Several questions have been asked about the paragraph on page 10 (quoted below).

> *Nine of the chemicals in Table 1 (2-methylnaphthalene, p-isopropyl toluene, cyclohexane, 1,2,3-trimethylbenzene, m & p-xylene, o-xylene, diesel range organics [C10-C20], gasoline range organics [C6-C10], and oil range organics [C20-C34]) were not included in the risk calculations. Several of the chemicals did not have toxicity values (necessary information for the risk calculations) available. Calculations for m- & p- and o-xylene were not done individually as xylenes were evaluated together. The diesel range organics (C10-C20), gasoline range organics (C6-C10), and oil range organics (C20-C34) were not included in the calculations as there are no toxicity values for weathered mixtures of hydrocarbons (Edwards et al. 1997).*

A better explanation of the nine chemicals listed and why they were not included in the evaluation is below. This evaluation included skin contact and accidental eating of small amount of sediment containing submerged oil.

2-Methylnaphthalene

This chemical was accidently included in the list. As presented in Table 3 (page 14), 2-methylnaphthlene was included in the non-cancer risk evaluation.

p-Isopropyl Toluene

No toxicity values are available to evaluate this chemical. Skin irritation (a rash) could develop if a person touches this chemical. There is no way to determine how much of this chemical may cause skin irritation.

This chemical is also known as p-cymene. The United States Food and Drug Administration (FDA) allows this chemical to be added to foods as a flavoring.

p-Isopropyl toluene was not found in any of the sediment samples in amounts that could be measured. Because of problems with measuring any specific chemical when working with samples from a spill such as this, the amount of chemical measured will vary from sample to sample. The smallest amount that can be measured in one sample, also known as reporting limit, will depend on what other chemicals are present that may affect the analysis. The largest reporting limit measured for all of the samples is listed, under the heading *maximum reporting limit*, on page 11. (See Table 1, page 11.)

Even if p-Isopropyl toluene is present in the sediment samples at the maximum reporting limit of 0.75 mg/kg, the amount of this chemical that could be accidently eaten is expected to be very small (one-half of the maximum reporting limit [1.5/2 = 0.75 mg/kg] times the amount of sediment that could be accidently eaten in a day [0.2 kg], which is 0.15 mg).

Cyclohexane

No toxicity values for skin contact with and accidental eating of this chemical are available. Most of the available health effects information is about breathing in (inhaling) cyclohexane. However, skin contact with this chemical can cause skin irritation. There is no way to determine how much of this chemical may cause skin irritation.

Cyclohexane was not found in any of the samples in amounts that could be accurately measured. The amount in Table 1, page 11, is the maximum reporting limit. The amount of this chemical that could be accidently eaten is expected to be very small (one-half of the maximum reporting limit [1.5/2 = 0.75 mg/kg] times the amount of sediment that could be accidently eaten in a day [0.2 kg], which is 0.15 mg).

1,2,3-Trimethylbenzene

No toxicity values were available for the exposures expected to this chemical. Most of the information is about breathing in 1,2,3-trimethylbenzene. However, skin contact with this chemical can cause skin irritation. There is no way to determine how much of this chemical may cause skin irritation.

1,2,3-Trimethylbenzene was not found in any of the sediment samples in amounts that could be measured. The amount of this chemical that could be accidently eaten is expected to be very small (one-half of the maximum reporting limit [1.5/2 = 0.75 mg/kg] times the amount of sediment that could be accidently eaten in a day [0.2 kg] which is 0.15 mg).

m & p-Xylene and o-Xylene

These chemicals were not evaluated individually. These chemicals were evaluated together, as xylenes. The Michigan Department of Environmental Quality has a toxicity value (a reference dose) that was used to evaluate the non-cancer risk of these chemicals. The Hazard Quotient for xylenes is 0.0000046 (Table 3, page 14). Even if these chemicals had been evaluated separately, the non-cancer risk value would have still been far below 1.0.

Diesel Range Organics (C10-C20)

The diesel range organics (DRO) are a group of chemicals that have 10 to 20 carbons in their structure. To evaluate this group, the toxicity value from one of the chemicals in the group is selected. The toxicity value may be from the chemical that is considered the most toxic or just the one that has a toxicity value. This chemical and its toxicity is then considered as a surrogate for all the chemicals in the group. The toxicity value most commonly used for this group is based on a combined assessment of the chemicals isopropyl benzene, naphthalene, fluorene, and fluoranthene, with consideration given to acenaphthene, biphenyl, anthracene, and pyrene.

All of the chemicals, except for biphenyl, were measured individually in the oil and the health risks of exposure to these chemicals were individually evaluated. Therefore, to evaluate them again as a group and add the DRO group Hazard Quotient to the total Hazard Index would overestimate the risk of exposure to Kalamazoo River sediments.

Gasoline Range Organics (C6-C10)

The gasoline range organics are a group of chemicals that have 6 to 10 carbons in their structure. To evaluate this group, the toxicity value from one of the chemicals in the group is selected. The toxicity value may be from the chemical that is considered the most toxic or just the one that has a toxicity value. The toxicity value most commonly used for this group is based on toluene, ethylbenzene, styrene, and xylenes. All chemicals, except for styrene, were measured individually in the samples. Styrene was not found in samples of the oil taken in August 2010.

Gasoline range organics were not detected in any of the samples above the reporting limit and the value of 10 mg/kg is larger than the individual chemicals that were measured (See Table 1, page 11).

Oil Range Organics (C20-C34)

The oil range organics are a group of chemicals that have 20 to 34 carbons. To evaluate this group, the toxicity value from one of the chemicals in the group is selected. The toxicity value may be from the chemical that is considered the most toxic or just the one that has a toxicity value. The toxicity value most commonly used for this group is based pyrene. Pyrene was measured individually in the samples and the maximum level (0.78 mg/kg) is more than 2,000 times below the oil range organics maximum value of 1,900 mg/kg (See Table 1, page 11). Use of a toxicity value based on pyrene would be a misrepresentation of the non-cancer risk.

Diesel Range Organics (C10-C20), Gasoline Range Organics (C6-C10), and Oil Range Organics (C20-C34)

These chemical groups also include chemicals that are straight lines of carbons (aliphatic hydrocarbons). If the toxicity values for the aliphatic hydrocarbons in the diesel range organics, gasoline range organics, and oil range organics were used, it would increase the total Hazard Index from 0.039 to 0.089. (See Table 3, page 14 for the source of the 0.039.) This number is still far below 1.0.