



November 2, 2018

Mr. Tom Kilian
Citizens for a Clean Wausau
133 E Thomas Street
Wausau, WI 54401

Dear Mr. Kilian:

At your request, I have reviewed the State of Wisconsin Department of Health Services (DHS) Letter Report written to the Honorable Patrick Peckham, City Council Alderman, District 1, Wausau, by Clara Jeong, Toxicologist, Bureau of Environmental and Occupational Health, Wisconsin Department of Health Services, dated August 20, 2018. This Letter Report addresses the Wausau Riverside Park dioxin contamination and includes an evaluation and risk assessment of soil sample results collected from the Thomas Street neighborhood that were analyzed for dioxin.¹

Before addressing my concerns about this report, I thought it would be helpful to include some background on my experience in assessing the public health risks posed by dioxin.

I have participated in the U.S. Environmental Protection Agency's (EPA) activities on dioxin since 1994 and have reviewed and submitted comments on the draft health assessment documents multiple times and on drafts reviewed by the EPA's Science Advisory Board (SAB) and a committee of the National Academy of Sciences. I have substantially contributed to two significant reports on dioxin, *Dying from Dioxin*, published in 1995, and *The American People's Report on Dioxin*, published in 1999, and have presented papers on dioxin at scientific conferences. In my capacity as Science Director at CHEJ (since 1983), I have worked with hundreds of grassroots communities where exposure to dioxin was a major concern. These communities include Superfund sites in Jacksonville and Pensacola, FL, Lock Haven, PA, Columbia, MS, Jacksonville, AR, Times Beach, MO and Love Canal in Niagara Falls, NY. I have devoted a good portion of my career to evaluating the public health risks resulting from exposure to dioxin.

The Department of Health Services concluded in this letter report that there is "no apparent health hazard for people using the Riverside park and residents in living in the Thomas Street

¹ Dioxin doesn't refer to a single chemical but rather to a group of 75 compounds that share similar chemical structure and toxicity. In this letter report, the class of dioxin and dioxin-like compounds are referred to simple as dioxin.

neighborhood due to dioxin soil contamination.” I could not disagree more with this conclusion. My reasons are described below.

- 1) First, and most importantly, the **risk calculations and analysis conducted by the WI DHS failed to consider the cancer risk posed by exposure to dioxins.** The WI DHS risk analysis was based only on the non-cancer risks posed by exposure to dioxin. The risk of developing cancer is the most dominant and important risk posed by exposure to dioxin. No risk assessment of dioxin exposure would be complete without it. It is completely mystifying to me how the state DHS could assess and evaluate the public health risks posed by dioxin levels in soil without including the potential cancer risk.

This is important because dioxin is generally considered the most potent man-made carcinogen ever tested. Dioxin has been classified as a human carcinogen by the World Health Organization’s (WHO) International Agency for Research on Cancer (the most prestigious cancer research and risk assessment agency in the world) and the U.S. Department of Health and Human Services’ National Toxicology Program. The human epidemiological evidence provides consistent findings of increased risk for all cancers combined and lung cancer in occupational studies as well as evidence of tissue specific increases in cancer. Increased mortality from soft-tissue sarcomas and all cancers among workers exposed to dioxin has also been reported.²

The WI DHS Letter Report does acknowledge that the WHO has determined that TCDD, the most toxic form of the dioxin group, is a human carcinogen (See Page 4). However, the risk assessment fails to include any cancer risk analysis. In fact, there is no discussion at all about the potential cancer risks posed by dioxin in this letter report. Even the section on limitations of the risk assessment fails to mention anything about the failure to consider the potential cancer risk (See Page 5). On this basis alone, the risk analysis conducted by the WI DHS is inadequate and incomplete.

The USEPA uses the cancer risk posed by exposure to dioxin as the basis for setting its Regional Screening Level (RSL) for all cancer causing chemicals including dioxin. The RSL is a guidance value for evaluating contamination in soil. This approach is consistent with what most states use to generate soil cleanup guidance values or action levels. In a review of state soil cleanup levels for dioxin, EPA found that 23 states used cancer risk as the basis for establishing unrestricted residential cleanup values for dioxin in soil.³ Twelve of these states used a one-in-a-million cancer risk (1E-6) value as the target cleanup goal. These cleanup values ranged from a low of 4 parts per trillion (ppt) to a high of 19 ppt. The mean value was 7.18 ppt. Eight of these states used a one-in-

² <https://ntp.niehs.nih.gov/ntp/roc/content/profiles/tetrachlorodibenzodioxin.pdf>

³ <https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=217926>

100,000 cancer risk value as the target cleanup goal, with levels ranging from 20 ppt to 120 ppt. The mean was 61.1 ppt. A-one-in-a million cancer risk value is the generally accepted target cancer risk used for calculating the cancer risk posed by toxic chemicals. Twenty-four states did not have a cleanup level for dioxin in soil.

- 2) The WI DHS used the second highest concentration of dioxin in soil among the samples considered in its non-cancer risk calculations and assessment of dioxin in soil. No explanation is given for why this choice was made. The report only states that the “dioxin level from the culvert outfall was used for the calculation” (See Page 5). When calculating the non-cancer risk for ingesting dioxin contaminated soil in the Thomas and River Streets neighborhood, the highest level of dioxin detected in the residential areas was used (See Page 5). For consistency, the highest level of dioxin detected should have been used in both calculations. That was not done. It is standard risk assessment practice to use a worse-case scenario in order to compensate for the many uncertainties inherent in the risk assessment calculations.
- 3) There has been limited soil sampling for dioxin in the neighborhood. There have been four separate sampling efforts in this neighborhood. One of these efforts was paid for by the local community group Citizens for an Environmentally Safe Thomas Street Neighborhood (CESTN) and one was paid for by the city of Wausau. The results of all four sampling groups are summarized in the Table 1 of the WI DHS Letter Report (See Page 8).

This table shows that the concentration of dioxin found in soil in a number of samples collected from the Thomas Street neighborhood exceeds the USEPA Regional Screening Level (RSL) for dioxin in soil. Several of these samples also exceed the cleanup level set by the USEPA at the Escambia Superfund site in Pensacola, Florida.⁴ Two of the three 2006 samples had the highest concentrations found among all sampling groups, with the highest level being 105.65 ppt. The two highest concentrations exceeded the EPA RSL of 4.8 ppt and Escambia Superfund cleanup goal of 30 ppt. Three of the nine 2008 samples exceeded the EPA RSL and the cleanup goal at the Florida Superfund site. The highest level found in 2008 was 46.10 ppt. None of the 2018 sample results exceeded the Superfund cleanup level in Florida, though the highest level found, 15.44 ppt, did exceed the EPA regional screening level for dioxin in soil. Overall, five out of sixteen, or 31%, of the samples exceed the dioxin concentrations used as a cleanup level for the Escambia Superfund Site in Pensacola, Florida. Superfund sites represent some of the nation’s most contaminated land, and no residential area should be built on soil containing more dioxin than a federal Superfund site, especially for such a toxic

⁴ <https://semspub.epa.gov/work/HQ/188801.pdf>

chemical as dioxin. The 2017 samples collected for the City of Wausau were taken from six locations in the Thomas Street construction limits (see Letter Report, Page 3). Unfortunately, these samples were analyzed using nonconventional analytical procedures and cannot be compared to the results of the other sample groups.⁵

The point here is that the dioxin levels found in several samples taken in the neighborhood exceed USEPA screening levels for dioxin in soil and levels used to clean up a federal Superfund sites. While different scientists can disagree about what the numbers mean, there can be no doubt that the concentrations of dioxin found in the soil raise a red flag of concern and require further action and evaluation. The reason screen levels are set is to identify levels of concern that require follow-up. In this case, the WI DHS should conduct additional testing in the Thomas Street neighborhood that will accurately define the extent of dioxin contamination in this area. This additional testing should include surface soil samples which represent a direct contact route of exposure. None of the current soil samples were collected from surface soil. All of the current samples are subsurface soil samples. Once sufficient tests have been conducted, the risks posed to the residents who live in this community can be evaluated. It is inappropriate to evaluate the public health risks using the limited sampling data that is currently available and to evaluate only the non-cancer risks when the primary toxic effect posed by exposure to dioxin is the risk of developing cancer.

There are additional weaknesses and limitations with the non-cancer risk assessment calculations and exposure estimates made by the WI DHS. These limitations result in an underestimate of the non-cancer risks posed by exposure to dioxin in soil. These weaknesses include not calculating a full lifetime of exposure (70 years vs. 30 years), assuming a maximum hand-to-mouth soil ingestion rate of 200 milligrams per day (mg/day);⁶ the failure to include inhalation as a route of exposure; and inconsistently using worst case assumptions in calculating the non-cancer risk estimates resulting in an underestimate of the potential non-cancer risk posed by exposure to dioxin in soil. While these limitations led to an underestimate of the non-cancers risks posed by exposure to dioxin in soil, they pale in comparison to the failure to consider the cancer risk posed by exposure to dioxin.

In summary and conclusion, the risk calculations and analysis conducted by the WI DHS is inadequate and incomplete because it failed to consider the cancer risk posed by exposure to dioxin in soil. The WI DHS inconsistently applied worst case scenario assumptions in calculating

⁵ The current standard for analyzing samples for dioxin is to measure the concentration of 17 dioxin-like compounds to yield a total Toxic Equivalent (or TEQ) value. This procedure was not used by the contractor hired by the city.

⁶ There is a great deal of literature on why the 200 mg/day estimate is too low that is described in CHEJ's comments on the EPA's *Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites*.

non-cancer risk estimates for dioxin in soil. The best example of this is the use of the second highest concentration of dioxin in soil among the samples considered instead of the highest concentration. No explanation for why they chose to do this even though the WI DHS was calculating a worst case analysis. The levels of dioxin found in 5 of 16 (31%) samples taken from the neighborhood soil exceed USEPA screening levels for dioxin in soil and levels used to clean up a federal Superfund site. There is insufficient sampling data for dioxin in soil in the Thomas neighborhood to properly determine the extent of dioxin contamination in the neighborhood. WI DHS should conduct additional testing in the Thomas Street neighborhood in order to define the extent of dioxin contamination in this area. Once sufficient tests have been conducted, the risks posed to the residents who live in this community can be evaluated. It is inappropriate to evaluate the public health risks using the limited sampling data that is currently available and to evaluate only the non-cancer risks when the primary toxic effect posed by exposure to dioxin is the risk of developing cancer.

I hope these comments are helpful. Feel free to contact me if you have any questions or need any additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen Lester", with a stylized flourish at the end.

Stephen Lester
Science Director