



ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OW-2004-0019; FRL-9931-21-OW]

Request for Scientific Views: Draft Recommended Aquatic Life Ambient Water Quality Chronic Criterion for Selenium - Freshwater 2015

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of availability.

SUMMARY: The Environmental Protection Agency (EPA) is opening the comment period for the Agency's draft recommended aquatic life water quality chronic criterion for selenium in freshwater. EPA released a previous draft entitled "External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater, 2014" for public comment on May 14, 2014. EPA received scientific views from the public and stakeholders, and convened a contractor-led expert external peer review. EPA considered the results from the expert peer review and scientific views and comments from the public and stakeholders to develop the current draft document, which is now available for comment. Following closure of this public comment period, EPA will consider scientific views from the public on this draft document as well as any new data or information received. EPA will then publish **Federal Register** notice(s) announcing the availability of the final selenium criterion.

DATES: Comments must be received on or before **[INSERT DATE 60 DAYS AFTER**

PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OW-2004-0019, by one of the following methods:

- www.regulations.gov: Follow the on-line instructions for submitting comments.

- Email: *ow-docket@epa.gov*. Attention Docket No. **EPA-HQ-OW-2004-0019**.
- Fax: 202-566-1140
- Mail: **EPA Water Docket, Environmental Protection Agency, Mailcode 2822-IT 1200 Pennsylvania Ave., NW., Washington DC 20640**, Attention Docket No. EPA-HQ-OW-2004-0019. Please include a total of two copies (including references).
- Hand Delivery: EPA Water Docket, EPA Docket Center, William Jefferson Clinton West Building, Room 3334, 1301 Constitution Avenue NW. Washington, DC 20004, Docket No. EPA-HQ-OW-2004-0019. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. [EPA-HQ -2004 -0019]. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through www.regulations.gov or *ow-docket@epa.gov*. The www.regulations.gov website is an “anonymous access” system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to

technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

FOR FURTHER INFORMATION CONTACT:

Kathryn Gallagher, Ph.D., Office of Water, Health and Ecological Criteria Division (4304T), Environmental Protection Agency, 1200 Pennsylvania Avenue NW, Washington, DC 20460; telephone: (202) 564-1398; fax: 202-566-1140, or email: gallagher.kathryn@epa.gov.

SUPPLEMENTARY INFORMATION:

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the EPA-HQ-OW-2004-0019 Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the EPA-HQ-OW-2004-0019 is (202) 566-2426. For additional information about EPA's public docket, visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>.

GENERAL INFORMATION:

I. What Are Recommended Water Quality Criteria?

EPA's recommended water quality criteria are scientifically derived numeric values that protect aquatic life or human health from the deleterious effects of pollutants in ambient water.

Section 304(a)(1) of the Clean Water Act (CWA) requires EPA to develop and publish and, from time to time, revise, criteria for protection of aquatic life and human health that accurately reflect the latest scientific knowledge. Water quality criteria developed under section 304(a) are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects. Section 304(a) criteria do not reflect consideration of economic impacts or the technological feasibility of meeting pollutant concentrations in ambient water.

EPA's recommended section 304(a) criteria provide technical information to states and authorized tribes in adopting water quality standards (WQS) that ultimately provide a basis for assessing water body health and controlling discharges or releases of pollutants. Under the CWA and its implementing regulations, states and authorized tribes are to adopt water quality criteria to protect designated uses (e.g., public water supply, aquatic life, recreational use, or industrial use). EPA's recommended water quality criteria do not substitute for the CWA or regulations, nor are they regulations themselves. EPA's recommended criteria do not impose legally binding requirements. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from these recommendations.

II. What is Selenium and why is EPA Concerned about It?

Selenium is a naturally occurring chemical element that is nutritionally essential in small amounts, but toxic at higher concentrations. Selenium can be released to the environment by a number of anthropogenic sources, such as coal mining, coal-fired power plants (fly ash), irrigated agriculture, and phosphate mining. Selenium is a bioaccumulative pollutant. Fish and other aquatic organisms are exposed to and accumulate selenium primarily through their diet, and not directly through water. Selenium toxicity in fish occurs primarily through maternal

transfer to the eggs and subsequent reproductive effects. Consequently, EPA is updating its national recommended chronic aquatic life criterion for selenium in freshwater to reflect the latest scientific information, which indicates that selenium toxicity to aquatic life is primarily driven by organisms consuming selenium-contaminated food rather than by being directly exposed to selenium dissolved in water.

III. Information on the Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015

EPA prepared a draft aquatic life criterion document for selenium based on the latest scientific information and current EPA policies and methods, including EPA's *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) (EPA/R-85-100) and *Guidelines for Ecological Risk Assessment* (1998) (EPA/630/R-95/002F). Toxicity data and other information on the effects of selenium were obtained from reliable sources and subjected to both internal and, in some cases, external peer review. EPA considered public comments previously collected in response to EPA's 2004 notice of availability (published on December 17, 2004 at 69 FR 75541) and new toxicity data for selenium developed in response to those comments (EPA-822-F-08-005) in the development of the external peer review draft criterion document. EPA also considered information submitted in 2014 during the external peer review and public comment on the "External Peer Review Draft," including additional toxicity data, in developing the current draft criterion.

The draft criterion has four elements (Table 1), consisting of two fish tissue-based and two water column-based elements. The draft criterion document contains a recommendation that states and authorized tribes adopt into their WQS a selenium criterion that includes all four elements. Because fish tissue-based concentration is a more direct measure of selenium toxicity

to aquatic life than water column concentrations, EPA recommends that fish tissue elements be given precedence over the water column elements when both types of data are available, except in certain situations.

The available data indicate that freshwater aquatic life would be protected from the toxic effects of selenium by applying the following four-element criterion:

1. The concentration of selenium in the eggs or ovaries of fish does not exceed 15.8 mg/kg, dry weight;
2. The concentration of selenium (a) in whole-body of fish does not exceed 8.0 mg/kg dry weight, or (b) in muscle tissue of fish (skinless, boneless fillet) does not exceed 11.3 mg/kg dry weight;
3. The 30-day average concentration of selenium in water does not exceed 3.1 µg/L in lotic (flowing) waters and 1.2 µg/L in lentic (standing) waters more than once in three years on average;
4. The intermittent concentration of selenium in water does not exceed

$$WQC_{int} = \frac{WQC_{30\text{-day}} - C_{bckgrnd}}{f_{int}} \text{ more than once in three years on average.}$$

Table 1. 2015 Draft Selenium Chronic Criterion (Freshwater)				
Media Type	Fish Tissue		Water Column³	
Criterion Element	Egg/Ovary¹	Fish Whole Body or Muscle²	Chronic	Intermittent Exposure⁴
Magnitude	15.8 mg/kg	8.0 mg/kg whole body or 11.3 mg/kg muscle (skinless, boneless filet)	1.2 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement ⁵	Instantaneous measurement ⁵	30 days	Number of days/month with an elevated concentration
Frequency	Never to be exceeded	Never to be exceeded	Not more than once in three years on average	Not more than once in three years on average

¹ Overrides any whole-body, muscle, or water column element when egg/ovary concentrations are measured, except in certain situations. See footnote 3.

² Overrides any water column element when both fish tissue and water concentrations are measured, except in certain situations. See footnote 3.

³ Water column values are based on dissolved total selenium (includes all oxidation states, i.e., selenite, selenate, organic selenium and any other forms) in water. Water column values have primacy over fish tissue values under two circumstances: 1) “Fishless waters” (waters where fish have been extirpated, or where physical habitat and/or flow regime cannot sustain fish); and 2) New or increased inputs of selenium until equilibrium is reached.

⁴ Where WQC_{30-day} is the water-column chronic element, C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥ 0.033 (corresponding to 1 day).

⁵ Instantaneous measurement. Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in the fish at a given site. Selenium concentrations in fish tissue are expected to change only gradually over time in response to environmental fluctuations.

The draft criterion document does not include a draft acute criterion (based on water-only exposure) because selenium is bioaccumulative and toxicity primarily occurs through dietary exposure. EPA will consider the public comments, revise the document as necessary, and issue a final updated selenium criterion document. This draft criterion document does not represent and should not be construed to represent any final EPA policy, viewpoint, or

determination.

IV. What is the Relationship between the Draft Chronic Water Quality Criterion and Your State or Tribal Water Quality Standards?

As part of the WQS triennial review process defined in section 303(c)(1) of the CWA, the states and authorized tribes are responsible for maintaining and revising WQS. Standards consist of designated uses, water quality criteria to protect those uses, a policy for antidegradation, and may include general policies for application and implementation. Section 303(c)(1) requires states and authorized tribes to review and modify, if appropriate, their WQS at least once every three years.

States and authorized tribes must adopt water quality criteria that protect designated uses. Protective criteria are based on a sound scientific rationale and contain sufficient parameters or constituents to protect the designated uses. Criteria may be expressed in either narrative or numeric form. States and authorized tribes have four options when adopting water quality criteria for which EPA has published section 304(a) criteria. They can:

- (1) Establish numerical values based on recommended section 304(a) criteria;
- (2) Adopt section 304(a) criteria modified to reflect site-specific conditions;
- (3) Adopt criteria derived using other scientifically defensible methods; or
- (4) Establish narrative criteria where numeric criteria cannot be established or to supplement numerical criteria (40 CFR 131.11(b)).

It is important for states and authorized tribes to consider any new or updated section 304(a) criteria as part of their triennial review to ensure that state or tribal WQS reflect current science and protect applicable designated uses. The recommendations in the draft selenium criterion document may change based on scientific views shared in response to this notice. Upon finalization, the updated selenium criterion would supersede EPA's previous 304(a) freshwater

criteria for selenium.

Consistent with 40 CFR 131.21, new or revised water quality criteria adopted into law or regulation by states and authorized tribes on or after May 30, 2000 are in effect for CWA purposes only after EPA approval.

To support EPA's upcoming CWA section 304(a) ambient water quality criteria recommendations for selenium, EPA is developing informational materials to aid state and tribal adoption. These informational materials will be released when the final selenium criterion is published.

V. Solicitation of Scientific Views:

EPA is soliciting additional scientific views, data, and information regarding the science and technical approach used by the Agency in the derivation of this draft freshwater chronic criterion for selenium. The Agency has identified two particular issues (detailed below), for which additional data and information are solicited.

1. Request for Additional Data and Information related to the Sensitivity of Cyprinids (minnow species) to Selenium.

During the 2014 public comment process, EPA received comments that included data on zebrafish (*Danio rerio*) toxicity testing with selenium. (Public comment EPA-HQ-OW-2004-0019-0354; <http://www.regulations.gov/>). The commenters suggested that the data be used by the EPA in its revision of the egg-ovary criterion element, since the zebrafish study was a maternal transfer study similar to those used in the external peer review draft. In response to the comments, EPA solicited the study and all underlying data from the authors of the study referenced by the commenters (Thomas and Janz, 2014). EPA undertook a comprehensive data review of the study and data.

During its review, EPA identified concerns regarding the concentration response curve of the zebrafish toxicity test compared to the other fish species toxicity tests that EPA used in derivation of the 2014 draft criterion. The zebrafish data showed an anomalously shallow concentration response curve compared to data from all other tested fish species. Further, high control mortality (47%) at the end of the study raised concerns about the study design as well as the health of the fish at the time of testing. In addition, since the zebrafish is a non-native cyprinid species, EPA assessed the information available on zebrafish sensitivity to selenium compared to the sensitivity of native cyprinid (minnow) species across the United States (Appendix D in the criteria document), including several studies where native cyprinids were investigated in selenium-impacted waters. Data from these studies suggest that native cyprinids are likely less sensitive to selenium than the currently available non-native zebrafish data suggest. The results of the study, particularly a comparison of the concentration response relationships of zebrafish vs. all of the other fish species for which we have similar data, raises a concern.

Given these concerns, EPA has not used the zebrafish data quantitatively in the derivation of the revised criterion. EPA seeks additional information on cyprinid taxa sensitivity to selenium, and particularly additional data on zebrafish. These studies should be submitted to the docket in similar fashion as scientific views on the criterion document. EPA will then consider this information in finalizing the selenium criterion document.

2. Request for Additional Data and Information on the Dynamics of Selenium Equilibrium in Lentic and Lotic waters related to New or Increased Selenium Inputs.

EPA's draft selenium water quality criterion recommends that elements based on fish tissue (egg-ovary, whole body, and/or muscle) data should override the criterion elements based on

selenium water column data. The criterion is structured this way because fish tissue concentrations generally provide the most robust and direct information on potential selenium effects in fish. However, because selenium concentrations in fish tissue are a result of selenium bioaccumulation via dietary exposure, there are specific circumstances where the fish tissue concentrations are not expected to fully represent potential effects on fish and the aquatic ecosystem: waters with new or increased selenium inputs, prior to equilibrium within the food web; and “fishless waters” (waters where fish have been extirpated or where physical habitat and/or flow regime cannot sustain fish).

For the purposes of EPA’s draft recommendations, EPA considers new inputs to be new activities resulting in selenium being released into a lentic or lotic waterbody. Increased inputs are increases from a current activity in which selenium is being released into a lentic or lotic waterbody. New or increased inputs of selenium into the water and hence into the food web, likely will result in increased bioaccumulation of selenium in fish over a period of time until the selenium from the new or increased selenium release achieves a quasi-“steady state” balance within the food web. EPA estimates that concentrations of selenium in fish tissue will not represent a “steady state” for up to several months in lotic systems, and longer time periods (e.g., 2 to 3 years) in lentic systems, dependent upon the size and bathymetry of a given system; the location of the selenium input related to the shape and internal circulation of the waterbody, particularly in reservoirs with multiple riverine inputs; and the particular food web. EPA recommends that in implementing a selenium water quality criterion to protect aquatic life, fish tissue concentrations of selenium not override water column concentrations until sufficient time has passed to allow equilibrium to be attained in the food web of lotic and lentic systems. Estimates of steady state under new or increased selenium input situations are expected to be site

dependent. Local information should be used to better refine an estimate of time to steady state for a particular waterbody. EPA seeks data and information that EPA can include in its final recommendations on time intervals during which fish tissue concentrations should not override water column concentrations.

SUPPLEMENTARY INFORMATION:

EPA will make the external peer review and public comments, as well as Agency responses to these comments on the previously published External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2014 (EPA 822-P-14-001) (External Peer Review Draft), available in the docket with the revised draft selenium criteria document at *www.regulations.gov*.

Dated: July 17, 2015.

Kenneth J. Kopocis,
Deputy Assistant Administrator,
Office of Water.

[FR Doc. 2015-18348 Filed: 7/24/2015 08:45 am; Publication Date: 7/27/2015]