

HUMAN HEALTH CRITERIA WORK GROUP MEETING

MEETING MINUTES

March 24, 2021

I. CALL TO ORDER

Laura Cooper, Division of Water and Management Assistant Director and Work Group Chair called the meeting to order at 10:08 AM on March 24, 2021 via “Zoom” call. The call was moderated by Laura Cooper. Agendas were sent via email by Laura Cooper on March 23, 2021.

II. ROLL CALL

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

Chris Smith recorded the meeting minutes.

III. OLD BUSINESS

Laura Cooper began with a recapitulation of the topics discussed in the previous HHC Workgroup meeting held on February 24, 2021. Mrs. Cooper discussed the HHC Workgroup goals that were previously agreed upon including, to learn about water quality standards and how science is used in their determination and to reach consensus moving forward. Ms. Cooper reiterated that consensus in the group would be agreement on standards that everyone could live with.

Ms. Cooper also discussed flowcharts that were previously constructed by Dr. Brittain, Angie Rosser and Autumn Crowe and Jennie Henthorn for the purpose of determining appropriate toxicity values (Cancer Slope Factors (CSFs) and Reference Doses (RfDs) for the group of compounds that the group is working on. Ms. Cooper further stated that the group ran into some difficulties with the flow charts also citing an email from Autumn Crowe stating her concern that we were getting into the weeds. To help alleviate this issue, Ms. Cooper stated that she thought it would be more advantageous for the group to work from a new spreadsheet instead of the flowchart format.

IV. NEW BUSINESS

Laura Cooper stated that our next goal moving forward is to agree on a set of toxicity factors before we move on to a discussion of Bioaccumulation Factors (BAFs) and that we would move forward with our discussion using a spreadsheet instead of the previously discussed flow charts. Dr. Larry Harris expressed concern regarding the transition stating that he found flow charts more useful than spreadsheets. Ms. Cooper again stated the concern about getting into the weeds with the flow chart format and that we needed to move forward and decide if we agree on the decisions made by EPA in the calculation of their recommended HHC and the spreadsheet would be helpful for that purpose.

Chris Smith shared his computer screen showing the new spreadsheet and provided an overview of the information contained within it. Mr. Smith began by stating that columns B and C of the spreadsheet showed if toxicity values are provided in the Integrated Risk Information System (IRIS) database and what year the value was added (respectively). He then stated that column D of the spreadsheet illustrated what toxicity data source EPA used in the calculation of their 2015 recommended HHC. He stated that column E of the spreadsheet provided the numeric toxicity values contained in IRIS for each compound and that columns F and G provided toxicity values from Tier 2 and Tier 3 sources (respectively). Mr. Smith then explained that column H of the spreadsheet contained comments for the compounds for which Tier 3 toxicity values were available asking if the Tier 3 values are more appropriate for use in the HHC calculations than the values used by EPA in the 2015 recommended HHC calculations and that these were questions the group needed to consider. Mr. Smith stated that columns I and J of the spreadsheet showed which sources of data EPA used in the 2015 recommended HHC criteria calculations and those highlighted in yellow where the ones where the decision process previously discussed by the workgroup was in agreement with EPA's process. Mr. Smith stated that column K of the spreadsheet showed which method EPA used to derive their BAFs. He further stated that column L provided the Bioconcentration Factors (BCFs) used by EPA in their 2002 recommended HHC calculations and that column M of the spreadsheet provided the BAFs used by EPA in their 2015 recommended HHC calculations. Mr. Smith stated that there were small differences between BCFs and BAFs in some cases citing 1,2-dichlorobenzene as an example and large differences in some cases such as benzo (a) pyrene which has a difference of two orders of magnitude.

Laura Cooper recommended that the workgroup move forward by accepting the toxicity values for those compounds highlighted in columns I and J (where EPA's approach was consistent with the approach previously proposed by the workgroup).

Autumn Crowe posed the question of whether it would be appropriate for the workgroup to use California EPA (CalEPA) cancer slope factors (CSFs) for the compounds for which EPA used Reference Doses (RfDs) to calculate their recommended HHC. Laura Cooper responded that we would not be able to make the decision on our own whether the CalEPA CSFs would be more appropriate for use.

Autumn Crowe stated that we don't want to just ignore the eight chemicals (from the spreadsheet) that have issues that we don't understand and expressed that we need a process to address these chemicals including an assessment by a toxicologist. Laura Cooper responded that it would require a lot of work by an environmental toxicologist to address these concerns and that we are not going to have the time to do that in the next two months (the remainder of the HHC workgroup duration). Ms. Cooper stated that we need to move forward with the criteria for which we do not have questions at this point.

Autumn Crowe asked if the remaining compounds will be reviewed over the next year. Laura Cooper stated that when new toxicity data are added to the IRIS database, we could consider them. Ms. Cooper also stated that proposing use of toxicity values not previously accepted by EPA would result in an extensive review process by EPA.

Dr. Ross Brittain stated that CalEPA has defined CSFs for ethylbenzene and gamma-BHC and that although EPA considered them, EPA decided not to use them in the calculation of their 2015 recommended HHC opting to use RfDs that resulted in less stringent recommended HHC. Dr. Brittain stated that EPA provided no rationale for this decision and stated that we need to follow up with EPA to find out why they made that decision.

Laura Cooper reviewed the criteria that EPA uses when deciding whether to use IRIS toxicity values quoting an EPA document stating that EPA used IRIS values in their recommended HHC calculations when:

1. EPA's IRIS toxicological assessment was the only available source of a toxicity value.
2. EPA's IRIS toxicological assessment was the most current source of a toxicity value.
3. EPA's IRIS program was reassessing the chemical in question and had published the draft Toxicological Review for public review and comment, discussion at a public meeting, and subsequent expert peer review.
4. The toxicity value from a more current toxicological assessment from a source other than EPA IRIS was based on the same principal study and was numerically the same as an older EPA IRIS toxicity value.
5. A more current toxicological assessment from a source other than EPA IRIS was available, but it did not include the relevant toxicity value.
6. A more current toxicological assessment from a source other than EPA IRIS was available, but it did not introduce new science.

Ms. Cooper further stated that we aren't privy to the information EPA used to make the decisions they made. Ms. Cooper then asked if the group were in agreement on the compounds for which we didn't have outstanding questions.

Dr. Ross Brittain expressed his support for moving forward with accepting the toxicity values for those compounds.

Autumn Crowe stated that standards for five of the compounds would be weakened (in comparison with current WV HHC) and that she didn't have enough information for some compounds such as confidence levels of studies used to derive the toxicity values specifically

mentioning cyanide and chrysene. Scott Mandirola asked Autumn if she could provide him a list of the five compounds later. Autumn responded yes.

Laura Cooper asked Jennie Henthorn if she would be in agreement with compounds previously discussed. Jennie Henthorn replied yes.

Dr. Larry Harris stated that he trusted the assessment of the WVRC being against increasing criteria for carcinogens also stating that if EPA was okay with it that he would be as well.

Autumn Crowe stated that the five compounds for which standards would be decreased were: chrysene, benzo (k) fluoranthene, DDT, methyl bromide and cyanide. Ms. Crowe further stated that the WVRC would not be okay with the EPA-recommended criteria for these compounds because they would become less stringent.

Dr. Ross Brittain stated that he didn't know if RfDs or CSFs drove the calculations for these standards. Jennie Henthorn responded that all of these compounds were driven by CSFs (as opposed to RfDs).

In response to Ms. Crowe's previous comment, Ms. Henthorn further stated that the other PAH compounds (the ones based on benzo (a) pyrene (in addition to chrysene) would also become less stringent.

Laura Cooper asked Autumn Crowe if she would like her to add the remaining PAH compounds to the list the WVRC would not be alright with. Autumn Crowe responded yes.

Jennie Henthorn stated that it bothered her not to be moving forward with the most recent science.

Kerry Bird expressed similar sentiment questioning why we would not be moving forward with these.

Laura Cooper stated that we are seeking science-based criteria.

Autumn Crowe stated that the WVRC agrees with many of the EPA proposed criteria on a scientific basis but that they cannot support some of the proposed criteria on a policy level.

Dr. Ross Brittain stated that we can agree on the science and leave policy to every representative as they so choose.

Angie Rosser expressed that she would like a note to be added to the recommendations to be made by the HHC workgroup to DEP's Cabinet Secretary stating that the WVRC does not support revision of any existing standard to make it less stringent. Laura Cooper responded that she will be writing a report to DEP's Cabinet Secretary detailing what the HHC workgroup has done in which she will make a note to that effect.

Ms. Cooper asked Ms. Rosser if that would be acceptable and Ms. Rosser agreed. Ms.

Rosser further stated that she would be willing to help write specific language to use in the letter and also stated that they might stand aside on the consensus process.

Laura Cooper asked if there was agreement on the twenty-eight compounds so we could move on to talking about BAFs.

Angie Rosser asked if Laura was saying that we could go back to remaining eight compounds (those with remaining questions on the spreadsheet). Ms. Cooper responded that she didn't know if we would be able to do that on our own and expressed concern about getting stuck on those eight.

Autumn Crowe asked if EPA would have already approved CalEPA toxicity values if they used them in their HHC calculations. Laura Cooper stated that she didn't know if CalEPA has used any of their criteria in calculation of HHC. Ms. Cooper mentioned that Chris Smith had previously contacted other states to see where they were in the process of updating HHC and asked Mr. Smith if he remembered anything specific about California to which Mr. Smith replied that he didn't right off hand.

Angie Rosser asked Chris Smith to share the information he obtained from other states. Mr. Smith agreed to do so.

Autumn Crowe stated that she did not feel that we should be concerned about EPA approval adding that we won't know what EPA will approve until we make submissions. Jennie Henthorn expressed her sentiment that DEP was stating that more time is needed to address the remaining questions for the eight compounds (from the spreadsheet). Laura Cooper stated that DEP is interested in proposing standards that we know that EPA will approve.

Scott Mandirola stated that we need to contact CalEPA to see if they have used their toxicity values in any criteria that have been approved by EPA and further said that we should pursue the compounds that we have agreement on at this time.

Laura Cooper stated that if the group was okay proceeding with the toxicity factors for the 28 compounds. No objections were voiced.

Laura Cooper then proceeded with an overview of Bioaccumulation Factors (BAFs). Ms. Cooper shared her screen showing an excerpt from EPA's chemical-specific document for Anthracene. Ms. Cooper stated that BAFs are not intended to reflect fluctuations over short periods but instead are intended to represent lifetime exposures. Ms. Cooper explained EPA's process for derivation of BAFs for use in HHC calculations and the order of priority EPA uses when deriving BAFs. She stated that BAFs are derived from field measurements whereas Bioconcentration Factors (BCFs) are measured in a laboratory. Ms. Cooper further stated that if neither field BAFs nor lab BCFs are available that EPA uses log Kow values from peer-reviewed sources. Ms. Cooper then showed a flow chart from EPA's Technical Support

Document Vol. 2 illustrating how EPA decides which method to use to derive BAFs. The chart illustrated when each method may or may not be used which depends on the properties of the compound including its hydrophobicity and ability to be metabolized. Ms. Cooper used the compound Anthracene to show how EPA derived their BAF and compared how the BAF (610) differed from the BCF (30) EPA previously used in their 2002 recommended HHC. Ms. Cooper explained that EPA calculated the single BAF they derived as the geometric mean of the trophic level 2 and 3 BCF. Scott Mandirola questioned the difference in EPA's previous BCF and current BAF. Laura Cooper asked Jennie Henthorn if the BAF was based on more recent data. Jennie Henthorn responded that it may or may not involve more recent data, but the interpretation of the data is more recent. Ms. Henthorn further stated that the date seen on Arnot and Gobas is the date of the database itself and not the date of the studies used to derive the BAFs.

Scott Mandirola pointed out that part of the reason for the discrepancy between BCF and BAF values is that the BAF values not only take into account uptake of compounds from water but also uptake through the food chain.

Jennie Henthorn began a presentation about BAFs with a slide showing the breakdown of the dates of studies used by EPA for the determination of BAFs. Ms. Henthorn stated that EPA used 161 studies to determine BAFs for the compounds for which EPA recommended HHC in 2015 that WV already has standards for in 47CSR2. Ms. Henthorn reiterated that the dates of the studies themselves are older than the dates of the databases from which they were taken. Ms. Henthorn stated that only 12 of the studies used by EPA were based on information past the year 2000. She further stated that those 12 particular studies were used in cases where EPA could not use the log Kow method. Laura Cooper mentioned that the log Kow method could not be used in cases when a compound has a high metabolism rate. Jennie Henthorn also mentioned cyanide as an example when the log Kow method could not be used since ionization of cyanide is not negligible. She also stated that the log Kow method cannot be used for polyaromatic hydrocarbons (PAHs).

In reference to the slide being shown, Laura Cooper asked Jennie Henthorn what biomagnification is. Ms. Henthorn explained that that is what occurs when a contaminant becomes more concentrated in the food chain.

Laura Cooper stated that EPA prefers to use the BAF method to which Jennie Henthorn responded only if it meets EPA's standards. Ms. Henthorn further stated that if BAF studies are not verified EPA uses the log Kow method to derive BAFs.

Jennie Henthorn stated that EPA's order of preference of methods to derive BAFs is:

1. BAF method
2. BSAF method
3. BCF method
4. Log Kow method

Ms. Henthorn explained that the BCF method is a laboratory study in which the fish is exposed to a compound by contact with the water the organism is in whereas the BAF method is a field method that takes into account the other sources of exposure such as consumption of food containing the compound. Ms. Henthorn mentioned that the trophic level occupied by the fish is also used in the determination of BAFs. Ms. Henthorn stated that there have been a lot of BAF studies performed in other countries, for instance China, but not many in the United States. In reference to BAF studies that EPA used to derive BAFs, Ms. Henthorn stated that there are studies in which water samples were not collected along with the fish therefore the chemical concentration in the water had to be assumed. Ms. Henthorn also stated that a BAF cannot be calculated if the chemical concentration is below the method detection limit (MDL) of laboratory analytical equipment. Scott Mandirola added that if an the MDL value itself is used as the chemical concentration (in cases where the true concentration cannot be determined due to the inability of analytical instrumentation to detect concentrations down to that level) in order to calculate BAFs, it skews the data.

Dr. Ross Brittain stated that there is also the issue of the chemical's ability to partition into the sediment since part of the exposure of the fish to the compound occurs by ingestion of organisms in the sediment. Dr. Brittain further stated that the makeup of the sediment influences the amount of chemical that will be able to enter the food chain in this way. For this reason, Dr. Brittain stated that studies need to be performed with different types of sediment.

Jennie Henthorn stated that of the 36 compounds the HHC workgroup is currently considering, 4 of the BAFs derived by EPA were derived by the BAF method, 3 were derived by the BCF method, 16 were derived using alternative BCFs (this group includes mostly the phthalates and PAHs), and 13 were calculated using the log Kow method. Ms. Henthorn stated that the majority of the BAFs were derived using the least preferred methodology. Ms. Henthorn stated that factors used to derive BAFs include:

- weight of the organism
- mean water temperature
- overall food web biomagnification factor
- maximum trophic level dilution factor
- lipid content of the lowest trophic level (1)
- lipid content of trophic levels 2, 3 and 4
- fraction of freely dissolved chemical in water

Ms. Henthorn stated that a lot of the information EPA used was derived from the Great Lakes and that chemicals behave differently in lakes than they would in a flowing stream in WV. She also stated that WV fish are different than those found in the Great Lakes therefore they are not representative of the fish in our state. Ms. Henthorn said that EPA has expressed that states should calculate their own BAFs based on state-specific factors. Laura Cooper stated that when EPA used the log K_{ow} method that used Great Lakes fish that are not representative of WV river fish. Ms. Henthorn agreed.

Laura Cooper used Aldrin as an example of a compound for which BAFs were derived by EPA using the log K_{ow} method pointing out the large difference between the BCF of 4,670 and the BAFs of 18,000, 310,000 and 650,000 for that compound.

Jennie Henthorn showed a spreadsheet containing the compounds the workgroup is currently studying which compared the EPA-derived BCFs to BAFs. Ms. Henthorn explained that EPA derived the BAF for all three trophic levels for benzo(a) pyrene by using the geometric mean of data they had for trophic levels 2 and 3. Ms. Henthorn's spreadsheet also illustrated what the BAFs for each compound would be if derived by the different methods described by EPA and explained why certain methods could not be used for specific chemicals according to EPA protocol. Ms. Henthorn stated that Dieldrin has a verified trophic level 3 value of 39,000 however EPA used the Log Kow method to derive BAFs which contradicts their own methodology.

Laura Cooper stated that group will need to discuss how we feel about the BAFs EPA used.

Jennie Henthorn stated that we could adopt the EPA-recommended standards for some of the compounds like Dieldrin for now and then go back and revise them in the future. Mrs. Henthorn further stated that she struggled with the WVRC's argument that we should not adopt any standards if they become less stringent even if we know that the science is wrong.

Angie Rosser asked if Jennie Henthorn could offer an approach that WVRC could consider. Ms. Henthorn responded that she had considered some different approaches but there were several issues she encountered. One such issue was that it took her two hours to do a lipid evaluation just to get to a starting point in the evaluation of one study and that there are 30 studies that qualify for use with the PAH compounds alone.

Laura Cooper stated that EPA used the Arnot and Gobas database and did not look for newer data. Ms. Cooper further stated that the workgroup needs to examine the methods used by EPA for BAF calculation. Ms. Cooper stated that, in the next meeting, the workgroup will decide which BAFs to move forward with.

V. ADJOURNMENT

Laura Cooper proposed that the next HHC workgroup be scheduled for April 21, 2021. Angie Rosser pointed out that Autumn Crowe would be on vacation that day so Ms. Cooper changed the proposed date to April 14, 2021. No conflicts for this date were expressed by anyone.

The meeting ended at 12:07 PM

