

Submittal Crosswalk

This attachment contains information from Ecology to the EPA to assist EPA in its review of the water quality standards revisions adopted into the Washington Administrative Code 173-201A by the state of Washington on August 1, 2016.

The “Crosswalk” below is information required in 40 CFR 131.6 and 40 CFR 131.5 and the corresponding section in this attachment that directly address those requirements, as well as additional information that may be helpful to EPA:

- Minimum requirements for water quality standards submission by a state (40 CFR 131.6);
- EPA authority (40 CFR 131.5); and
- Additional information that may be of use to EPA is contained at the end of the tables.

The “Crosswalk” below is followed by the 12 corresponding sections that contain the information, from Ecology to EPA, that demonstrates that the newly adopted rule revisions fulfill the requirements in 40 CFR 131.6 and 40 CFR 131.5.

Documents that comprise parts of this submittal package and support the discussion in this attachment include:

- A memorandum from the Attorney General’s office certifying the standards were duly adopted pursuant to state law. (see Attachment B)
- *Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC*, as revised on August 1, 2016. (see Attachment C)
- *Washington State Water Quality Standards: Human health criteria and implementation tools, Overview of key decisions in rule amendment*. August 2016. Ecology Publication no. 16-10-025 (see Attachment D)
- *Concise Explanatory Statement. Chapter 173-201A WAC Water Quality Standards for Surface Waters of the State of Washington*. Summary of Rulemaking and response to comments. August 2016. Ecology Publication no. 16-10-026 (see Attachment E)
- *Rule Implementation Plan. Water Quality Standards for Surface Waters of the State of Washington. Amendments to Chapter 173-201A WAC*. August 2016. Ecology Publication no. 16-10-022. (see Attachment F)
- *Final Cost-Benefit and Least-Burdensome Alternative Analyses. Chapter 173-201A WAC. Water Quality Standards for Surface Waters of the State of Washington*. August 2016. Publication no. 16-10-019. (see Attachment G)
- *Final Environmental Impact Statement. Washington State’s Changes to Water Quality Standards for Surface Waters of the State of Washington – WAC 173-201A*. July 2016. Publication no. 16-10-023. (see Attachment H)
- *E-mails providing information on the priority pollutant bis(2-chloroisopropyl) ether. (Attachment I)*

- *EPA's Motion for Summary Judgement, US District Court, Western District, Case No. 2:16-cv-00293-JLR, June 3, 1016. (Attachment J)*

The Decision Document referred to within this attachment is the document cited in the third bullet above: *Washington State Water Quality Standards: Human health criteria and implementation tools, Overview of key decisions in rule amendment.*

EPA provided comments to Ecology on the 2016 proposed rule. Ecology's responses to those comments can be found in the Response to Comments portion of the Concise Explanatory Statement. (Attachment E). The Concise Explanatory Statement also lists and explains all changes made to the rule language between the proposed and final rule.

| “Crosswalk” of the various required information and the sections in this attachment that directly address those requirements. | | |
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| What state must include in submittal | What EPA must review and determine | Section number |
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State’s water quality standards submitted to EPA for review:</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review, and to approve or disapprove, State-adopted water quality standards. The review involves a determination of...</p> | <p>Section number in this Attachment that contains Information responding to requirements in 40 CFR 131.5 and 40 CFR 131.6.</p> |
| (a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act. | (1) Whether the State has adopted designated water uses that are consistent with the requirements of the Clean Water Act; | 1 |
| (b) Methods used, and analyses conducted, to support water quality standards revisions. | | 2 |
| (c) Water quality criteria sufficient to protect the designated uses. | (2) Whether the State has adopted criteria that protect the designated water uses based on sound scientific rationale consistent with §131.11; | 3 |
| (d) An antidegradation policy consistent with §131.12. | (3) Whether the State has adopted an antidegradation policy that is consistent with §131.12, and whether any State adopted antidegradation implementation methods are consistent with §131.12; | 4 |
| | (4) Whether any State adopted WQS variance is consistent with §131.14; | 5 |
| | (5) Whether any State adopted provision authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits is consistent with §131.15; | 6 |
| (e) Certification by the State Attorney General, or other appropriate legal authority within the State, that the water quality standards were duly adopted pursuant to State law. | (6) Whether the State has followed applicable legal procedures for revising or adopting standards; | 7 |
| (f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act... | (7) Whether the State standards which do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical, and scientific data and analyses, and... | 8 |
| ...as well as information on general policies applicable to State standards which may affect their application and implementation. | | 9 |

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| | (8) Whether the State submission meets the requirements included in §131.6 of this part and, for Great Lakes States, or Great Lakes Tribes, (as defined in 40 CFR 132.2) to conform to section 118 of the Act, the requirements of 40 CFR part 132. | 10 |
| | (b) If EPA determines that the State's or Tribe's water quality standards are consistent with the factors listed in paragraphs (a)(1) through (8) of this section, EPA approves the standards. EPA must disapprove the State's or Tribe's water quality standards and promulgate Federal standards under section 303(c)(4), and for Great Lakes States or Great Lakes Tribes under section 118(c)(2)(C) of the Act, if State or Tribal adopted standards are not consistent with the factors listed in paragraphs (a)(1) through (8) of this section. EPA may also promulgate a new or revised standard when necessary to meet the requirements of the Act | 11 |
| Additional information | | |
| A description of pollutants for which Ecology did, and did not, adopt human health criteria. | | 12 |

The following sections contain information corresponding to requirements in 40 CFR 131.5 and 40 CFR 131.6, and are intended to assist EPA in its approval of the Washington Water Quality Standards adopted on August 1, 2016.

Section 1 – Designated uses

| What state must include in submittal | What EPA must review and determine |
|--|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission.</p> <p>The following elements must be included in each State’s water quality standards submitted to EPA for review:</p> <p>(a) Use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act.</p> | <p>40 CFR 131.5 EPA authority.</p> <p>(a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of:</p> <p>(1) Whether the State has adopted designated water uses that are consistent with the requirements of the Clean Water Act;</p> |

Washington’s designated uses for surface waters are found in WAC 173-201A-600 through 612. WAC 173-201A-600(1) states: “All surface waters of the state not named in Table 602 are to be protected for the designated uses of: Salmonid spawning, rearing and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; harvesting; commerce, and navigation; boating; and aesthetic values.

The new human health criteria address the designated use of harvest (described below), and the uses listed below the description of the harvest use. There has been some confusion about how Washington’s harvest use is defined (e.g., in EPA’s draft rule for Washington). For clarity, the following description is provided. In addition, please see the Response to Comments in the Concise Explanatory Statement, section on Tribal treaty Rights.

Harvest use – General description:

The designated use of harvest in Washington’s WQS is a general use, and the population it applies to encompasses all people harvesting from Washington surface waters (not just a category represented by highly exposed groups, subsistence, and/or sustenance users). This population includes those who don’t eat fish and shellfish (but might have incidental intake via sauces, dressings, etc.), those who might eat as little as one fish or shellfish meal once in a lifetime, and ranges to those who eat fish and shellfish on a daily basis. The level of specificity of the harvest use, as described above, is consistent with EPA’s Water Quality Standards Handbook: “The State selects the level of specificity it desires for identifying designated uses and subcategories of uses (such as whether to treat recreation as a single use or to define a subcategory for secondary recreation,” at <https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter2.pdf>). Please also see the Responsiveness Summary in the Concise Explanatory Statement: section on Tribal Treaty Rights.

Apart from the general designated use of “harvest” described above, the specifically named designated uses in WAC 173-201A that the new HHC in Washington apply to are:

- The water-plus-organism HHC apply to any waters that include the Domestic Water (domestic water supply) use defined in WAC 173–201A–600.
- The organism-only HHC apply to waters that do not include the Domestic Water (domestic water supply) use and that are defined at WAC 173–201A–600, and 173–201A610, as the following: Fresh waters— Harvesting (fish harvesting), and Recreational Uses: Marine waters— Shellfish Harvesting (shellfish—clam, oyster, and mussel—harvesting), Harvesting (salmonid and other fish harvesting, and crustacean and other shellfish—crabs, shrimp, scallops, etc.—harvesting), and Recreational Uses.

Note: The new HHC apply to all waters where harvest, and/or drinking water, uses are designated. The current rule takes into account protection of fish and shellfish resources from toxics for all waters of the state, including the “usual and accustomed” waters referenced in tribal treaties. The HHC also include the practice of drinking untreated Washington surface waters.

Section 2 – Methods and Analyses

| What state must include in submittal | What EPA must review and determine |
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| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State’s water quality standards submitted to EPA for review: (b) Methods used and analyses conducted to support water quality standards revisions.</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of...</p> |

The August 1, 2016 rule revisions include adoption of new HHC and adoption of new and revised language on implementation tools.

Criteria: Information specific to the new criteria is found in sections further below in this attachment.

Implementation Tools: Ecology adopted:

- revised rule language for variances and compliance schedules
- a new permitting tool called an intake credit
- new rule language defining combined sewer overflow treatment plants, and added implementation clarification language for Combined Sewer Overflows.

Please refer to the Decision Document when reviewing these rule revisions. These tools and the rule changes associated with them are fully discussed in the Decision Document sections that are specific to Implementation Tools.

Public Process: In addition to the information elsewhere in this submittal (e.g., the other sections of this attachment, as well as other material submitted in support of this rule adoption), Ecology conducted an extensive public process to support this rulemaking. Ecology’s public process covered more than 4 years, with multiple opportunities for public input and discussion. This process included: 5 public meetings; 7 Policy Forums; 7 Delegates Table meetings; a total

of 8 public workshops; and 8 public hearings across the state, and received public comment on both the first and second proposed rules. For more detailed and extensive information about these processes see Appendix E of the Concise Explanatory Statement.

Ecology’s public process for this rule development is extensive, and Ecology considered the input from this extensive process when making decisions regarding the final inputs to the HHC equation, the final implementation tools language, as well as other policy decisions made during the development of this rule. Ecology’s decisions were informed by Ecology’s record of public process.

Section 3 - Criteria

| What state must include in submittal | What EPA must review and determine |
|--|--|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission.</p> <p>The following elements must be included in each State’s water quality standards submitted to EPA for review: (c) Water quality criteria sufficient to protect the designated uses.</p> | <p>40 CFR 131.5 EPA authority.</p> <p>(a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of... (2) Whether the State has adopted criteria that protect the designated water uses based on sound scientific rationale consistent with §131.11;</p> |

The state has adopted criteria consistent with 40 CFR 131.11. This section of the CFR is copied below:

CFR§131.11 Criteria.

(a) Inclusion of pollutants: (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

(2) Toxic pollutants. States must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use. Where a State adopts narrative criteria for toxic pollutants to protect designated uses, the State must provide information identifying the method by which the State intends to regulate point source discharges of toxic pollutants on water quality limited segments based on such narrative criteria. Such information may be included as part of the standards or may be included in documents generated by the State in response to the Water Quality Planning and Management Regulations (40 CFR part 130).

(b) Form of criteria: In establishing criteria, States should:

(1) Establish numerical values based on:

(i) 304(a) Guidance; or

(ii) 304(a) Guidance modified to reflect site-specific conditions; or

(iii) Other scientifically defensible methods;

(2) Establish narrative criteria or criteria based upon biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria.

The science and risk management decisions supporting the new criteria are contained in the Decision Document, the criteria input table (below), the Concise Explanatory Statement, and other sources as referenced in the discussion below.

This discussion is broken out into the following sections:

- Criteria generally
- Dioxin
- Bioconcentration factors
- Arsenic
- PCBs
- Downstream waters

Criteria Discussion:

The majority of the variables in the criteria equations were chosen based on the specific factors in 40CFR 131.11(b)(1)(i-iii) (see bolded text below) that EPA recommends that states use when establishing numeric criteria.

The CFR language is:

131.11(2)(b) Form of criteria: In establishing criteria, States should:

(1) Establish numerical values based on:

*(i) **304(a) Guidance; or***

*(ii) **304(a) Guidance modified to reflect site-specific conditions; or***

*(iii) **Other scientifically defensible methods;***

The specific sections in 40 CFR 131.11(2)(b)(i-iii) (above) supporting each variable are shown in the criteria input table below, and explained in the Decision Document. Please use the Decision Document when reviewing this table. To assist you with your review we have included specific additional information related to dioxin, bioconcentration factors, arsenic, PCBs, and relative source contribution, following the table below.

Criteria input value table with the 40 CFR 131.11 bases of the input values.

| Variables | Input values used in the criteria calculations | Basis of the input value (as per 40 CFR 131.11(2)(b) (i-iii)) that Washington State Used |
|--|---|---|
| Fish and shellfish consumption rate (FCR) | 175 g/day | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i></p> <ul style="list-style-type: none"> • use of local data (see Decision Document section on Human Health Criteria Equations and Variables) |
| Risk level (RL) | <p>Additional lifetime risk of 1 in one million (1×10^{-6}) (no change)</p> <p>PCBs: Risk Level = 4×10^{-5}</p> | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i></p> <p>PCBs: <i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i></p> <p><i>40 CFR 131.11(2)(b)(ii) 304(a) Guidance modified to reflect site-specific conditions:</i></p> <ul style="list-style-type: none"> • state-specific risk management (see Decision Document section on Challenging Chemicals: Polychlorinated Biphenyls (PCBs), and , Human Health Criteria Equations and Variables) |
| Relative Source Contribution (RSC) | 1 | <p><i>40 CFR 131.11(2)(b)(ii) 304(a) Guidance modified to reflect site-specific conditions:</i></p> <ul style="list-style-type: none"> • state-specific risk management (see Decision Document section on Human Health Criteria Equations and Variables) |
| Body weight (BW) | 80 kilograms (176 pounds) | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i></p> <ul style="list-style-type: none"> • And: use of local data (see Decision Document section on Human Health Criteria Equations and Variables) |
| Drinking water Intake (DI) | 2.4 liters/day | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i> (see Decision Document section on Human Health Criteria Equations and Variables)</p> |
| Reference dose (RfD) for specific chemicals | <p>Updated values in EPA IRIS and EPA NRWQC documents</p> <p>Dioxin (2,3,7,8-TCDD): IRIS 2012 RfD = 7×10^{-10} mg/kg-day</p> | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i></p> <p><i>40 CFR 131.11(2)(b)(ii) 304(a) Guidance modified to reflect site-specific conditions:</i></p> <ul style="list-style-type: none"> • state-specific risk management decision (see Decision Document, section on Human Health Criteria Equations and Variables) <p><i>40 CFR 131.11(2)(b)(iii) Other scientifically defensible methods</i> (see Decision Document section on Human Health Criteria Equations and Variables, and, discussion below)</p> |
| Cancer Slope Factor (CSF) for specific chemicals | Updated values in EPA IRIS and EPA NRWQC documents | <p><i>40 CFR 131.11(2)(b)(i) 304(a) Guidance</i> (see Decision Document section on Human Health Criteria Equations and Variables, and, Challenging Chemicals: Arsenic)</p> |
| Bioconcentration Factor | Values from 1992 NTR and | <i>40 CFR 131.11(2)(b)(ii) 304(a) Guidance modified to</i> |

| | | |
|-------|---|--|
| (BCF) | 1999 revision; EPA's 2002 HHC Calculation Matrix (EPA, 2002), and pre-2015 NRWQC; and two additional BCFs calculated based on EPA 1980. | <i>reflect site-specific conditions:</i> <ul style="list-style-type: none"> • state-specific risk management decision (see Decision Document, section on Human Health Criteria Equations and Variables) and discussion below <i>40 CFR 131.11(2)(b)(iii) Other scientifically defensible methods (see Decision Document, section on Human Health Criteria Equations and Variables).</i> |
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The CWA (Section 304(a)) and federal regulations (40 CFR 131.3(c)) require EPA to use the "latest" scientific information (which might not always be applicable or best for all processes) and EPA uses this information to develop "nationally" recommended criteria. States are not given that requirement. States are given primacy to adopt standards, and under the CWA (Section 303(c)(2)(A)) and federal regulations (40 CFR 131.2) are required to adopt criteria based on "use and value" of the resource. States make the decision on what science is most applicable for direct application to the state's resources. Ecology acknowledges that the requirement to use "latest" information puts EPA in a difficult situation when it develops guidance criteria applicable to all states, but notes that guidance is guidance, and should not be treated as rule when reviewing the new human health criteria.

Dioxin (2,3,7,8-TCDD):

Non-cancer effects: With regard to non-cancer effects, the Ecology HHC, based on the most recent 2012 IRIS non-cancer assessment, are calculated to be protective of non-cancer effects at a Hazard Quotient of 1.

Cancer effects: Without a reliable toxicity factor for cancer Ecology cannot calculate dioxin criteria based on cancer. EPA agrees that new cancer-based criteria for dioxin cannot be calculated at this time. In a May 6, 2016 filing with the United States District Court for the Western District of Washington, EPA stated that it will withdraw its propose dioxin criteria for Washington because “extensive additional scientific analysis is necessary before revised criteria” for dioxin can be promulgated. *Puget Soundkeeper Alliance et. al. V. U.S.E.P.A.*, Case No. 2:16-cv-00293-JLR, EPA’s Motion for Summary Judgment (May 6, 2016) at 13. As EPA explained in the Declaration of Elizabeth Southerland, Director of the Office of Science and Technology with EPA’s Office of Water, “EPA did not update its CWA section 304(a) recommended criteria” for dioxin in 2015, and “IRIS does not currently contain a quantitative carcinogenicity assessment” for dioxin. Declaration of Elizabeth Southerland (May 5, 2016) at 7. These statements indicate that the existing science does not allow either Ecology or EPA to adopt new cancer-based dioxin criteria for Washington.

Although cancer-based criteria cannot be accurately calculated at this time, it is possible to roughly estimate whether the proposed criteria are protective of effects from cancer. With regard to cancer risk, if one were to assume that either the EPA proposed criteria for dioxin or the current NTR criteria for dioxin are protective of human health in Washington, then a comparison of the EPA proposed criteria (5.8 and 5.9 x 10⁻¹⁰ ug/L) and the NTR criteria (1.3 and 1.4 x 10⁻⁸

ug/L) with the Ecology criteria (6.4×10^{-8}) indicates at most an approximate two orders of magnitude difference. If the EPA proposed criteria were “correct” and indeed reflected a 10^{-6} risk level, then the Ecology value would be protective in the 10^{-4} risk range, which is an allowable risk level under EPA 2000 guidance. If the NTR criteria were “correct” and indeed reflected a 10^{-6} risk level, then the Ecology value would be protective in the 10^{-6} risk range, which is also an allowable risk level under EPA 2000 guidance. This direct comparison among dioxin criteria for both ingestion of “organisms only” and “organisms + water” is possible because the bioconcentration factor for dioxin is very large.

With regard to protection of Washington consumers via controls on dioxin discharges, the new Ecology criteria will provide as much control of dioxin sources as the EPA proposed or NTR criteria: effluent monitoring data from major NPDES dischargers in Washington, using EPA approved methods, indicates that dioxin is rarely detected in discharges. In addition, if dioxin were detected in a discharge, and a water quality-based effluent limit was required, compliance with the water quality-based effluent limit would be assessed at the quantitation level for EPA Method 1613B, which is 5 pg/L (5×10^{-6} ug/L), well above any of the proposed or current criteria levels.

The information above, along with information in the Decision Document, fulfills the requirement of 40 CFR 131.11(a):

40 CFR 131.11(a) Inclusion of pollutants: (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.

Bioconcentration factors:

Ecology used the bioconcentration factor (BCF) values that were used to calculate criteria in the 1992 NTR and 1999 NTR revision, as listed in EPA’s 2002 HHC Calculation Matrix (EPA, 2002), 1980 criteria documents, and other pre-2015 EPA 304(a) criteria. Two additional BCFs were calculated based on EPA 1980 guidance (Please see Decision Document, section on Human Health Criteria Equations and Variables). The rationale for use of the BCF-based approach instead of EPA’s new BAF-based approach is explained in the Decision Document.

Ecology continues to be concerned about the lack of process around the final 2015 adoption of EPA’s 304(a) nationally recommended human health criteria. We submitted our concerns to EPA in Ecology’s public comment on EPA’s draft 304(a) criteria (8/6/2014 letter from Melissa Gildersleeve, Ecology, to EPA Water Docket), on EPA’s draft regulation for Washington (12/21/15 letter from Maia Bellon, Ecology, to Gina McCarthy, EPA), and in the Decision Document. Subsequently, additional information has come to Ecology’s attention that reinforces Ecology’s concern with the new 2015 304(a) criteria documents and the equation inputs used in those documents. In particular, EPA did not thoroughly check both its priority pollutant list, and past criteria documents and actions, resulting in the publication and posting of a criteria document for the new, and non-priority pollutant, bis(2-chloro-1-methylethyl) ether, as a priority pollutant (please see e-mail correspondence in Appendix I). EPA then proposed criteria

for this chemical in draft regulations for Washington and Maine, asserting in the federal publications that the new criteria were for priority pollutants only. This situation reinforces the skepticism that Ecology has regarding the thoroughness of the process used to develop the new 2015 EPA criteria, and reinforces the concern over the single public review of the new 2015 criteria documents, particularly with regard to the bioaccumulation and bioconcentration factors used in calculating those criteria. In addition, the state of Florida recently published draft human health criteria using state-specific bioaccumulation factors. Florida developed state-specific values because the national bioaccumulation factors were not representative of Florida waters, a situation pointed out by Ecology with regard to Washington waters. This action by Florida reinforces that EPA's national BAFs are not applicable to all waters, as discussed in the Decision Document. All of these circumstances further reinforce the reasonableness of Ecology's decision to continue use of the older BCF-based approach and values based on:

- 40 CFR 131.11(2)(b)(2) (ii) 304(a) Guidance modified to reflect site-specific conditions (a state-specific risk management decision); and
- 40 CFR 131.11(2)(b) (iii) Other scientifically defensible methods.

Arsenic:

The new HHC for total arsenic were developed to address contaminant exposure from both organism and ingesting untreated water.

Please see the discussion specific to non 101(a)(2) uses (Section 8 below) for drinking water ingestion information. The criterion for the "organism only" exposure route is explained in more detail below:

1. Please see the Decision Document section on arsenic for general discussion. Ecology made the following two specific rule changes for arsenic:

- Surface water HHC for total arsenic at the Safe Drinking Water Act (SDWA) maximum contaminant level (MCL) of 10 µg/L was based on a consideration of several things, including:
 - a) the continuing uncertainty around the long-term reassessment of the EPA IRIS cancer potency factor for arsenic;
 - b) the need for a BCF specific to inorganic arsenic;
 - c) EPA's Clean Water Act-approval of the SDWA MCL for arsenic for other states; and
 - d) the presence of naturally occurring arsenic in Washington. *The criterion of 10 µg/L is being applied to both marine and freshwater scenarios. The MCL was developed for drinking waters. Because calculation of new criteria for arsenic is not possible with current information, Ecology also chose to apply the criterion of 10 µg/L to protect designated uses in marine and estuarine waters in lieu of not adopting a criterion value for these waters.*

- Pollution minimization requirements to reduce anthropogenic inputs of arsenic in discharges to surface waters were added to ensure that arsenic would not be introduced through industry processes that could potentially add arsenic to the receiving water.
2. In general, the arsenic criterion for “organisms-only” applies to estuarine and marine waters because drinking water (Domestic Water Supply) is not a designated use in these saline waters. There are 6 waterbodies in Washington that are freshwaters *not* designated for drinking water, and this criterion also applies to those waters.
 3. *Appropriate use of the SDWA maximum contaminant level (MCL) for arsenic.* Ecology considers that the SDWA MCL of 10 ug/L for total arsenic is appropriate for Clean Water Act (CWA) criteria use. The arsenic MCL is based on science and cost, which does not negate full protection of CWA uses, and the CWA does not indicate that SDWA values are inappropriate for CWA use. The EPA went through an extensive process to evaluate science and feasibility to derive and finalize the SDWA arsenic MCL, and that MCL development is based on consideration of newer science (cancer effects) than the older CSF used in EPA's 304(a) criteria for arsenic, and also was subject to a nation-wide public and scientific review through the federal register. Most of the arsenic in fish and shellfish tissues is in the organic form, which is much less toxic than the inorganic form.
 4. *Uncertainty around the cancer slope factor (CSF) for arsenic.* There is considerable scientific uncertainty in assessing carcinogenicity of arsenic. Without a reliable toxicity factor for cancer Ecology cannot calculate arsenic criteria based on cancer. EPA agrees that new cancer-based criteria for arsenic cannot be calculated at this time. In a May 6, 2016 filing with the United States District Court for the Western District of Washington, EPA stated that it will withdraw its proposed arsenic criteria for Washington because “extensive additional scientific analysis is necessary before revised criteria” for arsenic can be promulgated. *Puget Soundkeeper Alliance et. al. V. U.S.E.P.A.*, Case No. 2:16-cv-00293-JLR, EPA’s Motion for Summary Judgment (May 6, 2016) at 13. As EPA explained in the Declaration of Elizabeth Southerland, Director of the Office of Science and Technology with EPA’s Office of Water, “EPA did not update its CWA section 304(a) recommended criteria” for arsenic in 2015, and “EPA recognizes that there is substantial uncertainty surrounding the toxicological assessment of arsenic with respect to human health effects.” Declaration of Elizabeth Southerland (May 5, 2016) at 7.
 5. *Uncertainty around the bioaccumulation factor (BCF) for arsenic.* The BCF of 44 L/kg used in EPA’s 304(a) criteria is based on total arsenic. This value does not accurately reflect the uptake of inorganic arsenic, the most toxic form of arsenic, and the form to which EPA applies its 304(a) criteria. Most of the arsenic in fish and shellfish tissues is in the organic form, which is much less toxic than the inorganic form. EPA (1997; page 10) estimated the percentage of inorganic arsenic in tissue: “*the maximum inorganic arsenic in fish and shellfish used for this estimate is 4% ...The median inorganic arsenic value for the fish and shellfish data... is 0.4%. No inorganic arsenic was detected in 23 of 42 fish samples and 18 of 50 shellfish samples. Therefore, the median value reflects the higher inorganic arsenic concentrations found in*

shellfish and is a conservative value.” A BCF specific to inorganic arsenic is not available in EPA’s criteria documents, but applying the data above to the current BCF of 44 L/kg indicates that the BCF of 44 L/kg could be adjusted downward by a large amount if inorganic arsenic only were considered. A new BCF for arsenic, as well as a new CSF, will be required in order to calculate criteria for arsenic using the HHC equations.

Given the scientific uncertainties associated with calculating human health criteria for arsenic, and given the extensive public and scientific process carried out by EPA to develop a protective MCL appropriate for drinking water exposures, it makes sense for Washington to use the best available regulatory value, based on the best available science, for the arsenic HHC, which at this point is the SDWA MCL. Since EPA has set precedence by approving the SDWA MCL of 10 ug/l for several other states, it seems like a reasonable approach for Washington to take until such time that better science becomes available for EPA to recommend new national criteria for arsenic. Because calculation of new criteria for arsenic is not possible with current information, Ecology also chose to apply the criterion of 10 µg/L to marine and estuarine waters, in lieu of not adopting a criterion value for these waters. Apart from the approach of adopting the MCL, there are no other defensible criteria values available at the current time.

Section 304(a) of the CWA directs EPA to develop guidance values “*reflecting the latest scientific knowledge*“, and 40 CFR 131.3(c), specifies that EPA guidance values are “*based on the latest scientific information*” and that “*this information is issued periodically to the States as guidance for use in developing criteria.*” However, neither the CWA, nor the CFR, require that states use the 304(a) guidance values, or EPA’s guidance documents. Instead, Section 303(c)(2)(A) of the CWA and 40 CFR 131.2 both direct states to adopt criteria taking into account the “*use and value*” of the resources. Ecology’s broad public process, and compliance with APA requirements, have accounted for this CWA and CFR requirement.

The information above, along with information in the Decision Document, fulfills the requirement of 40 CFR 131.11(a):

40 CFR 131.11(a) Inclusion of pollutants: (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.

In addition, the arsenic criteria adopted by Ecology fulfill the requirements of:

- *40 CFR 131.11(2)(b)(2) (ii) 304(a) Guidance modified to reflect site-specific conditions (Ecology’s use of a state-specific risk management decision to use the SDWA MCL); and*
- *40 CFR 131.11(2)(b) (iii) Other scientifically defensible methods (Ecology’s use of the extensive public and scientific review conducted by EPA to develop the SDWA MCL).*

PCBs

Ecology's new HHC for total PCBs are based on an approach that is consistent with EPA's 2000 Human Health Criteria Guidance (EPA, 2000), and that also provides a high level of protection for Washingtonians. Ecology used a state-specific risk level exclusively for PCBs. These calculated criteria concentrations are higher than the prior NTR values, and because PCBs are a chemical of concern in Washington, Ecology made a chemical-specific decision *not to increase the criteria concentrations* above the prior criteria levels, thus the proposed criteria values are the same as the NTR values of 0.00017 µg/L.

State-specific risk management decisions on chemical-specific risk levels are consistent with EPA HHC guidance, as well as with precedent from other states. For example, EPA approved inorganic arsenic criteria adopted by the Oregon Department of Environmental Quality (ODEQ) based on 1×10^{-4} and 1×10^{-5} risk levels, even though risk levels for other chemicals were set to 10^{-6} (ODEQ, 2011). This criteria development approach combines the current cancer-based calculation with a state-specific risk level. All other variables in the HHC equations for PCBs would remain the same. The state-specific risk level is summarized in the following text:

| Equation variable | Risk Value | Information |
|---------------------------------------|---|--|
| Additional lifetime cancer risk level | 4.0×10^{-5} (0.00004) = 4 possible additional cancer occurrences in 100,000 people after 70 years of daily exposure | <p>Choice of a state-specific risk level is a risk management decision made by individual states. EPA 2000 guidance (EPA, 2000) specifies that the maximum risk level for highly exposed populations should not exceed 1×10^{-4} (1 possible additional cancer occurrence in 10,000 people after 70 years of daily exposure.) The chemical-specific risk level for PCBs was chosen to be consistent with the level of risk/hazard in the toxicity factor used by the WDOH in developing fish advisories. This is an estimated cancer risk at the corresponding safe dose (RfD) for a chemical. This value was developed as follows:</p> <p><u>Equation:</u></p> $\text{RfD (mg/kg-day)} \times \text{cpf (mg/kg-day)}^{-1} = \text{Risk Level}$ <p><u>Equation with PCB toxicity factors:</u></p> $2.0 \times 10^{-5} \text{ mg/kg-day} \times 2.0 \text{ mg/kg-day}^{-1} = 4.0 \times 10^{-5}$ <p>This state-specific risk level is a <i>lower</i> level of risk (<i>is more protective</i>) than the maximum risk recommended in EPA guidance.</p> |

Since the bioconcentration factor for PCBs is very large, exposure through drinking water is negligible. The calculated criteria for exposure routes with and without drinking water are virtually the same, as are the calculated criteria values. The calculated total PCB criteria using this approach are 0.00029 µg/L. These calculated values are higher than the current NTR values, and because PCBs are a chemical of concern in Washington, Ecology made a chemical-specific risk management decision not to increase the criteria concentrations, thus the proposed criteria values are the same as the NTR values of 0.00017 µg/L. This value is associated with a lower risk level (2.3×10^{-5}) than the calculated criteria. These values are shown below.

| Additional lifetime Cancer Risk Level | Average Fish Consumption Rate (g/day) | Calculated HHC concentration (µg/L = parts per billion) |
|--|--|--|
| Calculated value: | | |
| 4 x 10 ⁻⁵ Four-in-one hundred thousand = 0.00004 | 175 | 0.00029 |
| New criteria (= NTR Criteria) | | |
| 0.00017 | | |
| The risk level associated with the final 0.00017 ppb PCB criteria is 2.3 x 10⁻⁵ which is within EPA's acceptable risk range for human health criteria. | | |

Relative Source Contribution (RSC)

EPA has urged Ecology not to use a RSC equal to one in its criteria calculations for non-carcinogens. Ecology explains the basis of its approach in the Decision Document, (please refer to the section on Human Health Criteria and Variables), and has had lengthy discussion and public input about this matter during the public process surrounding this rule (see section 2 above). See also Ecology's comments to EPA on EPA's draft 304(a) criteria (8/6/2014 letter from Melissa Gildersleeve, Ecology, to EPA Water Docket), and on EPA's draft regulation for Washington (12/21/15 letter from Maia Bellon, Ecology, to Gina McCarthy, EPA). The choice of whether to account for other (non-CWA and/or non-fish/shellfish and surface drinking water) sources of chemical exposure when calculating criteria is clearly a risk management choice (such as risk level and FCR) that is appropriately left to states, not to EPA.

Downstream waters are protected:

Previous comments from EPA indicate that EPA believes that upstream numeric human health criteria must not be a higher concentration than downstream human health criteria. Information below demonstrates that criteria concentrations among and between waterbodies do not need to be identical in order to provide downstream protection. Implementing mechanisms in a state's water quality standards can provide this protection. Washington's water quality standards include provisions requiring protection of downstream waters at WAC 173-201A-260 and 240. This is discussed below.

Summary: The federal regulations specify how states are to address downstream waters in development of state water quality standards. These two requirements are found in 40 CFR 131.10 and specify that the State:

- 1) shall take into consideration the water quality standards of downstream waters, and
- 2) shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

To fulfill the first requirement to take into consideration the water quality standards of downstream waters, Ecology placed language requiring protection of downstream waters in the draft rule at WAC 173-201A-240(b), and considered all public comments that were received

during the public comment period regarding downstream waters protection, as the final rule was developed. Ecology considers “downstream waters” to include both intra- and interstate waters, as well as waters that form a boundary between adjacent jurisdictions.

The second part of the federal requirement is that the state shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters. New language in WAC 173-201A-240(b) explicitly requires upstream water quality to provide for attainment and maintenance of downstream water quality standards. This language was taken from EPA’s *Templates for Narrative Downstream Protection Criteria in State Water Quality Standards* (EPA 2014, 820-F-14-002). Further, existing narrative rule language in WAC 173-201A-260(3)(a) and (3)(b) allows for case-by-case establishment of additional requirements to fully support designated and existing uses, and requires that upstream actions must be conducted in manners that meet downstream water body criteria. These narrative standards will collectively be used to ensure that downstream waters are adequately considered and protected.

Background information. The federal regulations specify how states are to address downstream waters in development of state water quality standards. These two requirements are found in 40 CFR 131.10 as follows:

*“Subpart B—Establishment of Water Quality Standards
§ 131.10 Designation of uses.*

(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.”

These requirements are broken out as:

- ...the State shall take into consideration the water quality standards of downstream waters
- ...the State... shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

These two specific requirements of states are addressed more fully below.

Has Ecology fulfilled the federal requirements? Yes, as explained in 1 and 2 below.

1. ...the State shall take into consideration the water quality standards of downstream waters.

Washington formally took into consideration the water quality standards of downstream waters by (a.) placing language requiring protection of downstream waters in the draft rule and (b.) by considering all public comments that were received during the public comment period, regarding downstream waters protection, as the final rule was developed.

In addition, when the draft rule was published, Ecology sent letters to all federally recognized tribes in Washington to offer consultation about this rule-making. This would include protection

of downstream waters as it pertains to tribal water quality standards and U&A waters, as well as the standards applied to shared waters that are also treaty guaranteed U&A waters (e.g., the Columbia River has water quality standards applied to it by the state of Oregon as well as the state of Washington, and also has sections that are U&A waters). Ecology considers “downstream waters” to include both intra- and interstate waters, as well as waters that form a boundary between adjacent jurisdictions.

2. ...the State... shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

The narrative rule language in WAC 173-201A ensures that Washington’s water quality standards provide for attainment and maintenance of the water quality standards of downstream waters (see table below):

| Washington water quality standard from WAC 173-201A-260 that provides for attainment and maintenance of the water quality standards of downstream waters | What does this language mean? |
|---|---|
| <p>New language: WAC 173-201A-240 Toxic substances. (b) Human health protection. The following provisions apply to the human health criteria in Table 240. All waters shall maintain a level of water quality when entering downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including the waters of another state.</p> | <p>This new language explicitly requires upstream water quality to provide for attainment and maintenance of downstream water quality standards.</p> <p>This language was developed by EPA to meet the requirement for downstream protection. This language is from EPA’s <i>Templates for Narrative Downstream Protection Criteria in State Water Quality Standards</i> (EPA 2014, 820-F-14-002) found at: http://water.epa.gov/scitech/swguidance/standards/narrative.cfm</p> |
| <p>WAC 173-201A-260 Natural conditions and other water quality criteria and applications. (3) Procedures for applying water quality criteria. <i>In applying the appropriate water quality criteria for a water body, the department will use the following procedure:</i> (a) <i>The department will establish water quality requirements for water bodies, in addition to those specifically listed in this chapter, on a case-specific basis where determined necessary to provide full support for designated and existing uses.</i></p> | <p>This existing language allows for case-by-case establishment of additional requirements to fully support designated and existing uses.</p> |
| <p>WAC 173-201A-260 Natural conditions and other water quality criteria and applications. (3) Procedures for applying water quality criteria. <i>In applying the appropriate water quality criteria for a water body, the department will use the following procedure:</i> (b) <i>Upstream actions must be conducted in manners that meet downstream water body criteria.</i></p> | <p>This existing language directs that upstream actions (such as discharges into waters) must be conducted in a manner to meet downstream criteria.</p> |

Does Ecology's approach align with federal precedent?

The downstream waters protection approach that is used in the Washington standards (language in table above) is consistent with EPA's approach to downstream waters protection in its response to a petition for rulemaking to publish water quality standards for the Mississippi and Missouri Rivers within Arkansas, Illinois, Iowa, Kansas, Kentucky, Missouri, Nebraska, and Tennessee <http://water.epa.gov/scitech/swguidance/standards/upload/Sierra-Club-Petition-Response-signed-2004-06-25.pdf>)." Because of issues surrounding downstream waters protection, the Ozark Chapter of the Sierra Club petitioned EPA to "*publish water quality standards for the Mississippi and Missouri Rivers within the petition area states. Such standards should be: 1) Consistent among the states on each river, such that no state impairs the ability of any other affected state (whether across-stream or downstream) to achieve its water quality standards; and...*" (EPA 2004).

EPA's response to that petition states:

"Protection of Downstream Uses

*The federal regulations state, "In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters." 40 C.F.R. §131.10(b). **The regulations do not compel states to adopt the same criteria and uses, nor do they suggest that this is the only way a state can meet these requirements. The water quality program is structured to provide states with flexibility to determine the best way to meet their obligations under § 131.10(b).***

Under the NPDES permitting regulations, no permit may be issued "when the imposition of conditions cannot ensure compliance with applicable water quality requirements of all affected States[.] " 40 C.F.R. §122.4(d). To obtain approval of a state NPDES program, the CWA requires the state to have the authority to notify other affected states of applications for permits and provide an opportunity for a hearing.

CWA section 402(b)(3). Further, the state must allow any state whose waters may be affected by the discharge to submit recommendations. If the permitting state rejects the recommendations, it must notify the affected state and EPA Administrator. CWA section 402(b)(5). Where EPA determines the permitting state rejected the recommendations for inadequate reasons, EPA may exercise its discretionary authority to object to the permit. If the objection is not resolved, EPA may issue a federal permit. 40 C.F.R. §123.44(c)(2)."

(Page 4, EPA 2004, emphasis added)

In this response EPA recognizes that the federal water quality program is structured to provide states with flexibility to determine the best way to meet their obligations regarding downstream waters. The Washington water quality standards contain the combination of a direct statement on downstream protection (new language), an allowance for additional requirements, and requirements for upstream actions implemented under various CWA permitting programs (see table above).

Do upstream water quality standards, need be as stringent as the downstream standards in order to protect downstream uses?

This is also addressed by EPA's response to the petition for rulemaking to publish water quality standards for the Mississippi and Missouri Rivers.

<http://water.epa.gov/scitech/swguidance/standards/upload/Sierra-Club-Petition-Response-signed-2004-06-25.pdf>)

In its response, EPA recognized that the states along the Mississippi River could have different criteria based in part on the states' discretion to use different risk levels when adopting criteria (PCB example given):

“EPA acknowledges there are variations in the numeric PCB criteria adopted by the petition states. There are four legitimate reasons why the numeric PCB criteria vary within the petition area: ...

... (3) As discussed in the “Statutory and Regulatory Background” section, EPA publishes section 304(a) criteria based on a 10–6 risk level for carcinogens; states may select a specific risk level based on their own risk management decisions. EPA believes that adoption of criteria within a risk level of 10–6 (one in a million incremental risk for cancer) or 10–5 (one in one hundred thousand incremental risk for cancer) represents an acceptable range of risk management discretion for states and tribes.²⁴ Within the petition states, each state adopts criteria to protect human health based on risk management decisions. Iowa, Arkansas, Tennessee, and Nebraska have adopted PCB criteria based on a 10-5 risk level; Illinois, Kentucky and Missouri have adopted PCB criteria based on a 10-6 risk level; and Kansas chose to adopt a PCB criterion to protect human health at a 10-7 risk level.

As discussed above, Iowa and Missouri adopted a numeric PCB criterion to protect human health based on the toxicity information available in IRIS that was updated in 1989. With regard to the Sierra Club's specific concern about Iowa's PCB criterion as compared to Missouri's criterion, EPA found that Iowa's criterion is an order of magnitude greater than Missouri's because Iowa has chosen to protect human health at a 10-5 risk level while Missouri protects human health at a 10-6 risk level. With regard to the Sierra Club's specific concern about Nebraska's PCB criterion as compared to Missouri, EPA found that Nebraska adopted a numeric PCB criterion to protect human health based on EPA's section 304(a) criteria recommendations published in 1999 (Missouri used the updated 1999 IRIS data), but chose a 10-5 risk level. As a result, Nebraska's PCB criterion is greater than Missouri's criterion.”

²⁴ U.S. Environmental Protection Agency. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000). Office of Water. Washington, D.C. EPA-822-B-00-004. <http://www.epa.gov/waterscience/humanhealth/method> October 2000.”

(Pages 17-18, EPA 2004)

These differences in criteria were not found to be cause for EPA to promulgate consistent criteria across the states:

“...the regulations do not compel states to adopt the same criteria and uses in order to provide for attainment and maintenance of downstream water quality standards (40 C.F.R. §131.10(b)), nor do the regulations suggest that this is the only way a state can meet the requirements under § 131.10(b). The water quality program is structured to provide states with flexibility to determine the best way to protect their designated uses and meet their obligations under § 131.10(b).”

(Page 19, EPA 2004)

Section 4 - Antidegradation

| What state must include in submittal | What EPA must review and determine |
|---|--|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State’s water quality standards submitted to EPA for review: (d) An antidegradation policy consistent with §131.12.</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of... (3) Whether the State has adopted an antidegradation policy that is consistent with §131.12, and whether any State adopted antidegradation implementation methods are consistent with §131.12;</p> |

This rule revision does not include any modifications that deal with antidegradation. Washington’s antidegradation standards have previously been approved by EPA in 2008 and are at WAC 173-201A-300--330.

Section 5 – Adopted Variances

| What state must include in submittal | What EPA must review and determine |
|--|--|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State’s water quality standards submitted to EPA for review: <No specific submittal requirement></p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of... (4) Whether any State adopted WQS variance is consistent with §131.14;</p> |

This rule revision does not grant any specific variances to water quality standards. Instead, this rule change gives more details on the information requirements for granting variances, and on the types of actions that would be required of dischargers during variance periods. The new state rule language is consistent with EPA regulations on variances at 40 CFR 131.14.

Section 6 –Provisions Authorizing the Use of Compliance Schedules

| What state must include in submittal | What EPA must review and determine |
|--|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review:</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of...</p> |
| <p><No specific submittal requirement></p> | <p>(5) Whether any State adopted provision authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits is consistent with §131.15;</p> |

Compliance schedules were incorporated into the state water quality standards in 1992 to ensure continued use in the permitting program and were subsequently approved by EPA. They can be found at WAC 173-210A-510(4). The newly adopted water quality standards includes additional language for compliance schedules. This new language is consistent with 40 CFR 131.15

Section 7 – State Legal Authority

| What state must include in submittal | What EPA must review and determine |
|---|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review:</p> <p>(e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of...</p> <p>(6) Whether the State has followed applicable legal procedures for revising or adopting standards;</p> |

Please see the memorandum from the Attorney General's office certifying the standards were legally adopted pursuant to state law. (see Attachment B).

Section 8 – Non-101(a)(2) Uses

| What state must include in submittal | What EPA must review and determine |
|---|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review:</p> <p>(f) General information which will aid the Agency in determining the adequacy of the scientific basis of the standards which do not include the uses specified in section 101(a)(2) of the Act...</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of...</p> <p>(7) Whether the State standards which do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses, and</p> |

The CWA 101(a)(2) uses are those uses that address “*the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water.*” (CWA Sec. 101(a)(2). The non-101(a)(2) use addressed by the HHC is the designated use of “Domestic Water” (domestic water supply; as defined in WAC 173-201A-600). This use is represented in the criteria calculation by the Drinking Water Intake variable in the criteria equations. Ecology used the value of 2.4 L/day, applied over a lifetime, to represent the exposure pathway of drinking surface waters that are not treated to remove priority pollutant toxics. This value is consistent with EPA’s most recent updates to its CWA Sec. 304(a) National Recommended Water Quality Criteria for human health, and is derived from survey data from EPA’s most recent 2011 Exposure Factors Handbook. The drinking water intake exposure value of 2.4 L/day is explained in more detail in the Decision Document, in the section Human Health Criteria Equations and Variables.

The Drinking Water Intake exposure value of 2.4 L/day was not used in calculation of the criteria for arsenic, copper, and asbestos, which are based on Safe Drinking Water Act (SDWA) values. Washington’s new criteria for copper and asbestos are: (1) the same as EPA’s 304(a) guidance values for these chemicals and, (2) the same values EPA included in its proposed rule for Washington, thus the new criteria for these two chemicals meet the EPA recommendation in 40 CFR 131.11(2)(b)(i), in bold below:

40 CFR 131.11(2) (b) Form of criteria: In establishing criteria, States should:

(1) Establish numerical values based on:

*(i) **304(a) Guidance**; or*

(ii) 304(a) Guidance modified to reflect site-specific conditions; or

(iii) Other scientifically defensible methods;

Special note: Arsenic

Arsenic criteria, apply to both organism + water ingestion. Thus, the following discussion addresses the requirement to base the new arsenic criteria (for non-101(a)(2) uses, as explained above) “*upon appropriate technical and scientific data and analyses,*” as required under 40 CFR 131.5. The new HHC for total arsenic, that was developed to address exposure from contaminants from both organism and water ingestion, are explained in more detail below:

1. Please see the Decision Document section on arsenic for general discussion. In addition, please see information on Ecology’s public process and rule-development materials in Section 2 above, which demonstrate the comprehensive process that considered factors that led to support of the SDWA MCL.

2. *Appropriate use of the SDWA maximum contaminant level (MCL) for arsenic.* Ecology considers the SDWA MCL of 10 ug/L for total arsenic appropriate for CWA use. Use of SDWA regulatory levels as HHC is not unusual for both EPA and states. EPA developed Clean Water Act §304(a) national recommended HHC (for freshwater) for asbestos in 1991 and copper in 1998 based on SDWA regulatory levels (EPA 2002). The SDWA-based asbestos criterion (7,000,000 fibers/L) is currently in EPA’s NTR, and was issued to several states in 1992 and was

retained in the 1999 NTR revision. The copper criterion (1,300 mg/L) was issued by EPA to California in 2000 (40 CFR 131.38 - Establishment of Numeric Criteria for Priority Toxic Pollutants for the State Of California). EPA's 2015 draft HHC regulation for Washington includes retention of the asbestos criterion in the NTR, as well as addition of the SDWA-based copper criterion. The arsenic MCL is based on science and cost, which does not negate full protection of CWA uses, and the CWA does not indicate that SDWA values are inappropriate for CWA use. The EPA went through an extensive process to evaluate science and feasibility to derive and finalize the SDWA arsenic MCL, and that MCL development is based on consideration of newer science (cancer effects) than the older CSF used in EPA's 304(a) criteria for arsenic, and also was subject to a nation-wide public and scientific review through the federal register. The majority of the arsenic in fish and shellfish tissues is in the organic form, which has been found to be less toxic than the inorganic forms (EPA 1997). When the cancer slope factor is finalized in EPA IRIS in the future, EPA has specified that it will be for inorganic arsenic (EPA 2015, *IRIS Program Multi-Year Agenda* (December 2015) at <https://www.epa.gov/iris/iris-agenda>) and as such would be inapplicable to the majority of arsenic in fish and shellfish tissues.

3. *The new criteria requirement at WAC 173-201A-240, Table 240 Footnote A adds unquantified additional protection to the designated uses protected by the new arsenic criterion for organisms + water ingestion.* In addition to other rationale supporting use of the MCL in this discussion, Footnote A, which is part of the new criterion, provides the new numeric criterion additional but unquantified safeguards:

“Footnote A: This criterion for total arsenic is the maximum contaminant level (MCL) developed under the Safe Drinking Water Act. The MCL for total arsenic is applied to surface waters where consumption of organisms-only and where consumption of water + organisms reflect the designated uses. When the department determines that a direct or indirect industrial discharge to surface waters designated for domestic water supply may be adding arsenic to its wastewater, the department will require the discharger to develop and implement a pollution prevention plan to reduce arsenic through the use of AKART. Industrial wastewater discharges to a privately or publicly owned wastewater treatment facility are considered indirect discharges.”

4. *Uncertainty around the cancer slope factor (CSF) for arsenic.* There is considerable scientific uncertainty in assessing carcinogenicity of arsenic. Without a reliable toxicity factor for cancer Ecology cannot calculate arsenic criteria based on cancer. EPA agrees that new cancer-based criteria for arsenic cannot be calculated at this time. In a May 6, 2016 filing with the United States District Court for the Western District of Washington, EPA stated that it will withdraw its proposed arsenic criteria for Washington because “extensive additional scientific analysis is necessary before revised criteria” for arsenic can be promulgated. *Puget Soundkeeper Alliance et. al. V. U.S.E.P.A.*, Case No. 2:16-cv-00293-JLR, EPA's Motion for Summary Judgment (May 6, 2016) at 13. As EPA explained in the Declaration of Elizabeth Southerland, Director of the Office of Science and Technology with EPA's Office of Water, “EPA did not

update its CWA section 304(a) recommended criteria” for arsenic in 2015, and “EPA recognizes that there is substantial uncertainty surrounding the toxicological assessment of arsenic with respect to human health effects.” Declaration of Elizabeth Southerland (May 5, 2016) at 7.

5. *Uncertainty around the bioaccumulation factor (BCF) for arsenic.* The BCF of 44 L/kg used in EPA’s 304(a) criteria is based on total arsenic. This value does not accurately reflect the uptake of inorganic arsenic, the most toxic form of arsenic and the form to which EPA applies its 304(a) criteria. Most of the arsenic in fish and shellfish tissues is in the organic form, which is much less toxic than the inorganic form. EPA (1997; page 10) estimated the percentage of inorganic arsenic in tissue: “*the maximum inorganic arsenic in fish and shellfish used for this estimate is 4% ...The median inorganic arsenic value for the fish and shellfish data... is 0.4%. No inorganic arsenic was detected in 23 of 42 fish samples and 18 of 50 shellfish samples. Therefore, the median value reflects the higher inorganic arsenic concentrations found in shellfish and is a conservative value.*” A BCF specific to inorganic arsenic is not available in EPA’s criteria documents, but applying the data above to the current BCF of 44 L/kg indicates that the BCF of 44 L/kg could be adjusted downward by a large amount if inorganic arsenic only were considered. A new BCF for arsenic, as well as a new Cancer Slope Factor, will be required in order to calculate criteria for arsenic using the HHC equations.

6. *The exposure route of tissue ingestion confers an insignificant proportion of risk in the freshwater setting.* Although Ecology acknowledges the uncertainty in the CSF and the BCF, using the old CSF and BCF in comparative criteria calculations helps to illustrate why the organism ingestion exposure route for the “organisms + water” criteria is largely irrelevant when considering risk levels between 10^{-4} and 10^{-6} , and why it appears the only relevant exposure routes for those waters with drinking water as a designated use (which is most freshwaters in the state) is the drinking water exposure route. Therefore, Ecology considers using the SCWA MCL limit is appropriate.

The same inputs to the organism + water criteria equation for carcinogens that EPA used in its proposed rule for Washington results in the hypothetical criterion with the hypothetical 10^{-6} risk level in the table below. If that criterion concentration is held constant, but the risk level is increased due to changes in the FCR, the small effect of the FCR on the criteria can be seen. Using the EPA inputs and holding all variables other than FCR and risk level constant, it takes 2,240 g/day of fish + 2.4 L/day of drinking water to raise the risk level to 10^{-5} while staying at the same hypothetical water concentration. It takes 22,900 g/day of fish + 2.4 L/day of drinking water to raise the risk level to 10^{-4} while staying at the same hypothetical water concentration. FCR survey data from Washington indicates that no one, even high consuming individuals from the surveys of the highest consuming populations, eat this much fish and shellfish on average on a daily basis over a lifetime. These increases in FCR are possible because the BCF for arsenic is low, and most of the risk is conferred by the exposure to 2.4 L/day of drinking water. In addition, the use of a BCF that was calculated for total arsenic instead of inorganic arsenic, provides a large and unaccounted for protective factor in this example. Since an insignificant

proportion of risk is associated with the exposure to organisms, a criterion based on drinking water protection is appropriate and protective for waters with designated uses of drinking water supply.

| Hypothetical criteria value (ug/L) ¹ | Risk level | Fish consumption rate (g/day) | Fish consumption rate (pounds/day) | Body weight (kg) | Cancer slope factor ³ | Drinking water intake (L/day) | BCF for total arsenic (not inorganic) (L/kg) ⁴ |
|---|------------------|-------------------------------|------------------------------------|------------------|----------------------------------|-------------------------------|---|
| 0.0045 ² | 10 ⁻⁶ | 175 | 0.39 | 80 | 1.75 | 2.4 | 44 |
| 0.0045 | 10 ⁻⁵ | 2,240 | 4.94 | 80 | 1.75 | 2.4 | 44 |
| 0.0045 | 10 ⁻⁴ | 22,900 | 50.49 | 80 | 1.75 | 2.4 | 44 |

Footnotes:

¹ Criteria values were held constant, only the FCR and risk levels were changed in the calculations.

² This is EPA's proposed criteria in its proposed regulation for Washington, which was calculated with the variables shown in this row of the table.

³ This CSF was used for illustrative purposes only. Scientific uncertainty precludes its use in criteria development.

⁴ This is the BCF for total arsenic in tissues from EPA's most recent CWA 304(a) criteria document for arsenic. Most arsenic in tissues is in the organic form (see: EPA 1997. *Arsenic and fish consumption*. EPA 822-R-97-003.) A BCF (or BAF) that expresses total or inorganic arsenic in water to inorganic arsenic in tissue would be much lower than the 44 L/kg used here. In that case the possible FCRs in the table would be even greater. Uncertainty in this value precludes its use in criteria development.

Given the scientific uncertainties associated with calculating human health criteria for arsenic, and given the extensive public and scientific process carried out by EPA to develop a protective MCL appropriate for drinking water exposures, it makes sense for Washington to use the best available regulatory value, based on the best available science, for the arsenic HHC, which at this point is the SDWA MCL. Apart from the approach of adopting the MCL, Ecology could determine no other defensible criteria values available at the current time.

Section 304(a) of the CWA directs EPA to develop guidance values “*reflecting the latest scientific knowledge*“, and 40 CFR 131.3(c) specifies that EPA guidance values are “*based on the latest scientific information*” and that “*this information is issued periodically to the States as guidance for use in developing criteria.*” However, neither the CWA nor the CFR require that states use the 304(a) guidance values or EPA’s guidance documents. Instead, Section 303(c)(1) of the CWA and 40CFR131.2, both direct states to adopt criteria taking into account the “*use and value*” of the resources. Ecology’s broad public process and compliance with APA requirements have accounted for this CWA and CFR requirement.

Section 9 – Implementation of State Rules

| What state must include in submittal | What EPA must review and determine |
|---|--|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review: ...as well as information on general policies applicable to State standards which may affect their application and implementation.</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of...</p> |

Implementation of the new water quality standards is explained in the following Ecology document: *Rule Implementation Plan Water Quality Standards for Surface Waters of the State of Washington, Amendments to Chapter 173-201A WAC*. August 2016. Publication No. 16-10-005.

Section 10 – Requirements of 40 CFR 131.6

| What state must include in submittal | What EPA must review and determine |
|---|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review:</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of... (8) Whether the State submission meets the requirements included in §131.6 of this part and, for Great Lakes States or Great Lakes Tribes (as defined in 40 CFR 132.2) to conform to section 118 of the Act, the requirements of 40 CFR part 132.</p> |
| <p><This is an EPA determination based on this submittal package.></p> | |

Based on its submission in this and other attachments, Ecology considers that the submittal package meets the requirements of 40 CFR 131.6 Minimum requirements for water quality standards submission.

Section 11 - Requirements of 40 CFR 1431.5

| What state must include in submittal | What EPA must review and determine |
|---|---|
| <p>40 CFR 131.6 Minimum requirements for water quality standards submission. The following elements must be included in each State's water quality standards submitted to EPA for review:</p> | <p>40 CFR 131.5 EPA authority. (a) Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. The review involves a determination of... (b) If EPA determines that the State's or Tribe's water quality standards are consistent with the factors listed in paragraphs (a)(1) through (8) of this section, EPA approves the standards. EPA must disapprove the State's or Tribe's water quality standards and promulgate Federal standards under section 303(c)(4), and for Great Lakes States or Great Lakes Tribes under section 118(c)(2)(C) of the Act, if State or Tribal adopted standards are not consistent with the factors listed in paragraphs (a)(1) through (8) of this section. EPA may also promulgate a new or revised standard when necessary to meet the requirements of the Act.</p> |
| <p><This is an EPA determination based on this submittal package.></p> | |

Based on its submission in this attachment, Ecology considers that the information in this submittal to EPA demonstrates that the revisions to WAC 173-201A, adopted on August 1, 2016, are consistent with the factors listed at 40 CFR 131.5 (a)(1) through (8). See table at the beginning of this section for details on how we have responded to these requirements.

Section 12 –Pollutants that Ecology did not adopt criteria for

| Additional information |
|--|
| Pollutants that Ecology did, and did not, adopt criteria for |

The criteria addressed in this rule-making were limited to the human health criteria. Updates of other criteria (e.g., aquatic life-based criteria for toxics, recreational criteria) will be addressed in future rule-making.

Priority pollutants

Ecology adopted HHC for all Clean Water Act (CWA) Sec. 307(a) priority toxic pollutants (40 CFR 423) (except mercury/methyl mercury) for which EPA has developed national recommended numeric HHC, regardless of whether the pollutants are known to be present. Please refer to the Decision Document (section on What Chemicals and Criteria will be included) for the rationale for this approach.

Mercury: Ecology did not adopt criteria for mercury, and plans to adopt criteria for this chemical in a subsequent rule-making. It is most likely that the subsequent rule-making will focus on methylmercury, as opposed to total mercury. EPA’s most recent 304(a) criteria recommendation for the priority pollutant mercury focuses on methylmercury. Please refer to the Decision Document (section on Challenging Chemicals: Methylmercury).

The state currently has criteria for mercury that address human health protection (the NTR criteria, and the marine and freshwater chronic aquatic life criteria at: WAC 173-201A-240). Ecology plans to schedule adoption of new human health criteria for mercury, and develop a comprehensive implementation plan after this water quality standards package has received Clean Water Act approval. Ecology assumes that not adopting HHC criteria for mercury means that Washington’s HHC for total mercury will remain in the NTR (and the state’s chronic aquatic life criteria for mercury) until new mercury criteria are adopted by the state, or are updated by EPA.

Ecology based this decision on the following factors:

- Implementation and control strategies to reduce methylmercury concentrations in fish and shellfish tissue need an integrated approach that uses available Clean Water Act tools, and also other non-Clean Water Act actions.
- Taking time to develop an integrated approach now would slow the progress of the adoption of the other proposed HHC and implementation tools. Ecology considered the scope of the rule-making for mercury and decided that continued progress on the main rule adoption was most important to maintain.

Non-priority pollutants

Ecology did not adopt criteria for the non-priority pollutants for which EPA has developed 304(a) national criteria recommendations (refer to the Decision Document, section What Chemicals and Criteria will be included). Ecology will use the existing narrative statement in WAC 173-201A-240 to protect designated uses from effects of chemicals that do not have numeric criteria. If monitoring, or other information, indicates that non-priority pollutant sources or concentrations are a concern, Ecology will use the narrative statement to protect designated uses from regulated sources. The ongoing triennial review process for the water quality standards will be used to determine whether there is a need to adopt numeric criteria for additional pollutants in future revisions to the water quality standards.

Additional: With regard to bis(2-chloroisopropyl)ether (CAS # 39638-32-9) and bis(2-chloro-1-methylethyl) ether (CAS no. 108-60-1), Ecology recommends that EPA revise the priority pollutant list at Appendix A to 40 CFR Part 423, to reflect the chemical name that EPA considers to be the original intended name.