

Mackil, Molly J. (DNREC)

From: DeFriece John R. (DNREC)
Sent: Monday, May 22, 2006 10:04 AM
To: 'CATHY.K.MALAST@saic.com'
Subject: RE: Dioxin question
Attachments: TEF_and_CAS.xls

Cathy,

Hi. I was out all last week, so I'm catching up on requests & e-mails. Under the heading of "Nothing is ever simple", our "dioxin" standard is actually for all "dioxin-like" congeners (including PCBs, dioxins, and furans) as Toxic Equivalents (TEQs) to 2,3,7,8-TCDD.

$$\text{TEQ} = \sum \{(\text{Sample Concentration of Congener}_i) \times (\text{TEF}_i)\}$$

"TEF" is the "Toxicity Equivalence Factor" (see table below). There are over 400 congeners for PCBs, Dioxins, and Furans. Only 29 have TEFs > 0. To make life a little easier, I have attached a spreadsheet with the TEFs and CAS numbers for the 29 congeners.

If the discharge is to the De. River watershed and only PCBs are in question, then the requirements under the Delaware River Basin Commission's (DRBC) PCB TMDL for Zones 1-5 of the De. River apply. The .url attachments are just links to DRBC requirements. The gist is to prepare a "Pollutant Minimization Plan" to trackdown PCB sources and implement BMPs to reduce PCB discharges. I think OxyChem is the only permittee you're working on that would be affected by these requirements. I am not sure what will happen (or how) with them, since they have proposed to close the site.

Zone 6 of the De. River is still in the preliminary monitoring stage for a DRBC PCB TMDL. I think that neither Allen Family Foods nor Perdue have been flagged for congener monitoring:

"Point source discharges considered in monitoring for Zone 6 PCB TMDLs in Delaware"

1. Dover, City of McKee Run
2. Harrington STP
3. Kent County STP
4. Reichhold Chemicals

Please remind me which facility we are talking about, and I can be much more specific. Do they already have any congener monitoring results?

I've gone through these TEQ calculations for several DE. facilities. I can probably provide an example spreadsheet so you don't have to start from scratch for TEQ calculations.

Pls. feel free to call me at (302)739-9946 if you'd like to discuss this.

Thanks,

John

1. DeSWQS References

Delaware's Surface Water Quality Standards (DeSWQS) are available at <http://www.dnrec.state.de.us/DNREC2000/Divisions/Water/WaterQuality/WQStandard.pdf>.

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Chemical	Systemic Toxicants		Human Carcinogens	
	Fish Ingestion	Fish and Water Ingestion	Fish Ingestion	Fish and Water Ingestion
2,3,7,8-TCDD (Dioxin) (as TEQ) ¹		0.00003 (MCL)	5.1E-09	5.0 E-09

Footnote on Page 33 of 48 of the .pdf file:

1 Criteria is for the "total toxic equivalence (TEQ) to 2,3,7,8-TCDD". The toxic equivalence for a sample is the sum of the concentration for each congener multiplied by its associated Toxicity Equivalence Factor (TEF) listed in table below.

$$TEQ = \sum ((\text{Concentration of Congener in sample}) \times (TEF))$$

where the TEF is unitless and the concentration is in ug/l.

Congener	TEF value	Congener	TEF value
<i>Dibenzo-p-dioxins</i>		<i>Non-ortho PCBs</i>	
2,3,7,8-TCDD	1	PCB 77	0.0001
1,2,3,7,8-PnCDD	1	PCB 81	0.0001
1,2,3,4,7,8-HxCDD	0.1	PCB 126	0.1
1,2,3,6,7,8-HxCDD	0.1	PCB 169	0.01
1,2,3,7,8,9-HxCDD	0.1		
1,2,3,4,6,7,8-HpCDD	0.01	<i>Mono-ortho PCBs</i>	
OCDD	0.0001	PCB 105	0.0001
		PCB 114	0.0005
<i>Dibenzofurans</i>		PCB 118	0.0001
2,3,7,8-TCDF	0.1	PCB 123	0.0001
1,2,3,7,8-PnCDF	0.05	PCB 156	0.0005
2,3,4,7,8-PnCDF	0.5	PCB 157	0.0005
1,2,3,4,7,8-HxCDF	0.1	PCB 167	0.00001
1,2,3,6,7,8-HxCDF	0.1	PCB 189	0.0001
1,2,3,7,8,9-HxCDF	0.1		
2,3,4,6,7,8-HxCDF	0.1		
1,2,3,4,6,7,8-HpCDF	0.01		
1,2,3,4,7,8,9-HpCDF	0.01		
OCDF	0.0001		

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

From: CATHY.K.MALAST@saic.com [<mailto:CATHY.K.MALAST@saic.com>]
Sent: Friday, May 19, 2006 2:38 PM
To: DeFriece John R. (DNREC)
Subject: Dioxin question

Good afternoon John,

Long time no email. Quick question regarding 303(d) listing for dioxin: does "dioxin" refer to one compound, e.g., 2,3,7,8- TCDD, or a group of compounds, e.g., those analyzed by EPA Method 1613B?

Cathy

