

HUMAN HEALTH CRITERIA WORK GROUP MEETING

MEETING MINUTES

April 15, 2021

I. CALL TO ORDER

Laura Cooper, Division of Water and Management Assistant Director and Work Group Chair called the meeting to order at 10:04 AM on April 15, 2021 via “Zoom” call. The meeting was moderated by Laura Cooper.

II. ROLL CALL

Members present at meeting: Laura Cooper, Scott Mandirola, Kathy Emery, Dr. Ross Brittain, Chris Smith, Kerry Bird, Angie Rosser, Autumn Crowe, Dr. Larry Harris, Jennie Henthorn, Rebecca McPhail and Ed Maguire

Chris Smith recorded the meeting minutes.

III. OLD BUSINESS

Laura Cooper briefly discussed the draft of the letter that will be submitted to the Cabinet Secretary at the conclusion of the Human Health Criteria Work Group that she previously emailed to the members of the group asking the members to review the letter and provide suggestions on revisions.

Ms. Cooper discussed the overall goals of the work group and discussed how the remaining time would be spent. She also discussed the timeline for the future rule revisions stating that the Environmental Protection Advisory Council will meet June 3rd, by June 7th DEP will put the rule out for the 45 day comment period, by July 22 DEP will host a public hearing and by July 30th DEP will have an agency approved rule and response to comments to the WV Secretary of State.

Laura Cooper asked if there were any comments before proceeding. No comments were heard.

IV. NEW BUSINESS

Laura Cooper shared a spreadsheet that was used in the previous HHC Work Group meeting illustrating the toxicity factors and Bioaccumulation Factors (BAFs) used by EPA in their 2015 Human Health Criteria revisions. Ms. Cooper stated that Chris Smith and Dr. Ross Brittain

had done a search for additional BAFs that the work group could consider and that they would discuss what they had done.

Chris Smith began by sharing a spreadsheet of scientific article titles that he said was provided by Jennie Henthorn some time ago for consideration. Mr. Smith stated that he had read the abstracts for these articles when he had received the list and that he did not think that any of them warranted further consideration. He stated that he did not make specific notes regarding each article however he recalled that some of the reasons he didn't feel that the articles would be useful were that, based on the article abstracts, some of them involved compounds that were not compounds the work group is dealing with, some did not appear to derive BAFs and that others involved species that would not be appropriate.

Mr. Smith then shared a spreadsheet illustrating that he and Dr. Ross Brittain divided the chemicals up and did a search of scientific articles on Google Scholar using the names of the compounds and the words bioaccumulation factor. Dr. Ross Brittain stated that he also included bioconcentration and Kow in his search. Mr. Smith stated that he had found an article by Bleeker that could potentially be useful for five of the compounds (Acenaphthene, Anthracene, Benzo (a) pyrene, Fluoranthene and Pyrene). He also stated that he found an article by Carr related to butyl benzyl phthalate however that it only contained a laboratory derived BCF for bluegill.

Dr. Ross Brittain stated that he found an article by Swackhammer and Hites related to Aldrin and Heptachlor however that this study did not report BAFs for these compounds and that we would only be able to make BAF estimates from the Y axis of a figure illustrated in the report.

Dr. Brittain stated that he found an article by Cullen and Connell that was relevant to DDT and Dieldrin however that this study was conducted in Australia and that DEP didn't purchase this article in part because one of Jennie's concerns was that BAFs needed to be calculated using fish that are relevant to West Virginia also stating that Dieldrin and DDT are not in common use.

Dr. Brittain then discussed the Bleeker study previously mentioned by Chris Smith stating that it contained BCF information related eight PAH compounds. Dr. Brittain explained that this paper was a review paper that included collective information from other studies and that it was not a research paper. Dr. Brittain compared the values contained in the Bleeker paper to those found in the Risk Assessment Information System (RAIS) database. Dr. Brittain pointed out that the Bleeker paper generally reported higher values based on percent lipid content than the RAIS database. Dr. Brittain mentioned that the BAF used by EPA for Benzo (a) pyrene was higher than the Bleeker and the RAIS value.

Angie Rosser inquired as to what RAIS is. Dr. Ross Brittain responded that it is the Risk Assessment Information System and described it as a storehouse of chemical specific data. He further stated that it contains information such as melting points, molecular weights, toxicity information and BAFs. He stated that it is used frequently in risk assessment.

Laura Cooper asked a question regarding the units of BCFs and BAFs and Dr. Brittain explained that both are expressed as liters per kilogram (l/g).

Angie Rosser asked if EPA considered RAIS (in their 2015 recommended criteria). Laura Cooper responded that EPA considered studies that were available at the time.

Dr. Ross Brittain stated that RAIS uses LogKow and that it models BAFs using the BCF/BAF model.

Laura Cooper stated that Dr. Larry Harris had just joined the meeting at that time. Ms. Cooper provided a brief recap of the information that had been discussed prior to his arrival.

Autumn Crowe inquired if DEP had been able to look at why the Benzo (a) compound BAFs were so different than the previous BCFs. Dr. Ross Brittain responded that he didn't see why this was the case. Dr. Brittain further stated that the bioavailability of the Benzo (a) compounds is highly dependent on organic carbon availability so when it starts going through sediment high in organic carbon that its bioaccumulation will increase and that this could be the reason for EPA's use of a BAF of 3,900 versus its previous use of a BCF of 30.

Laura Cooper further stated that the BAF value of 3,900 for Benzo (a) pyrene came from Arnot and Gobas 2006. Dr. Brittain further explained that this value was modeled whereas the value of 608 for this compound provided in the Bleeker paper was derived in a laboratory study.

Laura Cooper asked what year the Bleeker paper was published. Chris Smith looked up the year and stated that it was 2009. Autumn Crowe responded that it was based on older studies though. Dr. Brittain answered that it was.

Laura Cooper stated that Arnot and Gobas used BCFs to estimate BAFs and that most of the 28 compounds the group is currently considering only have a BCF for one trophic level. Ms. Cooper further stated that, by doing so, EPA did not account for biomagnification. Dr. Ross Brittain added that PAHs are generally lipophilic and that, in general, lipophilic compounds tend to biomagnify therefore not accounting for biomagnification at different trophic levels, they (EPA) were actually being more liberal with the standards.

Laura Cooper stated that the LogKows used by EPA came from Great Lakes area fish and part of what Chris and Ross looked for is data that may have come from other fish more closely related to fish found in WV adding that a lot of the studies that were found involved species in locations that would not be useful. Chris Smith stated that the majority of the articles in the list that he previously discussed provided by Jennie Henthorn were from other countries stating that Ms. Henthorn had previously expressed concern regarding EPA's use of data from Great Lakes fish since they are different than fish found in WV. Jennie Henthorn responded stating that most of the studies that are in EPA's database are fish from other countries so that should not be used as a basis for including or excluding. Ms. Henthorn further added that most of the data used by EPA to determine BAFs was not derived from U.S. fish. Chris Smith stated that Ms. Henthorn had previously stated that a concern of hers was that the fish used in EPA studies were from the Great Lakes and not representative of WV fish. Ms. Henthorn stated that Mr. Smith's statement was not correct and that her concern was in regard to LogKows where EPA used fish with the wrong lipid

content. She further stated that the fish in the Great Lakes were not lipid adjusted to be reflective. Ms. Henthorn stated that in the actual BAFs (not LogKows) EPA did lipid adjust however that still doesn't mean that it's representative of WV's lipid rate but at least EPA did turn the Asian fish data into something that would be more representative of lipid concentration in their judgement. Laura Cooper posed the question if anyone was aware of any studies that compared WV fish lipid content to other types of fish. Chris Smith responded that he wasn't aware of any.

Laura Cooper stated that work group needs to decide if it is accepting of the methods EPA used to derive BAFs (in the same way the group previously examined EPA's methodology for determination of toxicity values) or if there is newer and better information that is available that could be used to determine BAFs.

Regarding the Bleeker paper, Dr. Larry Harris expressed concern that this was starting to sound less like science and more like fudge factors stating that it seemed like a lot of guesswork. Dr. Ross Brittain expressed that the numbers reported in Bleeker paper were based on multiple studies which explained why there was such a range of values. Dr. Brittain further stated that models have to be used and that models are never perfect, but they are the best that we have because there is very little data available to use for these compounds.

Dr. Brittain pointed out that although there is one study for Benzo (a) anthracene, EPA did not use this study instead opting to use Benzo (a) pyrene for derivation of a BAF for that compound.

Laura Cooper shared a spreadsheet showing the methods EPA used to derive BAFs and the BAFs for each compound. Ms. Cooper pointed out cases where EPA used the BCF method applying the same value across all three trophic levels for many of the compounds. Ms. Cooper also pointed out cases where EPA used the LogKow method where there are different values for each of the three trophic levels.

Ms. Cooper stated that the work group needed to decide if this methodology met the criteria of the work group as being science-based and also needed to decide if there are any of the compounds for which the group should defer action, as was the case with some of the toxicity values.

Dr. Larry Harris expressed that the group needs to focus on the quality of the data as opposed to the age of the data. Dr. Harris further stated that we need to look at the best data. Laura Cooper stated that when these data got into the databases that were used to derive BAF values, they were heavily vetted and that Dr. Harris was correct that it doesn't matter what the date on the data was. Ms. Cooper further stated that we have looked for newer data, in case there was some, and we didn't find any new data on these specific 28 chemicals to inform BAFs.

Jennie Henthorn stated that the toxicity values were peer reviewed however the study databases used by EPA in the determination of BAFs were not that way and that those were individual scientists who published databases that did not go through a formal governmental review process further stating that those were databases that were compiled

by private groups and were published and there wasn't a peer review of those individual studies. Ms. Henthorn stated that EPA accepted the work of those scientists at face value so we don't know if those studies would have met what we could consider a peer review and that this was part of the issue we (she and her constituents) had had all along. Ms. Henthorn further stated that the frustration was that the manufacturers have said all along that this is where they thought the work needed to be done and that she didn't think a review on Google Scholar could be considered definitive in determining whether there are studies that can be used for this purpose. Ms. Henthorn further stated that the articles she had found often didn't have the word bioconcentration or bioaccumulation in the name, they had been more in terms of impacts on fish and that we would need to look at the study to determine if there were BCFs or BAFs that were available from that data. Ms. Henthorn stated that part of the issue was that it was limited based on how Chris and Ross searched for articles. Ms. Henthorn stated that Google Scholar was good but there were many other databases that we could search that would not just show up in a Google Scholar review. Ms. Henthorn stated that that she didn't want the work group to think that where we were presently was the definitive work product that needed to be done. Ms. Henthorn further stated that it needed time and it wasn't something that could be accomplished based on the scope of the call that day.

Laura Cooper asked Jennie Henthorn if she had found any studies for any of the chemicals that were more recent. Ms. Henthorn responded that she had and that they did report BAFs and BCFs but she hadn't been able to go through them to see if they were numbers we could use because that's a process and she thought that's what this group was going to do, go through them to determine if they are good numbers or bad numbers but it's not something that's quick.

Dr. Larry Harris stated that in his experience if data was published, it was peer reviewed by other scientists. Jennie Henthorn responded that that meant that it was good for the purpose for which it was intended and didn't mean that it was good for this regulatory purpose.

Jennie Henthorn stated that she didn't know if some of the fish in the studies would be comparable to fish in WV and in the case of BAFs one of the things that was not addressed was confounding factors and that they did not evaluate whether there were other compounds in the water that could have affected how things bioaccumulate and that there is a whole concept of co-biomagnification that we need to look at to determine whether the numbers are numbers that we can use or not. Ms. Henthorn further stated if we are using numbers that are not right, we are telling people that a compound isn't safe above a certain level, but we wouldn't actually know that.

Dr. Larry Harris stated another issue is could be who funded the research because the data could be biased.

Rebecca McPhail stated that one of the challenges they had was that there was obvious work that needed to be done and that it is labor-intensive and expensive and if groups like ours were to try to figure out how to get it done the question of validity will be raised every time.

Autumn Crowe asked if the BAFs that were used in the 24 adopted compounds were derived by the same methodology. Laura responded that they were. Angie Rosser stated that her struggle was that if the science was good for those 24 how would we rationalize diverting from that.

Jennie Henthorn stated that she (and her constituents) specifically said in their comments that they did not agree with the BAF numbers but that the overall criteria levels were acceptable (for those 24 compounds). Ms. Henthorn further stated that they knew that these standards would be achievable. Angie Rosser asked Jennie Henthorn what she meant by achievable. Ms. Henthorn responded that those criteria didn't change dramatically from the previous criteria. Rebecca McPhail stated that for the ones that were adopted the process for getting there may have been different, but the numbers came relatively close to agreement.

Angie Rosser posed the question of how DEP could be justified not following the science that had been previously supported. Laura Cooper asked if Scott Mandirola could respond to this question. Scott Mandirola responded that DEP would have to explain why we would take a different approach. Mr. Mandirola further stated that that if there's more recent, better science we could take that approach. Mr. Mandirola stated that WVRC had made it clear that they don't want anything going down and that's a policy issue. Mr. Mandirola continued saying that in some of the industry comments they were okay with the numbers but, in general, they weren't okay with some of the original science so that didn't mean they didn't support the 24 but in these cases they may not; that's something the DEP is going to have to come up with an approach to explain. Mr. Mandirola added that's not to say that we may not be able to find a path forward on some of these but it would be a challenge.

Angie Rosser stated that WVRC supports the EPA BAF methodology because it's the best we can do right now.

Laura Cooper asked Jennie Henthorn about the studies she found that calculated BAFs or BCFs. Ms. Henthorn responded that she had found a couple for phthalates and one extensive study for PAHs, Zhang. Dr. Ross Brittain asked Ms. Henthorn if she could share those and she said she could send the site. Laura Coper asked if that study calculated a BAF. Ms. Henthorn stated that it did for multiple water sources with multiple fish at multiple trophic levels.

Angie Rosser asked if Laura had a suggestion on the direction the work group could go moving forward. Ms. Cooper responded that we could use what EPA has come up with because it's the most recent data that we have however if the Zhang study calculated a BAF for the PAHs we will need to look into that.

Dr. Ross Brittain stated that he was reading the abstract for the Zhang study and it derived BSAFs (bio sediment accumulation factors) which is not a 1:1 correlation so that raised a flag that it would need to be looked into with more detail. Laura Cooper stated that she recalled that EPA didn't use BSAF for any of the compounds. Jennie Henthorn responded that the BSAF method is preferred over multiple methods, but the reason EPA didn't use it was because they didn't have any data for it.

Dr. Larry Harris stated that it seemed like it would be a little late in the game to start using the BAFs from China that were just mentioned when we had very little time left and that he sort of agreed with the idea that if the BAFs were good for the other 24 then they should be used for these compounds as well and if there was a great difference that he should always err on the side of protecting the public more.

Jennie Henthorn stated that if they had some ability to go back in the future and not face the battle about the numbers going higher, then they would be in a different position to accept numbers and know that they would be worked on in the future. Angie Rosser stated that the standards will always be looked at in the future via the triennial review process and although there might be a policy disagreement that that would be dealt with at the Legislature. Ms. Rosser further stated that it struck her odd how a policy decision her constituents has made would affect Ms. Henthorn's participation in the process. Jennie Henthorn responded that the point was that they have said for the last two years that we need to spend serious time and work doing these BAFs and that they had been consistent in that position. Ms. Henthorn further stated that the WVRC's policy position makes it difficult to present science retroactively and that if they let these go through, they would run the risk of policy winning out over science at the Legislature. Ms. Henthorn further stated that for a number of these compounds, the standards decrease dramatically and since that is the case we need to slow down and make sure that it is good science.

Angie Rosser stated that it has been six years and that there are recommended standards that are needed to adequately protect public health and the best science we have is telling us that.

Laura Cooper asked Jennie if there were any other studies she found that calculated a BAF or BSAF. Jennie Henthorn responded that she had found some on the phthalates and some on the pesticides but that she had not yet evaluated those.

Laura Cooper asked what we could agree to move forward with regarding BAFs.

Scott Mandirola asked Jennie if she would be okay with moving forward with some of the BAFs if DEP were to potentially memorialize the fact that every three years we go through triennial review and that if for particular ones of these compounds we were to find better science that we feel as if we can do an update. Mr. Mandirola further stated that in water quality standards, there is always the chance to do that but that we could potentially memorialize that in the rule. Mr. Mandirola stated that we can think about how to move forward. He then asked Angie Rosser if she wouldn't be opposed to us coming up with language stating that we aren't necessarily completely in agreement with the methodology used to come up with these BAFs and if additional data becomes available and these new studies show more up-to-date information the we would proceed with something like a site specific or state specific BAF as data becomes available. Mr. Mandirola stated that something like this may help to satisfy WVRC concerns. Angie Rosser stated that they would support frequent and regular reviews of the science.

Scott Mandirola stated that we could possibly put some language in the revision that we are moving forward with the standards but acknowledge in standards that as a group that we still have concerns with the BAFs and as additional information becomes available we want

to look at that. Mr. Mandirola further stated that we can always do this but if it makes people more comfortable that we memorialize it that may be somewhat of a compromise and asked if that made sense.

Angie Rosser stated her desire to see language also added that would address the compounds that we would be choosing not to move forward with at this time as well.

Rebecca McPhail stated that the only issue she had was that we have talked in great detail about the level of effort that will be required for this review so she wanted to be careful not to agree to something that there's not a path forward for how we will look at these and how we will develop better measures.

Scott Mandirola stated that it was clear that a lot of estimating was done by EPA in the BAFs and that they used the best of what they had. Mr. Mandirola further stated that in the water quality standards handbook there is a path forward for state specific and site-specific standards. Mr. Mandirola then asked Laura Cooper what she thought. Laura Cooper stated that memorializing an agreement like that in the rule would probably be beneficial to both groups especially if we work together on what that language would be and if it included the future consideration of the remaining of the 94 EPA chemical revisions and if it included that we were going to continue to look at newer science for the BAFs. Ms. Cooper further stated that continuation of this work might make sense in a work group like this one.

Dr. Larry Harris stated that the work group has done what we set out to do which was to understand the science behind what EPA has done and that he didn't know if he liked the term memorialize. He further stated that this was the best thing we can come up with at this time realizing that in the future better science could come out and that we'd have to revisit.

Laura Cooper reiterated that we would revisit in the future because we always do, triennially at the least and posed the question that if we did memorialize it in the rule would that make it easier to move forward at this point.

Jennie Henthorn asked if we could possibly to have some time to think about and talk things through. Laura Cooper said that made sense and that we should perhaps have another meeting before our next meeting to talk about this some more.

Dr. Larry Harris stated that he wondered if it would be useful to see a simplified set of data like if we accept EPA's method then this what we'd have compared to what we have now. Laura Cooper pointed out that as far as BAFs go, we have a simplified version of what EPA used in comparison to previous BCFs in the spreadsheet she had previously shared but that it didn't include the final criterion however we had already agreed on all of the other equation inputs.

Angie Rosser asked if we had some unresolved issues with toxicity values. Laura Cooper responded that there are eight of them several of which were cases where a more recent toxicity value was available from CalEPA and others were cases where EPA used a reference dose (RfD) in the calculation however CalEPA had defined a cancer slope factor (CSF). Angie Rosser asked if we had previously stated that we were going to follow up with CalEPA to see

if they had used any of their toxicity values in calculation of EPA approved criteria. Chris Smith responded that he had reached out to CalEPA. Dr. Ross Brittain explained that EPA had implemented standards for the state of California therefore the CalEPA toxicity values had not been used in their criteria. Chris Smith concurred and read the brief email response he received from California reiterating what Dr. Brittain had said.

Angie Rosser posed the question of where this left us with those eight compounds. Laura Cooper responded that we had not examined them yet and that EPA would have to evaluate them in order to determine if they would accept them. Dr. Ross Brittain pointed out that the same would be true of any BAFs we would propose to use that have not previously been accepted by EPA.

Laura Cooper asked if we should meet sooner than the work group's next monthly meeting. Autumn Crowe asked if we would have the draft language by then. Scott Mandirola replied that we would.

Dr. Ross Brittain asked Jennie Henthorn if she could share the articles that she previously mentioned. Laura Cooper responded that Ms. Henthorn would not be able to share the actual articles but that we could purchase them.

Angie Rosser reiterated that she wanted to see the eight previously mentioned compounds that were excluded due to questions regarding toxicity values addressed. Laura Cooper stated that she would send those questions to EPA.

V. ADJOURNMENT

Laura Cooper stated that the next work group meeting was scheduled for May 12th and asked if we should meet before that. It was agreed that the group would meet on April 28th at 1:00 PM. Ms. Cooper stated that she would work on a draft of the rule language previously discussed and asked the work group members to review the draft letter that she previously shared via email and to send her any suggested revisions that anyone may have.

The meeting was adjourned at 11:47 AM.