From: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Sent: Wednesday, April 17, 2024 7:29 AM
To: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: RE: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

I've reached out to Kevin and David on this topic last Monday but have not received a response.

Any metals that have been updated using new science or increased protection or both should have an updated hardness equation. You can find these updated hardness equations in the technical support document or rule language footnotes.

We did not review dose-response slopes for each new studies incorporated into the criteria development and believe EPA's previous assessments on slopes are satisfactory. When updating datasets with new studies, the intercept needs updated to accurately predict the criteria from hardness. You can find examples of where EPA updated hardness-based criteria using newer science but did not update the slope, only the intercept. Not updating slope but updating the intercept is common. One example is to compare the 1987 zinc criteria to the 1995 zinc updates (see attachments). EPA used new science in 1995 but did not update the slope from 1987. You will find the slopes are identical but intercepts have changed between the two published criteria docs for zinc.

-Bryson

From: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Sent: Tuesday, April 16, 2024 2:45 PM
To: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: Re: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Bryson

I really appreciate your quick response. Is there a timeline for the publication of the correction?

I was also trying to calculate cadmium criteria based on hardness and looks like the intercept for the CMC and CCC formula is different than the USEPA value (2016 study), although the slope is same. Is there a more recent study that Ecology used for these equations?

Sincerely,
Anurag

From: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Sent: Tuesday, April 16, 2024 2:20 PM
To: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Cc: Grant Walter <GWalter@Geosyntec.com>; Koberstein, Marla (ECY) <mkob461@ECY.WA.GOV>
Subject: RE: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Hi Anurag,
I had to request these directly from David Deforest and Kevin Brix because there was a misprint in their Brix et al. 2021 article. They are planning to print a correction this year and publish a short communication that demonstrates some of the work shown in the technical support document for this rulemaking. There was a lot of collaboration between myself and these two authors on the proposed copper criteria. If it is helpful, I can forward you the email where I communicated my concern with the omission and David's response which included an explanation for the error and the pooled model equations with the intercept.

-Bryson

From: Anurag Mishra <Anurag.Mishra@Geosyntec.com>
Sent: Tuesday, April 16, 2024 2:03 PM
To: Finch, Bryson (ECY) <bfin461@ECY.WA.GOV>
Cc: Grant Walter <GWalter@Geosyntec.com>
Subject: Question on Cu MLR Model for the Aquatic Life Toxics Criteria

Hi Bryson

I am looking at the Cu MLR model for the ALTC, and I see that the model used by Ecology includes an intercept (-6.738 in equation 1, and -1.183 in equation 2). However, I could not find how these numbers were arrived at based on the paper by Brix et al., 2021. I would appreciate if you could point me to the specific part in the TSD that I might be missing.

Sincerely,
Anurag

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