.0001		
2,3,4,4',5-PentaCB (114)	0.0005		
2,3',4,4',5-PentaCB (118)	0.0001		
2',3,4,4',5-PentaCB (123)	0.0001		
2,3,3',4,4',5-HexaCB (156)	0.0005		
2,3,3',4,4',5'-HexaCB (157)	0.0005		
2,3',4,4',5,5'-HexaCB (167)	0.00001		
2,3,3',4,4',5,5'-HeptaCB (189)	0.0001		
Your Overall TEQ:			

\* All results shown are expressed as parts per trillion (ppt) of dry mass of vegetation, which is the same as picograms per gram (pg/g) of dry mass of vegetation.

\*\* The level of this congener in your vegetation was below the level at which the laboratory can reliably provide a measurement so one half of the reliably measurable level is shown.

Abbreviations:

- CDD - chlorinated dibenzodioxins
- CDF - chlorinated dibenzofurans
- CB - chlorinated biphenyls
- TEF – toxicity equivalence factor
- TEQ – toxicity equivalence