STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

ENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

March 21, 2006

Mr. Ben Baker
Senior Environmental
Project Leader The Dow
Chemical Company 47
Building Midland, Michigan
48667

Dear Mr. Baker:

SUBJECT: Signs Required for Soil Exposures on Dow-Owned Recreational Use Property along the Tittabawassee River; The Dow Chemical Company (Dow), Midland; MID 000 724 724

This is in response to your letter of January 23, 2006, acknowledging Dow's obligation to provide access to the Michigan Department of Environmental Quality (MDEQ), Waste and Hazardous Materials Division (WHMD), to erect fish advisory and soil advisory signs on Dow-owned property along the Tittabawassee River. The placement of these signs is required pursuant to the Communications IRA approved with modification by the MDEQ on October 7, 2004. The MDEQ, in conjunction with the Michigan Department of Community Health (MDCH), will be in contact with Mr. Jeff Seeburger, Dow Security, to arrange access to Dow-owned property for the placement of these signs as soon as the soil conditions are conducive to the installation of signs.

Your letter included objections to the placement of these soil advisory signs. The MDEQ, in consultation with the MDCH, is responding to the objections.

1. Dow objects to the use of the Agency for Toxic Substances and Disease Registry (ATSDR) standard of 1,000 parts per trillion (ppt) for recreational used properties. Your discussion is that the 1,000 ppt value is clearly guidance applicable to a residential exposure not guidance applicable to the occasional recreational use of property. You provided the following citation from the ATSDR document, "Dioxin and Dioxin-Like Compounds in Soil, Part 1: ATSDR Interim Policy Guideline":

> *Accordingly, a 1 ppb (1000 ppt) level of dioxin and dioxin-like compounds in residential soil could result in* ***distinctly different contributions to overall body burdens in different populations.*** *For this reason, ATSDR's use of 1 ppb has always been coupled with the recommendation that full consideration be given to site-specific factors such as* ***demographics, on-***

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> ***site activities, climatic conditions,*** *and* ***soil cover.*** *(DeRosa et al., 1999)* (Emphasis added.)

Fishing is the most likely recreational use of this property. Consumption of fish from these waters is another source of exposure to the contamination likely to add to the population's body burden along with the soil exposure while fishing on the property. Site-specific data from fish, wild game, ecological receptors, and Dow's pilot bioavailability study indicate that the contaminants are bioavailable from both sediments and soils. The recreational use area of the property (e.g., river bank and trails leading to the river bank) does not have soil cover, and the area with greatest time spent (i.e., the river bank) fishing is subject to repeated flooding and subsequent deposition and erosion of contaminated sediments and soils. In addition, some of the population fishing from this property is likely to also live on contaminated property (e.g., within the Midland soils study area). These site-specific considerations indicate advisory signs to advise of the soil contamination on this property are appropriate for the public using this

property to allow them to make informed decisions on minimizing their exposures. Placing signs on this recreationally used property is consistent with signs placed at other similar recreational properties. Placement of these signs is also consistent with Dow's voluntary activities at locations in parks used for fishing along the Tittabawassee River. In fact, Dow has gone further than signage in some fishing locations by constructing fishing docks at Imerman and Freeland Festival Parks with the stated intent to decrease soil exposure during fishing activities in these areas.

2. Dow also objects to the placement of advisory signs due to inconsistencies with recommendations against signs on the Kalamazoo River by an MDCH/ATSDR Public Health Consultation.

The health consultation conducted by the MDCH in cooperation with the ATSDR (May 2, 2002) was in response to a very specific concern expressed by the Public Advisory Council (PAC) for the Kalamazoo River Area of Concern Remedial Action Plan (RAP). The PAC asked the MDCH to evaluate the health hazard associated with recreational exposure to PCBs in Kalamazoo River surface water and sediment. The Kalamazoo River Superfund site has been under study for many years: remedial investigations, feasibility studies, and human health risk assessments (HHRAs) were completed before the 2002 MDCH Health Consultation. The areas of highest concentrations in soil and sediments have been well-defined and are primarily in the former river impoundment areas. The PCB contaminated sediments in these areas were exposed when impoundment water levels were lowered.

To evaluate whether such exposures might pose a human health hazard, the MDCH evaluated a scenario in which children (i.e., an older child and a younger child exhibiting pica behavior) might be exposed to river sediments over several years. The MDCH used an exposure point concentration that was the highest level of PCBs detected in exposed sediment close to the Kalamazoo River in the most recent sampling event. In effect, the MDCH employed a "worst-case" scenario that assumed exposure to this maximum level over several years. The results of this evaluation indicated that, even under this worst case scenario, it was unlikely that an older child would receive a dose of PCBs that exceeded the U.S. Environmental Protection Agency (U.S. EPA) reference dose. While it was theoretically possible that a younger child exhibiting pica behavior might receive an unsafe dose, it is unlikely that such a child would be continuously

exposed to the maximum level of PCBs in river sediments. The MDCH, therefore, concluded that *"there is no need to restrict access to the Kalamazoo River."*

An HHRA was completed in 2000 for the Kalamazoo River Superfund site by Camp Dresser & McKee under contract with the MDEQ. Soil exposures (i.e., dermal contact, incidental ingestion, and inhalation exposure routes) under both residential and recreational scenarios were evaluated, and protective soil criteria were presented in the HHRA. The levels of PCBs in the contaminated former impoundment areas do not exceed soil values protective of the recreational scenario. Impoundment area soils may pose a risk under the residential scenario; however, nearby residents are kept informed by the MDEQ and the U.S. EPA. In addition, fish advisory signs posted at regular intervals along the river inform recreational users that the Kalamazoo River is a Superfund site and provide information about safe fish consumption.

A full evaluation of the risks posed by dioxin contamination to recreational users of the Tittabawassee River cannot be conducted until additional site data are gathered during the remedial investigation process. However, the MDCH evaluated dioxin intakes from wild game, commercially purchased food, and soil exposure in an internal memo and Technical Support Document (TSD), dated August 18, 2004 (enclosed). Table 3 of the TSD provides dioxin intake levels for varying dioxin soil concentrations for a 15 kilogram child aged one to six years under a residential exposure scenario. A key assumption of this calculation is the soil ingestion rate in kilograms per year of 0.073 (200 mg/day x 365 days/year). The changing of this assumption to reflect an annual soil ingestion rate of 0.0045 kg/year (50 mg/day x 90 days/year) consistent with a recreational scenario results in the risk values shown in the Table 1, below:

Table 1.

Soil Concentration (ppt TEQ)	Soil Ingestion Rate (kg/year)	Intake in mg/kg/day	Cancer Slope Factor [1/(mg/kg/day)]	Cancer Risk	ATSDR MRL for Chronic Noncancer Hazard (mg/kg/day)	HQ

90	0.0045	3.7E-11	7.5E+04	2.4E-07	1.0E-09	0.18
300	0.0045	1.2E-10	7.5E+04	7.9E-07	1.0E-09	0.62
500	0.0045	2.1E-10	7.5E+04	2.6E-06	1.0E-09	1.03
1,000	0.0045	4.1E-10	7.5E+04	2.6E-06	1.0E-09	2.05
8,000	0.0045	3.3E-09	7.5E+04	2.1E-05	1.0E-09	16.44
24,000	0.0045	9.9E-09	7.5E+04	6.3E-05	1.0E-09	49.32

These calculations assume recreational soil exposure only for the cancer risk estimate. For noncancer risks, it is assumed that 20 percent of the ASTDR Minimum Risk Level (MRL) is reserved for recreational soil exposures. Stated otherwise, these calculations assume that all other exposures to dioxins (e.g., background diet, exposure to dioxin in soil at home, or exposure to dioxins in fish and wild game) will not exceed 80 percent of the MRL. This assumption may not prove accurate if the child lives on dioxin contaminated property and/or is eating fish from the river or wild game taken from the flood plain.

Soil concentrations may be much higher than 1,000 ppt on Dow's property and may be as high as 8,000 ppt to 24,000 ppt, based on soil concentrations found in Area 1 from Dow's Scoping Study. It is clear from this table that advisories for exposure to soil are appropriate without sampling and analysis from the property.

Should you have questions regarding this letter, please contact Ms. De Montgomery, Chief, Hazardous Waste Technical Support Unit, Hazardous Waste Section, WHMD, at 517-373-7973 or by e-mail at montgomd@michigan.gov, or you may contact me.

Sincerely,

/s/

George W. Bruchmann, Chief
Waste and Hazardous Materials
Division 517-373-9523

Mr. Ben Baker

Enclosure
cc/enc: Mr. David Gustafson, Dow
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