SAB Drinking Water Committee

Review of the draft Fourth Contaminant Candidate List (CCL4)

April 29-30, 2015 Meeting

Additional Pre-Meeting Comments (4/28/2015)

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Charge Question 1: Please provide comment on whether or not the Draft CCL4 support documents are clear and transparent in presenting the approach used to list contaminants on the CLL4. If not, do you have any suggestions on how we could improve clarity and transparency of the support documents?

Developing and updating the CCL is an enormous undertaking by virtue of the sheer volume of potential contaminants to consider as well as substantial variability in available information. Thus, assembly of the CCL is an inherently complex process and challenging to characterize; it clearly requires tremendous effort on the part of the EPA. In part because of the nature of available information, the processes for listing chemical versus microbial contaminants are different. In general, the process for listing microbial contaminants is clearer than for chemical contaminants. But clarifying both processes is important not only so stakeholders can access relevant information but also because it is critical to improving and refining the CCL process over time. In this context, there are a number of components of the process that are unclear and/or not well documented. As a start, a detailed schematic representation of the process that provides more specifics than Exhibit 1 (FR, vol 80, no 23, February 4, 2015) would be a very useful starting point. Of note, this same suggestion was included in the DWC EAB review of the CCL3.

Examples of specific issues that need clarification.

1) Much of the CCL4 builds on work done for the CCL3 so understanding CCL3 is important to understanding CCL4. However, the support documents explicitly identified for this review did not provide comprehensive information about the CCL3 review. Those additional documents are available and their review was helpful to understanding the choices made that led up to CLL4 but how CCL4 was then developed was not transparent (see specific concerns below as, e.g., items #5 and #6).

2) The "universe" for CCL4 started with the final CCL3 list (minus those with regulatory determinations). The CCL3 universe definition was a substantial effort and it's reasonable to try to build on that, but it's unclear if there are mechanisms in place to determine what might be lost because of this abbreviated approach. What happens if something new is of potential interest? Does capturing that information depend entirely on nominations and/or later expert input? What happens to chemicals that stayed on the PCCL3 because of inadequate data and are therefore not in the CCL4 universe? Is there a mechanism to re-review the PCCL3 to see if new data are available that would result in including some PCCL3 chemicals in the CCL4 universe? It seems as if the re-review for new data was largely confined to the CCL1 or CCL2 or dependent on public nominations; it does not seem that there was any review the more inclusive PCCL3. The assumption seems to be that insufficient time has passed for there to be new data relevant to the PCCL3 contaminants but what is the basis for that assumption?

3) The process needs to balance identification of candidates for regulatory determination and candidates of concern but lacking sufficient information for regulatory determination. The CCL serves as a mechanism to support continued follow up and research for the latter contaminants. It seems as if this latter group may be under ascertained with the current approach? And
distinguishing these two groups of contaminants is not clear in their listing but would be helpful. Clarification about how to address these issues is needed.

4) Even in setting up the predecessor document, the draft CCL3, it is unclear if some important chemicals could have been missed because of the following uncertainties: (i) How were chemicals with non-CA toxicities and only qualitative/descriptive health data (e.g., no RfD) considered? E.g., it seems that much of the attribute scoring (especially for non-CA outcomes) depends on quantifiable toxicity indicators that are not available for many toxic chemicals. (ii) The implications of the latter are a likely predominant reliance on animal data for health effects information. This was evident in the contaminant information sheets (CIS) document included in this review. Important human health data is thereby overlooked. (iii) How was the timing of occurrence data considered? E.g., release or production data are time delimited (e.g., the CCL3 analyses used 2004 TRI or looked at the most recent year's data available from TSCA's production data). This means that contaminants that are no longer released but that have potential reservoirs in water could be missed (unless water measures are available) or that newer chemicals of interest could be missed. Given how rapidly some sectors are changing their chemical usage patterns (e.g., in pharmaceuticals or personal care products), this means it is likely difficult for the CCL process to stay up-to-date.

5) Although the general principles are explained, it is unclear what the specific screening criteria were and how were they implemented in order to reduce the "universe" of possible contaminants for CCL4 and create a Preliminary CCL4 (PCCL4)? As with the generation of PCCL3, presumably toxicity and occurrence information were considered but how this was actually done is not transparent.

6) Similarly, it is unclear what the more detailed review and classification criteria (scoring) used to develop a draft CCL4 from the PCCL4 were and how were they implemented? Presumably the same approach was used as was used to generate the draft CCL3 from PCCL3? If so, this involves scoring each contaminant based on 4 attributes (potency, severity, prevalence and magnitude), running models to generate an overall score based on these 4 attribute scores, considering potency/concentration ratios (where available), and considering data certainty (high, medium, low) to come up with the list. But it's a bit of a black box as to how these steps are implemented, the order in which they occur (it seems the process proceeds differently depending on data certainty), and how final decisions are made. The same concerns expressed above (comment #4) for generating the draft CCL3 would apply to generating the draft CCL4.

7) The contaminant information sheets (CISs) referenced for this review appear to be confined to contaminants included in the Draft CCL4 from nominations. What about the other contaminants?

8) It is unclear how (or if) the process might account for changes in water sources -- e.g., desalination, waste water re-use -- which may become more common over time.

9) Many of the same issues identified in the CCL3 DWC SAB report still apply. It's unclear if, or how, many of those previous issues have been addressed. Examples include: (i) it's unclear how experts were used in decision making; (ii) it is unclear how certainty of available information
was accounted for in decisions; (iii) cut offs for listing of pathogens from PCLL3 to CCL3 (relevant as the basis for CCL4) seem arbitrary; (iv) the CCL approach may need modification to better capture emerging contaminants of concern (e.g. pharmaceuticals and personal care products); and (v) the CCL definition of adverse health effects does not account for important secondary effects, such as antibiotic resistance, that have substantial human health consequences.

10) Some fundamental definitions would be helpful as it was unclear to this reviewer what are eligible, or not, for consideration in the CCL process?

- contaminants found in both drinking and source water (not recreational water)?
- contaminants in U.S. and non-U.S. water?
- contaminants with secondary standards (e.g., manganese)?
- how does the process work for contaminants that have both primary and secondary standards (e.g., fluoride)?
- contaminants that respond to standard treatment approaches (e.g., Salmonella, Shigella)?
- contaminants related to water distribution systems or biofilm formation (e.g., Mycobacterium avium, Legionella pneumophila, Naegleria fowleri)?
- contaminants with very localized (rather than national) occurrence (i.e., limited prevalence)?
- contaminants with chronic (vs acute) health effects (e.g., waterborne chemicals and pathogens may have important chronic human health effects not captured with outbreak data)?
- for pathogen selection, how is susceptibility of immunocompromised considered if at all?

**Charge Question 2:** Please identify any additional peer-reviewed information or data collected in accordance with accepted methods which the agency should consider for CCL4. Please see the Data Sources support document and CCL3 Universe support document for a list of data sources that EPA used to evaluate contaminants for the Draft CCL4.

1) Data sources for chemical contaminants seem to be focused largely on administrative databases and monitoring programs for occurrence (e.g., TRI, State Drinking Water Datasets) and toxicology data (e.g., IRIS, NTP) for health effects. In addition to being relevant data sources, this approach presumably facilitates CCL development by making it more automated and time efficient and by generating largely quantitative (rather than qualitative) occurrence and health data amenable to objective screening and scoring criteria. Also, where quantitative toxicity data were not available, descriptive (or categorical) data were used but apparently only for carcinogenicity assessment? It's unclear how descriptive data were used to assess non-cancer health risks. The data needed to do this include peer reviewed original research. However, it's unclear if/how peer reviewed primary research literature was included for CCL4 assessments? For CCL3, there is mention of use of peer reviewed literature for information regarding "pharmaceuticals, personal care products and other contaminants". Also, FDA's Maximum Recommended Daily Doses (MRDD) and LOAEL screening were used to help assess toxicity potential for pharmaceuticals. It was unclear how this process worked -- in any case a "safe" level of a pharmaceutical for therapeutic purposes (MRDD) is largely irrelevant to its impact on populations who do not need treatment. In addition to known side effects, pharmaceutical agents are, by design, biologically active and such biological activity may be a very inappropriate
"exposure" for the vast majority of the population that does not require treatment. As the CCL list is focused to a smaller subset of contaminants, use of peer-reviewed literature for more comprehensive characterization of health effects and occurrence would be useful. However, original research on human health effects may be unlikely to address exposure routes or, more specifically, what proportion of human exposure is likely attributable to water.

2) Assuming there was limited use of peer-reviewed, original research for CCL4, it seems as if this process could miss contaminants with chronic health effects or human health effects not ascertained via *in vitro* or *in vivo* toxicity data despite the fact that such human health effects can have substantial long term public health impacts. In finalizing the CCL4, a process analogous to review of criteria air pollutants might be helpful, assuming it could be adapted to a larger number of contaminants. An updated review of essentially all peer-reviewed health and exposure studies related to criteria air pollutants is done periodically under the Clean Air Act to ascertain whether changes in the standard are needed. A weight of evidence approach is used to synthesize findings across studies (rather than, e.g., relative toxicity factors) and this approach takes into account the quality of the data and level of certainty regarding exposure-health relationships. There may be text processing/search software that could facilitate doing such an analysis on a relatively large number of contaminants (not the universe but a smaller subset as, e.g., the PCCL4) for finalizing the CCL4.

3) Results of the UCMR for contaminants not on the CCL3 were to be used to update occurrence information to assess whether these contaminants should be listed for the CCL4. It's not clear if the UCMR data were used for this purpose and, if not, they should be.

4) Data sources for microbial contaminants initially (for CCL3) encompassed a large universe but based on limited sources -- one review paper (Taylor et al. 2001), a textbook (Manual of Clinical Microbiology or MCM, 9th and 10th eds.), CDC MMWR for outbreaks, online databases, and "a literature search". For CCL4, MMWR, MCM and an "EPA literature search for supplemental data for microbial contaminants" from 2007-2012 were used. It's unclear how the latter source contributed to the CCL4. Use of these data sources is in keeping with NDWAC recommendations (e.g., use of Taylor et al. 2001) and substantial emphasis in the CCL process on the importance of waterborne disease outbreaks (WBDO) in prioritizing microbial contaminants. But this emphasis under values chronic health effects which can have substantial public health impacts as increasingly, not only acute infection, but sub-acute infection and changes in microbial commensals (e.g. stool microbiome) can impact human chronic disease risk. Recommendations for next steps would depend on getting clarification on how the literature search used in CCL4 was done. As with chemical contaminants, better (clearer) inclusion of peer reviewed literature would be useful to address gaps and limitations to the information used. As the CCL4 "universe" of possible microbial contaminants is much smaller than that for chemical contaminants, a comprehensive review of the peer reviewed literature is more likely to be possible.
**Charge Question 3:** Based on your expertise and experience, are there any contaminants currently on the Draft CCL4 that you think do not merit inclusion on the list? Please provide the basis for your conclusions and any data or references.

Chemical contaminants: The list is too extensive to be critically reviewed in the available time. However, a shorter, more focused list would be appropriate for regulatory determinations.

Pathogens and toxins: None with the caveat that there was limited time for review.

**Charge Question 4:** Based on your expertise and experience, are there any contaminants which are currently not on the Draft CCL4 that should be listed? Please provide the basis for your conclusions and any data or references.

Within the limited available time, and with uncertainty regarding the CCL4 contaminant selection process, it is difficult to systematically identify new contaminants for inclusion. The below suggestions reflect areas of uncertainty in the CCL process. They are not a comprehensive list.

**Chemical contaminants:**

1) **Fluoride:**
I appreciate that fluoride is subject to a NPDWR as it is listed for primary regulation (MCL = 4 mg/L). However, given that it is also listed for as a contaminant under secondary drinking water guidelines (SMCL = 2 mg/L), how does this work? Fluoride's occurrence in public water systems is irrefutable as it is added to many public water supplies as a preventive agent for dental caries and the presumed beneficial public health impact of this intervention. Also, given that there is increasing evidence that fluoride water levels of 4 mg/L are likely associated with adverse neurodevelopment, can it be "added" to the CCL from its position as a secondary contaminant for reconsideration of its regulation? Increasingly there is concern that prenatal and childhood exposures to fluoride levels found in U.S. drinking water may contribute to adverse child neurodevelopment (National Research Council. Fluoride in drinking water: a scientific review of EPA’s standards. Washington, DC: National Academies Press, 2006. EPA and HHS Announce New Scientific Assessments and Actions on Fluoride: Agencies Working Together to Maintain Benefits of Preventing Tooth Decay While Preventing Excessive Exposure; 2011...). For example, in a recent study of 51 Chinese first graders, dental fluorosis score (an indicator of lifetime exposure) was predictive of poorer performance on neurodevelopmental testing, particularly tests of memory, among children chronically exposed to water fluoride levels ranging from 1-4 mg/L (geometric mean 2 mg/L) well within the current EPA drinking water standard (Choi AL, Zhang Y, Sun G, Bellinger DC, Wang K, Yang XJ, Li JS, Zheng Q, Fu Y, Grandjean P. Association of lifetime exposure to fluoride and cognitive functions in Chinese children: a pilot study. Neurotox Teratol 2015; Jan-Feb;47:96-101). The prevalence of Attention Deficit Hyperactivity Disorder (ADHD) among U.S. children and adolescents has been associated with prevalence of water fluoridation in an ecologic analysis adjusted for indicators of socioeconomic status (Malin AJ, Till C. Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: an ecologic association. Environ Health 2015; Feb 27;14(1):17. doi:10.1186/s12940-015-0003-1).
Given that fluoride is a drinking water additive and therefore impacts a large part of the U.S. population as well as recent evidence of neurotoxicity at levels commensurate with US drinking water standards, careful consideration of its risks and benefits is a critically important public health consideration for drinking water standards.

2) **Antibiotics**

Why were Amoxicillin, Bacitracin Zn, Methicillin, and Vancomycin removed from nominations? Antibiotic resistance is a critical and timely public health concern; inadvertent antibiotic exposure can contribute to resistance independent of discernable direct (acute or chronic) health effects.

3) **Emerging contaminants**

Future review of emerging contaminants with likely adverse human health impacts and high levels of production is warranted. These include, e.g., newer perfluorinated compounds, phenols used in personal care products and consumer goods such as parabens and benzophenone-3, etc.

**Pathogens and toxins:**

1) **Clostridium difficile (C. difficile):**

C. diff appears to have been excluded from CCL consideration? Is this because it is an anaerobe? Is this because it is associated with fecal contamination and thus would be signaled by total coliform monitoring? Or is there some other documentation related to consideration of this pathogen? This is an increasingly important infectious agent so may merit focus in order to protect public health. E.g., although C. difficile infection is often hospital acquired and/or associated with antibiotic use, it is increasingly common in the community and without previous antibiotic exposure (Chitnis AS, Holzbauer SM, Belflower RM, et al. *Epidemiology of community-associated Clostridium difficile infection, 2009 through 2011.* JAMA Intern Med 2013; Jul 22;173(14):1359-1367). Especially among vulnerable populations (e.g. the elderly), C. difficile can cause a life threatening illness and its incidence and severity are on the rise with associated potential substantial morbidity for the public at large (Lessa FC, Mu Y, Winston LG, et al. *Determinants of Clostridium difficile infection incidence across diverse United States geographic locations.* Open Forum Infect Dis 2014;Jul 28; 1(2): ofu048. doi: 10.1093/ofid/ofu048. eCollection2014). Although risk factors for community acquired C. difficile infection are incompletely understood, transmission from contaminated water is a potential exposure route of concern (Kotilla SM, Pitkanen T, Brazier J et al. *Clostridium difficile contamination of public tap water distribution system during a waterborne outbreak in Finland.* Scand J Public Health 2013; Jul;41(5):541-545; Steyer A, Gutierrez-Aguirre I, Racki N, et al. *The detection of enteric viruses and Clostridium difficile in a waste water treatment plant effluent.* Food Environ Virol 2015; Feb 7 [Epub ahead of print]: Romano V, Pasquale V, Krovacek K, et al. *Toxigenic Clostridium difficile PCR ribotypes from wastewater treatment plants in southern Switzerland.* Appl Environ Microbiol 2012; Sep;78(18):6643-6646). Lastly, C. difficile has been associated with waterborne disease outbreaks in the U.S. (Craun GF. *The importance of waterborne disease outbreak surveillance in the United States.* Ann 1st Super Sanita 2012;48(4):447-459).
2) **Other pathogens:**

it is unclear how it is determined what is adequately covered under the Total Coliform Rule (TCR) or Ground Water Rule or other relevant standards/rules and therefore does not need specific CCL listing and what is not adequately covered and therefore needs to be CCL listed?
1. Please provide comment on whether or not the Draft CCL 4 support documents (listed above) are clear and transparent in presenting the approach used to list contaminants on the CCL 4. If not, do you have any suggestions on how we could improve the clarity and transparency of the support documents?

There are numerous supporting documents for the Draft CCL 4 that provide information on specific contaminants. However the abbreviated approach used for the CCL 4 does not explain how the new Universe of contaminants was prioritized for placement into the Preliminary CCL. A flow diagram and interactive links would be very helpful for reviewers attempting to categorize and prioritize potential contaminants that should be of higher priority. It will be important to come to as close as consensus as possible regarding the documents that were selected for review and how contaminants were subsequently prioritized.

2. Please identify any additional peer-reviewed information or data collected in accordance with accepted methods which the agency should consider for CCL 4. Please see the Data Sources support document and CCL 3 Universe support document for a list of data sources that EPA used to evaluate contaminants for the Draft CCL 4.

With respect to microbial data sources evaluated for the Universe through final CCL it would be good to examine if there are electronic data bases [FDA bad bug book, CDC microbial contaminants (beyond the MMWR) etc] that could be used and not just rely on text-based resources. Just relying on the Taylor et al., 2001 publication as the definitive list of all know human pathogens is dated, as emerging microorganisms are being identified in the medical field some of which may have relevance to waterborne transmission.

3. Based on your expertise and experience, are there any contaminants currently on the Draft CCL 4 that you think do not merit inclusion on the list? Please provide the basis for your conclusions and any data or references.

The microbial draft CCL4 appears to be limited as compared to the chemical category. It will be important to evaluate all of the microbes as well as determine if conventional water treatment processes should be considered.

4. Based on your expertise and experience, are there any contaminants which are currently not on the Draft CCL 4 that should be listed? Please provide the basis for your conclusions and any data or references.

In the Summary of Nominations for the fourth CCL 3.2.1 the review criteria for exclusion indicated that treatment techniques were considered when eliminating microbes from the list “In addition, HPC bacteria are addressed under the Surface Water Treatment Rule as a treatment technique (TT) where they can be monitored in lieu of a disinfectant residual.” This exclusion criteria does not appear to be consistent for all microbes or chemicals and needs to be addressed.
Shane Snyder

1. Please provide comment on whether or not the Draft CCL 4 support documents (listed above) are clear and transparent in presenting the approach used to list contaminants on the CCL 4. If not, do you have any suggestions on how we could improve the clarity and transparency of the support documents?

a. I enjoyed the opportunity to review the US Environmental Protection Agency’s (EPA) Draft Contaminant Candidate List 4 (CCL 4). Having served previously on EPA expert panels for the review of the CCL3, I am particularly interested in the development of the CCL4. As in the establishment of the CCL3, I find the general construct and logic for prioritization to be sound and of good science. Indeed, the CCL3 process utilized the expert opinions provided by National Academy of Sciences (NAS)/National Research Council (NRC) Panels as well as the National Drinking Water Advisory Council (NDWAC) and EPA Science Advisory Board (SAB). This multi-step process includes three key elements: 1) identification of a broad universe of potential biological chemical and chemical contaminants (CCL Universe); 2) application of screening criteria based on potential occurrence and human health relevance (preliminary CCL or PCCL); and, 3) selection of priority contaminants based on more detailed occurrence and health effect data as well as expert judgment, public comment, and external advisory committees. Within the process, my primary concern remains the completeness of databases used by the US EPA. The fact that the majority of chemicals on CCL3 remain on CCL4 emphasizes my concern. For instance, occurrence data exists for certain chemicals, such as the estrogen hormones, to clearly demonstrate lack of occurrence at levels of health concern in US drinking water. The EPA should look more carefully at peer-reviewed published literature and data from USGS monitoring studies to better prioritize chemicals for the CCL4.

b. I believe the process for prioritization of the CCL is robust and scientifically justifiable. However, a weakness is the use of limited databases for occurrence and health data. Specifically, the inclusion of estrogen hormones as a priority in CCL3 and again in CCL4 suggests that all relevant literature has not been considered. Greater harmonization should occur between the UCMR and CCL processes, with cross-pollination proactively made with the USGS’s water quality monitoring efforts. Lastly, the CCL should not contain 100 chemicals if the EPA is unable to make regulatory determinations on more than a few per CCL cycle. As an alternative, the EPA should consider a more limited list of chemicals with a goal to develop HA levels or regulatory determinations on this smaller list within a CCL generation. Chemicals should not be recycled generationally across CCLs, which is inevitable if long lists (i.e., 100 chemicals) are included in the CCL. The PCCL is a more appropriate staging area for chemicals that require additional occurrence or health data for prioritization.
c. I did not find it easy to obtain the information I sought when reviewing the sources of data for CCL4. For instance, in the chemical information sheets (http://www2.epa.gov/sites/production/files/2015-01/documents/815r15003.pdf) the EPA provides only dossiers for the nominated chemicals. I struggled to find the information for the other 80 chemicals on the draft CCL4. My assumption is that the chemicals recycled from CCL3 do not have new data sheets, or more specifically, new information within the datasheets for those chemicals that appeared on CCL3. This is a major concern of mine in general.

d. How did the EPA use the UMRC3 data in the formulation of the draft CCL4? This was not clear within the documents provided.

2. **Please identify any additional peer-reviewed information or data collected in accordance with accepted methods which the agency should consider for CCL 4. Please see the Data Sources support document and CCL 3 Universe support document for a list of data sources that EPA used to evaluate contaminants for the Draft CCL 4.**

a. There is a wealth of information in peer-reviewed and published literature regarding the chemicals on the draft CCL4. A complete review of literature by the SAB Subcommittee within the allotted time period is not feasible. However, I do specifically suggest that EPA considers the UCMR data for some of the chemicals listed on the draft CCL4. For instance, for the estrogen steroid hormones equilin and estrone, not one sample in the 7,169 evaluated had a positive detection at 4 and 2 ng/L, respectively. Estradiol, ethynylestradiol, and estriol all had sub-ng/L method reporting levels, yet were only detected in 3, 3, and 1, respectively, out of 7,169 tests conducted in UCMR3. Only one hit for estradiol appears to exceed the health reference level; however, this HRL is taken from studies in rodents where dose response is not clear and the shorter term study was used to calculate the cancer risk despite the availability of longer term exposure studies (Figure 1). The EPA should consider using the WHO and FAO values for 17b-estradiol as opposed to the California data based on the rodents studies shown in Fig. 1.
3. **Based on your expertise and experience, are there any contaminants currently on the Draft CCL 4 that you think do not merit inclusion on the list? Please provide the basis for your conclusions and any data or references.**

   a. General comment: I strongly believe that the listing of 100 chemicals is far too many to reasonably be included. I understand the intent of the CCL originated from the 1996 SDWA amendments was to list contaminants that are known, or anticipated, to occur in US drinking waters and that may require future regulation. Indeed, this definition is impractically broad and I believe that the chemical portion of the CCL could be greatly improved by limiting the list to a more reasonable number of chemicals where occurrence data and toxicity data both suggest that information exists to begin the regulatory decision making process. The PCCL seems a more appropriate staging area for chemicals which will require additional monitoring and/or toxicity data to begin the regulatory decision making process. I further suggest that the EPA establish as a goal to develop health advisory (HA) levels for each of the chemicals listed on the CCL before the release of a new CCL. Recycling chemicals across generations of CCLs does not inspire confidence in this system, which is certainly overtaxed when 100 chemicals are considered as “priorities”. Lastly, the UCMR and CCL should be better connected; ideally, the CCL would become the dominant driver for the UCMR with timing that allows the development of HAs based on monitoring results ahead of a next generation of CCL.

   b. Specifically, based on lack of occurrence (UCMR3 and others) and questionable toxicity data, the inclusion of estrogen steroid hormones on CCL4 is not justified in my opinion.

   c. The EPA should also evaluate the UCMR3 data for other monitored chemicals that were not detected or consistently detected below the HRL.

4. **Based on your expertise and experience, are there any contaminants which are currently not on the Draft CCL 4 that should be listed? Please provide the basis for your conclusions and any data or references.**

   a. General comment: I strongly believe that the listing of 100 chemicals is far too many to reasonably be included. I understand the intent of the CCL originated from the 1996 SDWA amendments was to list contaminants that are known, or anticipated, to occur in US drinking waters and that may require future regulation. Indeed, this definition is impractically broad and I believe that the chemical portion of the CCL could be greatly improved by limiting the list to a more reasonable number of chemicals where occurrence data and toxicity data both suggest that information exists to begin the regulatory decision making process. The PCCL seems a more appropriate staging area for chemicals which will require additional monitoring and/or toxicity data to begin the regulatory decision making process. I further suggest that the EPA establish as a goal to develop
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b. In my opinion, the draft CCL4 contains far too many chemicals already. However, I would like to better understand the absence of more disinfection byproducts, especially iodinated haloacetic acids, other classes of nitrogenous DBPs, and other emerging disinfection byproducts considering the toxicity and that drinking water is (in most cases) the sole source of occurrence. Cited here are a few example references for EPA consideration. 1-10

Literature Cited: