



Matthew Thompson
Department of Natural Resources
1300 W Clairemont Avenue
Eau Claire, WI 54701-6127

October 4, 2021

RE: DIOXIN AND FURAN SOIL CLEANUP STANDARDS, RIVERSIDE PARK (02-37-584785 RIVERSIDE RAIL CORRIDOR)

Dear Mr. Thompson,

We appreciate the department's continued inclusion of community input related to Environmental Repair Program sites on Wausau's southwest side, especially since these sites are surrounded by formally identified Environmental Justice populations. Thank you for providing Citizens for a Clean Wausau (CCW) with this opportunity to submit our comments and concerns regarding the method in which the City of Wausau and REI may approach soil cleanup standards for future remedial actions of dioxin and furan contamination in Riverside Park.

On page 25 of the Riverside Rail Corridor Site Investigation Report (SIR) dated September 15, 2021, the City and REI indicate an intent to diverge from the standard residual contaminant levels (RCLs) for specific congeners of dioxins and furans – RCLs that are in accordance with Chapter NR 720 Administrative Code (Wisconsin Soil Cleanup Standards) – and instead use Toxic Equivalencies (TEQs) compared to “potential standards” to guide the definition of the area of remediation:

“Based on these results, REI recommends remedial actions be taken to address unsaturated soil contamination exceeding the WAC Chapter NR720 direct contact RCLs. Prior to the development of a Remedial Action Options Report, the WDNR will need to determine what standards the TEQ values will be compared as this will significantly affect the area of remediation. Due to the variability of the potential standards to compare the calculated TEQ values, REI recommends the Site Investigation Report be submitted to the WDNR as part of a Technical Assistance Request with the required WDNR fee (\$1,050.00).” [Emphasis Added]

We find the suggestion in the SIR that TEQs compared to certain standards will be used to guide the definition of the area of remediation to be potentially concerning, and also inappropriate in relation to Wisconsin's regulatory scheme, unless – and only in the case that – these total 2,3,7,8-TCDD equivalent results are compared to the state's standard of 4.82 ng/kg for the 2,3,7,8-TCDD Non-Industrial Direct-Contact Level.

Per the attached Chuck Warzecha memo, it is our understanding that, as a “practical matter,” individual groundwater standards are not developed for each congener of dioxin or furan. Instead, relative potency factors (Toxicity Equivalency Factors or TEFs), are applied to the concentration of each congener to determine the equivalent concentration of 2,3,7,8-TCDD for comparison to standards. However, this is not the case for soil standards in Wisconsin, and NR 720 direct contact RCLs do exist for



the concentration of individual specific congeners or compounds of dioxin or furan (e.g., 1,2,3,7,8-PeCDD, 1,2,3,7,8,9-HpCDD, 2,3,4,7,8-PeCDF, etc.).

Therefore, apparently, a state regulatory *soil* exceedance is not most commonly triggered by a single number which expresses the toxicity of a *mixture* of dioxins and dioxin-like compounds (the TEQ) – instead a regulatory soil exceedance in Wisconsin is most commonly triggered by the concentration of a specific *individual* dioxin or dioxin-like compound.

This would appear evident in both the numerical soil standards in the [DNR's RR spreadsheet of residual contaminant levels \(RCLs\)](#) that are associated with specific individual CAS Numbers (even though some of them historically have included "totals," such as "Total-HxCDD") and, importantly, in Table 4 on page 21 of the Responsible Party's SIR. The table is titled "Table 4: WAC Chapter NR720 Non-Industrial Direct Compound RCL exceedances by compound" in which it provides an "Exceedance Count" in Riverside Park for each specific dioxin or furan compound.

In short, per this table and in other instances, even the Responsible Party demonstrates in writing that it acknowledges what the appropriate numerical standards should be in Wisconsin "to address unsaturated soil contamination exceeding the WAC Chapter NR720 direct contact RCLs."

We are very concerned that the City's and REI's expressed intent to use soil cleanup values that deviate from established RCLs may result in a less stringent and less sizeable cleanup in a neighborhood park [bordering residential backyards](#) and [formally identified Environmental Justice populations](#). We also believe that this approach – unless the TEQs are simply compared to the 2,3,7,8-TCDD Non-Industrial Direct-Contact Level – is incongruent with Wisconsin's regulatory standards.

In this vein, we respectfully request that the department recognize and enforce its own NR 720 direct contact RCLs for dioxins and furans in this circumstance by, in part, requiring that these RCLs are used to define the area of remediation on the site, not a TEQ scheme compared to any non-state standards to which the SIR references. Alternatively, we believe that TEQs compared to or against Wisconsin's 2,3,7,8-TCDD Non-Industrial DC RCL (4.82 ng/kg) to define the area of remediation would be just as protective, and consistent with the state's regulatory scheme.

TEQs and Past Wisconsin Regulatory Opinions on Dioxins and "Equivalency"

The TEQ process is a method that was established by the US Environmental Protection Agency (EPA) to relate all the dioxin/furan congeners to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), widely considered to be the most toxic congener. The cumulative TEQ value of the sample can then be used for toxicity assessment purposes.

Per Oxford Languages, the definition of "equivalence" is "the condition of being equal or equivalent in value, worth, function, etc."

The 2,3,7,8-TCDD Non-Industrial Direct-Contact Level is 4.82 ng/kg. Therefore, in Riverside Park, total 2,3,7,8-TCDD equivalent sample results (based on TEFs and a resulting cumulative TEQ) which exceed the 4.82 ng/kg standard would be considered a regulatory exceedance if a TEQ or "equivalency"



approach for dioxins and furans was to be logically and legitimately applied to NR 720 Direct Contact RCLs.

Our above interpretation of the relationship between TEQ and Wisconsin's regulatory approach to dioxins and furans echoes, and is supported by, the following attached communications about total 2,3,7,8-TCDD equivalent results or a "total dioxin equivalency method" as they relate to groundwater standards:

1. The December 21, 2000 Memorandum/Correspondence from Chuck Warzecha to Wendy Anderson – DNR, Eau Claire, Subject: Groundwater Dioxin Results – Weissenberger Tie and Lumber, Marathon, WI
2. Email from William Phelps to Lisa Gutknecht – DNR, June 18, 2003, Subject: Dioxin Groundwater Standard

In the 2003 email from Mr. Phelps to Ms. Gutknecht, for example, Mr. Phelps states, "I will discuss with DHFS possible language we might include in NR 140 to clarify that our dioxin groundwater standard applies to both 2,3,7,8 TCDD and to a sample 2,3,7,8 TCDD equivalent concentration."

Additionally, is our understanding that it is customary that in cases in which a value representing a total of a mixture is used by a Responsible Party to calculate an RCL, and it is proposed to use that RCL for the whole mixture, **then the most toxic individual component of that mixture would be used to calculate the RCL** – and that this approach would be acceptable under NR 720. This understanding comes from an internal DNR email sent from Aristeo Pelayo to John Morris – DNR with the subject "RE: TEFs for Total Isomer Groups." This email is attached with emphasis/highlight added.

In the email, Mr. Pelayo also points out that the neighborhood and park dioxin risk that was calculated should "be considered an underestimate," as absent from the data submitted were dioxin-like PCBs (those with TEFs). This statement further supports that it would be prudent to use the most conservative, protective values possible if a TEQ scheme is used to define a future area of remediation in the park.

In conclusion, in the SIR for Riverside Park, when discussing TEQs, the City and REI expressed an intent to use cumulative 2,3,7,8-TCDD equivalent concentrations from *soil* sample results to define the area of future remediation. Based on the following...

- 1) by definition – what TEQs are; and
- 2) the 2,3,7,8-TCDD Non-Industrial Direct-Contact Level of 4.82 ng/kg; and
- 3) the department's past interpretation on multiple occasions that the total 2,3,7,8-TCDD equivalent concentration standard would be the same as the individual 2,3,7,8-TCDD standard in such a comparison scheme (as it relates to groundwater); and



4) the department's protocol of using the most toxic individual component of a mixture to calculate an RCL for the whole mixture

...we believe that the City and REI should be defining an area of remediation in Riverside Park which encompasses all soil sample results that exceed a dioxin TEQ value of 4.82 ng/kg if a TEQ scheme will be used to perform such a definition.

Thank you very much for your and the department's consideration.

Sincerely Submitted on Behalf of Citizens for a Clean Wausau,

Terry Kilian
Randy Radtke
Co-Spokespersons


CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

*Division of Public Health
Bureau of Environmental Health
Health Hazard Evaluation Section
(608)-267-3732*

DATE: December 21, 2000

TO: Wendy Anderson – DNR, Eau Claire

FROM: Chuck Warzech 

SUBJECT: Groundwater Dioxin Results – Weissenberger Tie and Lumber, Marathon, WI

You had asked if the dioxin results for groundwater at the Weissenberger Tie and Lumber site would pose a drinking water health risk. The monitoring well results that you provided indicate that total dioxin in groundwater is above levels protective of public health. Levels in drinking water are considered safe when the 2,3,7,8 tetrachlorodibenzo-p-dioxin (2,3,7,8 TCDD) equivalent concentration for all congeners is below the groundwater Enforcement Standard for 2,3,7,8 TCDD. **Groundwater at this site should not be used as a future source of drinking water.**

The groundwater standard for dioxin is specific to 2,3,7,8 TCDD. Although several individual congeners of dioxin are present, the 2,3,7,8 TCDD congener is not a significant part of the contamination for this property. The various forms of dioxin are believed to cause a similar toxic effect, though with different levels of potency based on the structure and number of chlorine atoms of each congener. As a practical matter individual groundwater standards are not developed for each congener of dioxin. Instead relative potency factors (often called Toxicity Equivalency Factors or TEFs) are applied to the concentration of each congener to determine the equivalent concentration of 2,3,7,8 TCDD for comparison to standards or other health protective thresholds.¹ This method is also referenced in the support documentation for the groundwater standard provided by our agency.²

The enforcement standard for 2,3,7,8 TCDD is 30 pg/L. Total 2,3,7,8 TCDD equivalent results exceed that standard in recent results from several monitoring wells. The highest 2,3,7,8 TCDD equivalent concentration (5,479 pg/L) is nearly 200 times higher than this standard. Groundwater with dioxin concentrations in this range would not be an appropriate drinking water source. Results of repeat sampling at individual wells indicate that dioxin concentrations fluctuate dramatically over relatively short periods. For this reason more than one “clean” dioxin sample should be achieved before considering the dioxin issue addressed.

If you have additional questions or I can be of further assistance, please contact me at (608) 267-3732. Thank you.

Cc: Mark Werner/Lynda Knobeloch

¹ ATSDR. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins. December 1998.

² DHSS. Background Documentation for NR140 Groundwater Protection Standards – Dioxins. Cycle 6.

Steve Karklins – DNR, Madison
Larry Schaefer – DNR, Eau Claire

Thompson, Matthew A - DNR

From: Gutknecht, Lisa A
Sent: Wednesday, June 18, 2003 9:01 AM
To: Phelps, William L
Subject: RE: Dioxin Groundwater Standard

Thanks Bill.

Lisa Gutknecht
Remediation & Redevelopment Program
Wausau Service Center
5301 Rib Mountain Drive
Wausau WI 54401
Telephone #(715)359-6514
Fax #(715)355-5253
Lisa.Gutknecht@dnr.state.wi.us

-----Original Message-----

From: Phelps, William L
Sent: Wednesday, June 18, 2003 8:59 AM
To: Gutknecht, Lisa A
Subject: Dioxin Groundwater Standard

Lisa - follow up to our conversation last week on the dioxin groundwater standard. I spoke some more with Chuck Warzecha about DHFS's recommendation of applying a sample total 2,3,7,8 TCDD equivalent concentration ("total dioxin equivalency method") to our NR 140 groundwater standard. Chuck pointed out that other tables of dioxin TEF values have been developed since our original (cycle 3 & cycle 6) dioxin groundwater standard scientific support documentation was written. Our dioxin scientific support documents reference a 1986 EPA document titled *Procedures for estimating risks associated with exposure to mixtures of chlorinated dibenzo-p-dioxins and dibenzofurans*, and include dioxin TEFs from that source.

Chuck noted that the SNE site data showed total 2,3,7,8-TCDD equivalence concentrations above our .00003 ug/L groundwater dioxin ES and his recommendation was that the company might want to consider recalculating their TCDD equivalence concentrations using the other sets of TEF values available to see if their equivalence concentration numbers might be reduced.

I sent you:

- Copies of our cycle 3 and 6 scientific support documentation for dioxin groundwater standards
- some information from a 9/18/2000 draft EPA document that includes 3 sets of dioxin TEF values
- copy of a memo that Chuck sent to Wendy Anderson re: dioxins in gw at the Weissberger Tie & Lumber site in Marathon

Let me know if you'd like me to do any more follow up on this. I will discuss with DHFS possible language we might include in NR 140 to clarify that our dioxin groundwater standard applies to both 2,3,7,8 TCDD and to a sample 2,3,7,8 TCDD equivalent concentration. Hopefully that will help in the future.

BP

From : Aristeo.Pelayo@wisconsin.gov
To : Morris, John M - DNR <John.Morris@wisconsin.gov>
Cc : Kent, Aaron T - DNR <Aaron.Kent@wisconsin.gov>; Fassbender, Judy L - DNR <Judy.Fassbender@wisconsin.gov>;
Bcc :
Subject : RE: TEFs for total isomer groups
Attachment(s) :  image001.gif  image002.gif  image003.gif  image004.gif  image005.gif  image006.gif

No. No TEFs for Totals.

Briefly, after a complete SI and it's determined that direct-contact is the only pathway of concern, totals can be ignore when all its isomers with TEFs have been identified and quantified.

What I was trying to explain earlier is why there are DC-RCLs for totals in the RCL spreadsheet. For example, Total-HxCDD has a CAS# 34465-46-8, and it is a mixture with CAS# 39227-28-6 (1,2,3,4,7,8-HxCDD) as a component. The RSL web-calculator has the same toxicity values for the component and the mixture.

In other words, the DC-RCL that applies to component CAS# 39227-28-6 (1,2,3,4,7,8-HxCDD) is the same RCL that gets calculated for the mixture CAS# 34465-46-8 (Total-HxCDD). Not entirely wrong in the sense that if an RP calculates an RCL (for the most-toxic individual component) and proposes to apply that RCL for the whole mixture, then that would be acceptable in NR 720. It is much like proposing an RCL of 1.6 ppm (Benzene's DC-RCL) for GRO – acceptable but overly protective because benzene only constitute typically <5% of gasoline.

What's still allowed in NR 720 is to use the individual DC-RCLs for isomers. So if we already have all the DC-RCLs for dioxin isomers with TEFs, then totals is redundant data relative to human health risk calculation.

An aside: Absent in the data submitted are dioxin-like PCBs (those with TEFs). So whatever dioxin risk was calculated from the submittal should still be considered an underestimate.

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Resty M. Pelayo

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