

Frequently Asked Questions: Implementing Water Quality Standards Based on EPA's 2016 Recommended Selenium Criterion in Clean Water Act Section 402 NPDES Permits

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This document supports Clean Water Act (CWA) regulators in states, territories, and authorized tribes¹ in implementing state water quality standards based on the U.S. Environmental Protection Agency (EPA) recommended four-part selenium water quality criterion (WQC)² in EPA’s 2021 Revision to: Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016 (USEPA 2021a; here after referred to as Aquatic Life Ambient Water Quality Criteria for Selenium – Freshwater 2016) as it relates to the CWA section 402 National Pollutant Discharge Elimination System (NPDES) permits. A summary of the recommended criterion is provided in Table 1. This set of frequently asked questions (FAQs) provides information on how to establish water quality-based effluent limits (WQBELs) in NPDES permits.

While this document cites statutes and regulations that contain requirements applicable to NPDES permitting, it does not impose legally binding requirements on EPA, states, authorized tribes, other regulatory authorities, or the regulated community and may not apply to a particular situation based upon the circumstances. EPA, state, tribal, and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those provided in this technical support document as appropriate and consistent with statutory and regulatory requirements. EPA may update this document as new information becomes available. In addition to this document, EPA has related documents that provide considerations and recommendations on implementing the national CWA section 304(a) recommended selenium criterion for freshwater, which are available at EPA’s selenium website: <https://www.epa.gov/wqc/aquatic-life-criterion-selenium>.

Note: For applicable state or authorized tribal water quality standards (WQS) that are not based on the national CWA section 304(a) recommended selenium criterion, EPA will assess the need for alternative state or authorized tribal specific implementation permitting guidance to ensure consistency with the NPDES permitting requirements at Title 40 of the Code of Federal Regulations (CFR) section 122.44.

¹ Throughout this document and in the [CWA](#), the term “states” means a state, the District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands. CWA section 502(3). The term “authorized tribe” means those federally recognized Indian tribes with authority to administer a CWA WQS program.

² These FAQs apply specifically with respect to an EPA-approved state and tribal water quality criterion for selenium that is based on EPA’s national CWA section 304(a) recommended selenium criterion – that is, one that includes elements substantially identical to the recommended selenium criterion. Where the applicable state or tribal water quality criterion for selenium differs from EPA’s recommended selenium criterion, these FAQs may not be relevant or applicable. As required by CWA section 301(b)(1)(C), permit writers must include limits necessary to meet the applicable state or tribal water quality criterion.

Table of Contents

INTRODUCTION	1
EPA’s National CWA section 304(a) Recommended Chronic Aquatic Life Selenium Criterion in Freshwater	1
Selenium Technical Support Materials	3
1. IDENTIFYING THE APPLICABLE SELENIUM WQS TO IMPLEMENT IN THE NPDES PERMIT	4
Q1-1: What is the applicable selenium criterion to use for conducting a reasonable potential (RP) determination or for developing effluent limits in an NPDES permit?	4
Q1-2: Which criterion elements of EPA’s CWA section 304(a) recommended four-part criterion for selenium should be used when implementing the criterion through the NPDES permits program?	5
Q1-3: Does state or authorized tribal adoption of a site-specific value for either egg-ovary or whole body/muscle elements require EPA approval under CWA section 303(c) before using the site-specific value in NPDES permitting?	6
Q1-4: When using the water column criterion element, can permit writers use mixing zones, initial zones of dilution, or dilution factors in NPDES permits?	7
2. NPDES REASONABLE POTENTIAL DETERMINATIONS	7
Q2-1: Which elements of the four-part criterion included in state or authorized tribal WQS for selenium should be used for conducting RP analyses?	7
Q2-2: How should a regulatory authority determine the appropriate water column criterion element based on the four-part criterion (e.g., a 30-day chronic criterion element versus an intermittent criterion element) for use in an NPDES permit?	9
Q2-3: What data should be used to assess RP using the four-part criterion?	10
Q2-4: In cases where a discharge occurs to a lotic (e.g. a flowing stream) water, but downstream waters are lentic (e.g., lakes, impoundments), which selenium criterion water column element should be used in the RP analysis?	10
Q2-5: In some cases, it might be unclear whether a receiving or downstream water body is lentic or lotic with regard to an appropriate selenium water column criterion element (e.g., run-of-the-river reservoirs). Does EPA have recommendations that address whether a receiving water body should be considered lentic or lotic for purposes of NPDES RP analysis and permit WQBEL determinations?	10
3. NPDES PERMIT WQBEL CALCULATIONS	11
Q3-1: Can an NPDES permitting authority derive selenium WQBELs using an EPA- approved state or authorized tribal WQS based on EPA’s recommended four-part selenium criterion for a noncontinuous or intermittent effluent discharge containing selenium? If so, how?	11
Q3-2: Can an NPDES permitting authority develop WQBELs using the fish tissue criterion element(s) of the four-part selenium criterion (i.e., egg-ovary or whole body and/or muscle) rather than the water column elements?	12

Q3-3: Can the selenium WQBEL be expressed in units of mg/kg selenium in ambient fish tissue, measured by dry weight?	12
Q3-4: The national CWA section 304(a) recommended selenium criterion does not include an acute expression. Must permits contain both short- and long-term limit expressions?	13
Q3-5: Should the selenium WQBEL be expressed as total recoverable selenium? If so, how should an NPDES permitting authority translate the dissolved selenium water column criterion element of the national CWA section 304(a) recommended selenium criterion to a total recoverable selenium concentration for a NPDES permit limit?	14
4. NPDES MONITORING (BASIS FOR RP AND WQBELS, COMPLIANCE MONITORING)	15
Q4-1: What EPA analytical test methods are recommended for analyzing water and fish tissue samples for selenium under EPA’s NPDES permits program?	15
5. COMPLIANCE SCHEDULES IN NPDES PERMITS	15
Q5-1: Would a compliance schedule be allowed in a renewed, modified, or reissued NPDES permit in which an existing WQBEL is being replaced with a more stringent NPDES permit limit or a new NPDES permit limit based on an EPA-approved state or tribal selenium criterion reflecting EPA CWA section 304(a) recommended selenium criterion?	15
REFERENCES	16
ATTACHMENT 1: EPA’S RECOMMENDED FLOWCHARTS FOR IMPLEMENTING THE NATIONAL CWA SECTION 304(A) RECOMMENDED SELENIUM CRITERION IN NPDES PERMITS PROGRAM	18

List of Acronyms

µg/L	micrograms per liter
AML	Average monthly limit
CFR	Code of Federal Regulations
CV	Coefficient of variation
CWA	Clean Water Act
EPA	Environmental Protection Agency
FAQ	Frequently asked question
FT	Fish tissue
FTE	Fish tissue element
LTA	Long-term average
MDL	Maximum daily limit
mg/kg	milligrams per kilogram
NPDES	National Pollutant Discharge Elimination System
POTW	Publicly owned treatment works
RP	Reasonable potential
TMDL	Total maximum daily load
TSD	Technical support document
USEPA	United States Environmental Protection Agency
WC	Water column
WCE	Water column element
WLA	Wasteload allocation
WQBELs	Water quality-based effluent limits
WQC	Water quality criterion
WQS	Water quality standards

Definitions

bioaccumulation

The uptake and retention of a chemical by an aquatic organism from all surrounding media (e.g., water, food, sediment) (USEPA 2003).

chronic

A stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. The measurement of a chronic effect can be growth, reduced reproduction, etc., in addition to lethality (USEPA 1991).

coefficient of variation

A standard statistical measure of the relative variation of a distribution or set of data, defined as the standard deviation divided by the mean (USEPA 1991).

frequency

How often criteria can be exceeded without unacceptably affecting the community (USEPA 1991).

lentic

Characterized by largely standing water, such as lakes and ponds (Jones 1997).

lotic

Characterized by flowing water, such as rivers and streams (Jones 1997).

magnitude

How much of a pollutant (or pollutant parameter such as toxicity), expressed as a concentration or toxic unit is allowable (USEPA 1991).

reasonable potential (RP)

Where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

steady state

An organism is in steady state when the rates of chemical uptake and depuration are equal and tissue concentrations remain constant over time (USEPA 2003). For the purposes of the national

CWA section 304(a) recommended selenium criterion, steady state refers to conditions where sufficient time has passed after the introduction of a new or increased discharge of selenium into a water body so that fish tissue concentrations of selenium are no longer increasing (USEPA 2016).

total maximum daily load (TMDL)

The sum of the individual wasteload allocations and load allocations. A margin of safety is included with the two types of allocations so that any additional loading, regardless of source, would not produce a violation of water quality standards (USEPA 1991).

wasteload allocation (WLA)

The portion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution (USEPA 1991).

water quality criteria (WQC)

Comprised of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by EPA or States for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal (USEPA 1991).

water quality standard (WQS)

A law or regulation that consists of beneficial designated use or uses of a water body, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an antidegradation statement (USEPA 1991).

Introduction

EPA's National CWA section 304(a) Recommended Chronic Aquatic Life Selenium Criterion in Freshwater

In 2016, EPA updated its national CWA section 304(a) recommended chronic aquatic life criterion for selenium in freshwater systems to reflect the latest scientific information. This information indicates that toxicity to aquatic life is driven by dietary exposures, and that the reproductive life-stages of egg-laying vertebrates are the most sensitive to the toxic effects of selenium. The recommended criterion has four criterion elements: (1) a fish egg-ovary criterion element; (2) a fish whole-body and/or muscle criterion element; (3) a water column criterion element (one value for lentic and one value for lotic aquatic systems); and (4) a water column intermittent criterion element (to account for potential chronic effects from short-term exposures to high concentrations in lentic and lotic aquatic systems (see Table 1)). Under EPA's 2016 CWA section 304(a) recommended selenium criterion, the fish tissue criterion elements have primacy over water column elements, except where there are no fish, where fish tissue data do not meet state or tribal quality assurance procedures, or for water bodies with new discharges and hence selenium concentrations in fish tissue might not have stabilized (USEPA 2018a). EPA also recommends that the egg-ovary tissue criterion element has primacy over the whole-body and/or muscle tissue criterion element.

Toxicity data indicate that the selenium concentration in fish eggs and ovaries is the most robust and consistent measurement endpoint directly linked to adverse reproductive effects in aquatic organisms. Likewise, toxicity to developing embryos and larvae is directly linked to egg selenium concentration (USEPA 2021a). EPA derived the whole-body, muscle tissue, and water column elements from the egg-ovary criterion element so that states and authorized tribes could more readily implement WQC based on EPA's national CWA section 304(a) recommended selenium criterion. The assessment of the available data on chronic selenium exposure for fish, invertebrates, and amphibians indicated that a criterion element derived from fish is expected to be protective of the aquatic community, because other taxa appear to be less sensitive to selenium than fish.

EPA did not develop an acute criterion for selenium when it updated the chronic criterion because, although selenium may cause acute toxicity at high concentrations, the most deleterious effects on aquatic organisms are due to selenium's bioaccumulative properties. The bioaccumulative effects, coupled with chronic effects, occur at lower concentrations than acute effects. In the case of bioaccumulative compounds like selenium, acute toxicity studies do not address risks that result from chronic exposure to chemicals via the diet (i.e., through the food web pathway). Such studies also do not account for the accumulation kinetics of many bioaccumulative compounds, such as selenium, and may underestimate effects from long-term accumulation in some types of aquatic systems. As described in EPA's *Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016*, EPA also included an intermittent exposure criterion element to provide protection from the most significant selenium toxicity effects, reproductive toxicity, by protecting against selenium bioaccumulation in the aquatic ecosystem resulting from short-term, high concentration exposure events (USEPA 2016a).

EPA recommends, as stated in the *Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016*, that states and authorized tribes³ adopt into their WQS a selenium criterion that includes all four criterion elements (USEPA 2021a). For more information see EPA’s *Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016*, which can be found at:

<https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf>

Table 1: Summary of the Recommended Freshwater Selenium Ambient Chronic Water Quality Criterion for Protection of Aquatic Life.

Media Type	Fish Tissue ¹		Water Column ⁴	
Criterion Element	Egg-ovary ²	Fish Whole-body or Muscle ³	Monthly Average Exposure	Intermittent Exposure ⁵
Magnitude	15.1 mg/kg dry weight	8.5 mg/kg dry weight whole-body or 11.3 mg/kg dry weight muscle (skinless, boneless fillet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement ⁶	Instantaneous measurement ⁶	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average

1. Fish tissue elements are expressed as steady state.
2. Egg-ovary supersedes any whole-body, muscle, or water column element when fish egg-ovary concentrations are measured, except as noted in footnote 4 below.
3. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured, except as noted in footnote 4 below.
4. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. When selenium inputs are increasing, water column values are the applicable criterion element in the absence of steady state condition fish tissue data.
5. Where WQC_{30-day} is the monthly average exposure from previous column for either lentic or lotic waters; C_{bkgnd} 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).
6. Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.

³ Throughout this document and in the [CWA](#), the term “states” means the fifty states, the District of Columbia, the Commonwealth of Puerto Rico, the United States Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands. CWA section 502(3): The term “authorized tribe” means those federally recognized Indian tribes with authority to administer a CWA WQS program.

Selenium Technical Support Materials

EPA has prepared a four-volume set of documents to provide recommendations to states, authorized tribes, and other agencies for implementing the WQC based on the national CWA section 304(a) recommended selenium criterion (USEPA 2016a). These four documents constitute the Technical Support Materials for EPA's *Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016* (USEPA 2021a). Each document focuses on a specific aspect of implementation of the national CWA section 304(a) recommended selenium criterion. Together, these four EPA documents provide information to assist states and authorized tribes with adopting the WQC based on EPA's CWA section 304(a) recommended selenium criterion and implementing it in various CWA programs.

- 1) *Technical Support for Adopting and Implementing EPA's Selenium 2016 Criterion in Water Quality Standards, Draft* (USEPA 2021b): provides recommendations for the adoption and implementation of the national CWA section 304(a) recommended selenium criterion, including the various flexibilities available to states and tribes using WQS tools.
- 2) *Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion, Draft* (USEPA 2021c): provides an overview on how to establish or enhance existing fish tissue monitoring programs to facilitate implementation of the fish tissue-based criterion elements in the national CWA section 304(a) recommended selenium criterion.
- 3) *Frequently Asked Questions: Implementing Water Quality Standards Based on EPA's 2016 Recommended Selenium Criterion in Clean Water Act Section 402 NPDES Permits, Draft*: is intended to help NPDES permit writers understand what permitting guidance (i.e., state or tribal implementation procedures) may be appropriate to implement state and authorized tribal WQS based on EPA's CWA section 304(a) recommended selenium criterion. This set of FAQs also provides recommendations on how to establish water quality-based effluent limits (WQBELs) in NPDES permits.
- 4) *Frequently Asked Questions (FAQs): Implementing the 2016 Selenium Criterion in Clean Water Act Sections 303(d) and 305(b) Assessment, Listing, and Total Maximum Daily Load (TMDL) Programs, Draft* (USEPA 2021d): provides information on how to complete assessments, list impaired waters, and develop TMDLs based on EPA-approved WQS that adhere to EPA's national CWA section 304(a) recommended selenium criterion, including all four elements.

In addition to the four-part selenium criterion, states or authorized tribes may want to adopt a method to derive site-specific water column criterion elements. Referred to by EPA as a “performance-based approach,” EPA first formalized this concept for a WQS in the preamble of the rule, *EPA Review and Approval of State and Tribal Water Quality Standards* (USEPA 2000). In the preamble, EPA describes this approach as a WQS that is a transparent process, rather than a specific outcome. The state or authorized tribe can adopt a process, such as a criterion derivation methodology, rather than a specific outcome, such as a concentration of a pollutant. If a state or authorized tribe adopts a process or methodology that is sufficiently detailed and has suitable safeguards that ensure predictable, repeatable outcomes, EPA can approve that process

as a WQS. This approval would also serve for CWA purposes as the approval of each outcome generated from following that process or method. The performance-based approach is defined in section 1.2.2 of EPA's *Technical Support for Adopting and Implementing EPA's Selenium 2016 Criterion in Water Quality Standards, Draft* as a recommended approach to developing a site-specific water column criterion element in which, "*States and authorized tribes can choose to adopt into their WQS and submit to EPA [for review and approval under CWA section 303(c)] a set of procedures to facilitate the translation of the fish tissue criterion concentration elements into site-specific water concentration values.*" Currently, the performance-based approach for development of WQS for selenium is based on the availability of fish tissue data and therefore is not appropriate for fishless waters.

This document addresses questions about NPDES permitting based on state or authorized tribal WQS that include elements based on EPA's recommended selenium criterion (USEPA 2021a). It is intended to help NPDES permit writers understand what permitting guidance (i.e., state or tribal implementation procedures) may be appropriate to implement EPA-approved state and authorized tribal WQS based on EPA's CWA section 304(a) recommended selenium criterion (USEPA 2021a). The four-part recommended criterion, as summarized in Table 1, replaces EPA's 1987 recommended selenium acute and chronic water quality criteria

1. Identifying the Applicable Selenium WQS to Implement in the NPDES Permit

Q1-1: What is the applicable selenium criterion to use for conducting a reasonable potential (RP) determination or for developing effluent limits in an NPDES permit?

A1-1: Permits must include limits necessary to meet the applicable state or tribal water quality standards, as required by CWA section 301(b)(1)(C). The applicable selenium criterion for CWA purposes is a state or authorized tribal criterion that has been approved by EPA as protective of the water body's designated uses. Accordingly, permit writers must develop WQBELs, where RP has been demonstrated, to meet a state's or authorized tribe's applicable EPA-approved selenium criterion (see CWA 301(b)(1)(C) and NPDES regulations at 40 CFR Part 122.44(d)(1)). In addition, a state or authorized tribal permit writer may have authority under a state statute or regulation or tribal law to include WQBELs necessary to meet a more stringent state or authorized tribal WQC for selenium that has not yet been approved by EPA. Permit writers must also include more stringent conditions necessary to meet other appropriate water-quality related requirement(s) under state or tribal law if a state or authorized tribe specified such conditions in a CWA section 401 certification.

As a component of their EPA-approved WQS, a state or authorized tribe's selenium aquatic life criterion, could be based on: (1) the national CWA section 304(a) recommended selenium criterion; (2) EPA's 1987 recommended selenium criteria; (3) Water Quality Guidance for the Great Lakes System, 40 CFR Part 132.6, (60 FR 15387, March 23, 1995); or (4) other scientifically defensible methods. A state or authorized tribe's selenium criterion might be adopted either on a site-specific basis, or throughout the state or tribe's jurisdiction, and used to protect applicable designated uses of the receiving water.

In addition, there may be EPA-promulgated WQS for selenium for certain waters. For waters covered by EPA's federally promulgated WQS, the permit writer must conduct a RP determination (40 CFR Part 122.44(d)(1)) and if RP is demonstrated develop a WQBEL that is protective of the state or tribal WQS (CWA 301(b)(1)(C)).

EPA's approved state and authorized tribal WQS are available at <http://water.epa.gov/scitech/swguidance/standards/wqslibrary/index.cfm>.

Q1-2: Which criterion elements of EPA's CWA section 304(a) recommended four-part criterion for selenium should be used when implementing the criterion through the NPDES permits program?

A1-2: Where a state has adopted a selenium aquatic life criterion based on EPA's recommended four-part criterion (see previous FAQ A1-1), the NPDES permitting authority can use any of the criterion elements to assess the need for and to establish effluent limits as stringent as necessary to meet the applicable selenium criterion. While all four elements of EPA's 2016 selenium criterion could be used to evaluate reasonable potential and develop permit limits for a permittee, EPA recommends primacy in the use of fish tissue elements (i.e., egg-ovary, or whole body/muscle) over the water column elements for receiving waters where the designated use includes protecting fish and where steady state fish tissue concentrations have been achieved. This recommendation is because selenium toxicity is closely associated with fish reproductive impairment due to maternal transfer, resulting in embryotoxicity and teratogenicity (USEPA 2021a). For the purposes of the national CWA section 304(a) recommended selenium criterion, steady state⁴ refers to conditions where sufficient time has passed after the introduction of a new or increased discharge of selenium into a water body, such that fish tissue concentrations of selenium are no longer increasing. The flowcharts provided in Attachment 1 present a recommended approach that considers both the fish tissue and water column elements of the criterion. Specific questions about using the four-part criterion to assess RP and WQBEL development are discussed in sections two through four of this document.

Considerations when using the water column criterion element include the following:

1. The relationship between the concentration of selenium in the tissues of fish and the concentration of selenium in the water column can vary substantially across aquatic systems.
2. The species of fish, species and proportion of prey, and a variety of site-specific biogeochemical factors affect selenium bioaccumulation. As a result, these factors determine the allowable concentration of selenium in ambient water that is protective of aquatic life.
3. Water column element (WCE) is the recommended part of the criterion to use in fishless waters or for new discharges and other scenarios where fish are not at steady state in terms of selenium bioaccumulation.

⁴ This definition of steady state applies to the national CWA section 304(a) recommended selenium criterion. It does not apply to the discussion of steady state modeling or conditions in USEPA 1991. For more information on the definition of steady state, see USEPA 2018a.

Due to the site-specific nature of this relationship, EPA provides two recommended approaches for translating a selenium fish tissue criterion element to a site-specific water column value. The first approach is the mechanistic model used by EPA to derive its default water column criterion elements. The second modeling approach uses an empirical bioaccumulation factor approach. Both approaches are described in detail in Appendix K of *Aquatic Life Ambient Water Quality Criterion for Selenium– Freshwater 2016* (USEPA 2021a). They can be used to derive either site-specific values for the water column elements individually adopted into a state’s WQS and submitted to EPA for review, adopted into a state’s WQS as part of a performance-based approach used to derive site-specific water column values, or used to develop site-specific water column values that NPDES permit writers use to implement fish tissue based WQC to perform RP analyses and calculate WQBELs. An exception is in the case of fishless waters, where a performance-based approach is not appropriate (see Appendix K of *Aquatic Life Ambient Water Quality Criterion for Selenium– Freshwater 2016*) (USEPA 2021a).

Within this NPDES FAQ document, references to the “water column criterion element” could mean the national default water column criterion element, a state- or site-specific water column value approved by EPA, a site-specific water column value based on an invertebrate toxicity threshold approved by EPA, or a site-specific water column value developed using a performance-based approach where appropriate and approved by EPA. **Please see: *Technical Support for Adopting and Implementing EPA’s 2016 Recommended Selenium Criterion in Water Quality Standards, Draft (EPA 820-F-16-010, USEPA 2018a)* for additional discussion regarding the flexibilities available to states in the adoption of water column criterion elements.**

Q1-3: Does state or authorized tribal adoption of a site-specific value for either egg-ovary or whole body/muscle elements require EPA approval under CWA section 303(c) before using the site-specific value in NPDES permitting?

A1-3: Site-specific values for fish tissue criterion elements would require EPA approval under CWA section 303(c) where such criteria are applicable for CWA purposes, including NPDES permitting (40 CFR 131.21(c)). However, as indicated in A1-1, a state or authorized tribal permit writer may have authority under a state statute or regulation or tribal law to include a WQBEL necessary to meet a more stringent state or authorized tribal criterion that has not yet been approved by EPA, or to include such conditions as part of their CWA section 401 certification.

The whole-body fish and fish muscle element as well as the water column elements in the national CWA section 304(a) recommended selenium criterion are derived from the egg-ovary criterion element. As a result, any state or authorized tribe that adopts a site-specific value for the egg-ovary criterion element and intends to also use other CWA section 304(a) selenium criterion elements in their WQS, would need to derive the related whole body/muscle and water column criterion elements from the site-specific egg-ovary criterion element. They would then need to submit those related criterion elements to EPA for review and approval under CWA section 303(c) as well. See EPA’s *Technical Support for Adopting and Implementing EPA’s 2016 Recommended Selenium Criterion in Water Quality Standards, Draft* for additional discussion on development of site-specific criterion values for the elements of the four-part criterion (USEPA 2018a).

Q1-4: When using the water column criterion element, can permit writers use mixing zones, initial zones of dilution, or dilution factors in NPDES permits?

A1-4: If applicable state or authorized tribal WQS allow mixing zones or consideration of dilution for bioaccumulative pollutants such as selenium, the permit writer may use mixing zones or dilution allowances in assessing the need for and deriving WQBELs. In such cases, WQS should be met during critical conditions⁵ after accounting for allowable dilution or at the edge of the regulatory mixing zone. The permit or fact sheet should describe the geographic extent of the mixing zone or dilution volume allowed under the permit. The NPDES permitting authority should make any allowance for dilution or mixing on a case-by-case basis that accounts for site-specific conditions, including effluent flow, stream flow, and ambient pollutant concentrations.

EPA recommends in section 5.1.2 of its online *Water Quality Standards Handbook* that states and tribes should carefully consider whether mixing zones are appropriate where a discharge contains bioaccumulative pollutants (USEPA 2014). When the applicable state or authorized tribal WQS prohibit mixing zones or consideration of dilution for bioaccumulative pollutants such as selenium, the permit writer must develop WQBELs that meet EPA-approved state or authorized tribal WQS at the point of discharge.

As stated in Section 2.2.2 of EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD) (USEPA 1991), mixing zones for bioaccumulative pollutants should be restricted such that they do not affect areas often used for fish harvesting, particularly of stationary species such as shellfish. In addition, mixing zones for bioaccumulative pollutants might be denied to account for uncertainties in the assimilative capacity of the water body. As stated in Section 4.3.4 of the TSD, where evidence indicates a lack of assimilative capacity for a bioaccumulative pollutant, mixing zones may not be appropriate.

2. NPDES Reasonable Potential Determinations

Q2-1: Which elements of the four-part criterion included in state or authorized tribal WQS for selenium should be used for conducting RP analyses?

A2-1: Any of the elements from the recommended four-part selenium criterion that have been approved by EPA and adopted as part of the state or authorized tribal water quality standards can be used by the permitting authority to determine whether the discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the applicable WQS. If a state or authorized tribe has steady state, site-specific fish tissue data available (that were collected under and met a quality-assurance plan according to EPA's guidance *Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion* (USEPA 2021c), that information should be used directly to assess RP consistent with the state

⁵ With respect to "critical conditions" for fish tissue sampling, Section 2.1 of EPA's *Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion* outlines a monitoring strategy that could be used to properly collect adequate fish tissue samples including a recommendation on fish species and timing for collection of different tissue types.

or tribe's approved WQS on a case-by-case basis (USEPA 2021c)⁶. In fishless waters or where steady state conditions are not met, the water column elements can be used to conduct RP analyses. Since the water column element was derived to be protective of fish, the state or authorized tribe can use the water column element to conduct RP analyses for any discharge to freshwater. Given the complexities of collecting fish tissue data, documenting steady state conditions in the water body with respect to selenium tissue concentrations over time, and the current lack of an approved analytical method for selenium in fish tissue in 40 CFR Part 136, states and authorized tribes may choose to use the water column element in RP analyses for selenium at the present time. In any case, such determinations should ensure that state and authorized tribal WQS are protected. The flowcharts in Attachment 1 summarize a recommended decision tree for conducting RP analyses assuming the state or tribe has adopted all four elements of the selenium criterion. The information outlined below and illustrated in Attachment 1 considers both the fish tissue and water column elements of the selenium criterion when conducting an RP analysis where fish tissue data are representative of steady state conditions in the water body. See the "Permitting for New or Increased Dischargers" flowchart (Attachment 1). Permit writers may want to consider requesting fish tissue monitoring to demonstrate whether fish are at steady state and for use in assessing reasonable potential. See the "Permitting for Existing Dischargers" and "Permitting for New or Increased Dischargers" flowcharts (Attachment 1).

- a. **Fish Tissue Data Available (With Criterion Excursion in Fish at Steady State):** If site-specific fish tissue concentrations indicate an excursion of the applicable fish tissue criterion elements (as explained in Question 1 of *Frequently Asked Questions (FAQs): Implementing the 2016 Recommended Selenium Criterion in Clean Water Act Section 303(d) and 305(b) Assessment, Listing, and Total Maximum Daily Load (TMDL) Programs, Draft* (USEPA 2021d)⁷) and a facility discharges detectable quantities of selenium to the water body, then the facility would have RP and the permit must contain a WQBEL limiting selenium discharge. See the "Permitting for Existing Dischargers" flowchart (Attachment 1).
- b. **Fish Tissue Data Available (With No Criterion Excursion in Fish at Steady State):**⁸ If a state or authorized tribe has site-specific fish tissue data available that do not indicate an excursion of the fish tissue criterion elements of the four-part selenium criterion, these fish tissue data may be used by the permitting authority to determine whether there is the "***reasonable potential to cause or contribute***" to an excursion of the WQS. When conducting an RP determination, the permitting authority shall take into account existing controls on point and nonpoint sources of

⁶ USEPA 2021c addresses fish tissue monitoring for assessment of the fish tissue elements of the selenium criterion and for the development of site-specific water column criterion elements. Elements of this document will be useful for consideration when sampling fish for RP determinations, such as target species and tissue types, however some elements may differ such as temporal and spatial considerations (e.g. distance from the facility, age of data) that may be specific to RP determinations.

⁷ See USEPA 2021d for additional information on assessing fish tissue data for the national CWA section 304(a) recommended selenium criterion (see FAQs 7-10).

⁸ EPA recommends that WQBELs be developed from fish tissue criterion elements where selenium loads discharged to the water body (including but not limited to the permitted load) are consistent over time and fish tissue measurements are representative of steady state conditions. See Section 3.4 and Appendix K of USEPA 2016.

pollution, the variability of the pollutant or pollutant parameter in the effluent, and, where appropriate, the dilution of the effluent in the receiving water (40 CFR Part 122.44(d)(1)(ii)). The permitting authority satisfies this requirement by evaluating whether the discharged selenium concentration (taking into account variability of these concentrations and available dilution in the receiving water if allowed in State or Tribal Water Quality Standards) cause, have the reasonable potential to cause, or contribute to excursions of the WQS that may have been calculated using the method in Appendix K in USEPA 2016. Other environmental factors may also affect the use of fish tissue data when determining RP. See the “Permitting for Existing Dischargers” flow chart (Attachment 1) and FAQ 2-3.

- c. **Fish Tissue Data Available (With No Criterion Excursion in Fish Not Yet at Steady State):** If a state or authorized tribe has site-specific fish tissue data available that do not indicate an excursion of the fish tissue criterion elements of the four-part selenium criterion, but the permitting authority determines that the observed fish tissue concentrations do not correspond to current or anticipated water column selenium concentrations (e.g., fish collected have not been exposed to or come to steady state⁴ with the anticipated water column selenium concentration), the permitting authority should use the water column criterion element to determine RP. See the “Permitting for New or Increased Dischargers” flowchart (Attachment 1).
- d. **No Fish Tissue Data Available:** If a state or authorized tribe does not have site-specific fish tissue data, or the receiving water body is fishless or not at steady state with respect to selenium in fish tissue, the permitting authority should use the water column criterion element for conducting RP analysis.

Q2-2: How should a regulatory authority determine the appropriate water column criterion element based on the four-part criterion (e.g., a 30-day chronic criterion element versus an intermittent criterion element) for use in an NPDES permit?

A2-2: The national CWA section 304(a) recommended selenium criterion (USEPA 2016a) is based on a 30-day average concentration and having less than a 30-day average concentration requires use of the intermittent water column criterion element. NPDES-permitted facilities that continuously discharge effluent over 30-days can use the water column criterion element, which is well suited in conducting RP analysis and developing WQBELs (see also chapter 5 of EPA’s TSD (USEPA 1991). The permitting authority should use the state adopted and EPA-approved water column criterion element, which could be EPA’s default recommended value, an EPA-approved state-specific value, or an EPA-approved site-specific water column element (see FAQ 1-2).

For NPDES permittees that discharge effluent non-continuously (<30 days per month), the intermittent water column criterion element provides an appropriate measure of aquatic life protection. The intermittent water column element can be calculated using ambient spikes in the receiving water, with the equations provided in EPA’s *Aquatic Life Ambient Water Quality Criterion for Selenium—Freshwater 2016* (Table 1) (USEPA 2021a). Note that both the

continuous (30-day) and the intermittent water column elements are designed to be protective of EPA's criterion for fish tissue over a 30-day period.

Q2-3: What data should be used to assess RP using the four-part criterion?

A2-3: Permitting authorities may use any available relevant and representative fish tissue or effluent data to assess RP. See sections 2.1 - 2.3 of EPA's *Draft Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Selenium Criterion* for a review of relevant and representative fish tissue monitoring strategies (USEPA 2021c). For new dischargers, permitting authorities may use estimates of effluent characteristics to assess RP. See sections 3.2 and 3.3 of EPA's TSD (USEPA 1991). For existing discharges and steady state conditions, and where RP analysis are based on a fish tissue-based criterion, the permit writer uses site-specific fish tissue data to calculate the site-specific water column value and actual or estimated effluent selenium concentrations, in addition to information about effluent variation and, where appropriate, available dilution in the receiving stream, to determine whether the permittee's selenium discharge causes, has the reasonable potential to cause, or contributes to exceedances of the site-specific water column value. If so, then the discharge has reasonable potential to cause or contribute to exceedance of the fish-tissue based criterion. See Section 3.4 and Appendix K in USEPA 2021a. The permitting authority may take a more stringent approach by presuming reasonable potential based on other information provided by the NPDES permit applicant, such as the known presence of selenium in minerals extracted at the permitted facility. Determinations of reasonable potential should be based on analysis of receiving stream assimilative capacity and if RP is demonstrated, then the permit requires incorporation of a WQBEL.

Q2-4: In cases where a discharge occurs to a lotic (e.g., a flowing stream) water, but downstream waters are lentic (e.g., lakes, impoundments), which selenium criterion water column element should be used in the RP analysis?

A2-4: The national CWA section 304(a) recommended selenium criterion water column element for lentic waters is more stringent than the criterion element for lotic waters. Therefore, if an NPDES discharge is located in lotic waters upstream of lentic waters, the permit writer should ensure that both the lotic WQC and the downstream lentic WQC, incorporated into a state's WQS, are protected when conducting the RP analysis and when developing WQBELs for selenium (see 40 CFR 122.4(d)). If a permitting authority bases RP on fish tissue elements of the selenium criterion, it is then important to document that discharge concentrations of selenium do not cause, have the reasonable potential to cause, or contribute to an excursion of the fish tissue criterion elements in the downstream lentic environment.

Q2-5: In some cases, it might be unclear whether a receiving or downstream water body is lentic or lotic with regard to an appropriate selenium water column criterion element (e.g., run-of-the-river reservoirs). Does EPA have recommendations that address whether a

receiving water body should be considered lentic or lotic for purposes of NPDES RP analysis and permit WQBEL determinations?

A2-5: Generally, the classification of fresh waters into lotic or lentic categories is made by the state or authorized tribe, based on site-specific information. States and authorized tribes should ensure that they use transparent, scientifically defensible methods to appropriately classify receiving waterbodies. Reservoirs with extended residence times are more likely to demonstrate bioaccumulation dynamics that are lentic in nature. Section 3.2.4, Classifying Categories of Aquatic System, in USEPA (2021a) provides further discussion of categories of fresh water. Lotic systems such as rivers and streams are characterized by flowing water. Lentic systems, such as lakes and ponds, are characterized by largely standing water. Water residence time is generally shorter in lotic systems than in lentic systems, and subsequently, aquatic organisms living in lentic systems tend to bioaccumulate more selenium than organisms living in lotic systems for a given dissolved selenium concentration. A site-specific study or use of available hydrologic information may be necessary to determine the residence time of the water body so that the application of the lentic or lotic water column value can be applied in a defensible manner for RP analyses consistent with EPA-approved WQS. Permitting authorities should determine whether to use the lentic or lotic water column element for a particular water body on a case-by-case basis, factoring in downstream water body characteristics (e.g., a lake or other lentic system downstream of a lotic system (e.g., stream) with a point source discharge).

3. NPDES Permit WQBEL Calculations

Q3-1: Can an NPDES permitting authority derive selenium WQBELs using an EPA-approved state or authorized tribal WQS based on EPA's recommended four-part selenium criterion for a noncontinuous or intermittent effluent discharge containing selenium? If so, how?

A3-1: Yes, the permitting authority can derive WQBELs for noncontinuous or intermittent discharges by using the intermittent water column element of the selenium criterion. Under EPA's CWA section 304(a) recommended selenium criterion, the intermittent water column element is applicable to any receiving water where the long-term instream background concentration is less than the 30-day average criterion value, and where there are instream spikes of selenium concentrations (above the background value) with a duration of less than 30 days. However, in some cases additional data should be collected to determine the duration of instream spikes (e.g., collection of more frequent instream selenium samples, such as – daily samples instead of weekly samples).

Permit writers who use the intermittent water column criterion element should, at a minimum, assess the long-term average background concentration of selenium in the portion of the stream not impacted by a discharge, as well as the maximum number of days out of any 30-day period that the instream concentration is expected to exceed the long-term average stream background concentration. With respect to a point source discharge of selenium, these in-stream “pulses” are likely to occur on days when the intermittent discharge is occurring, thus, the number of days a discharge is expected to occur may be used as part of the intermittent criterion element as the fraction of 30 days in which an elevated selenium concentration may occur. The number of days a discharge is expected to occur can be determined from historical effluent data. If sufficient

effluent data are not available, data from other sources such as local precipitation maps or data from discharges at other similar facilities may be used. In cases where selenium concentration data are not available, such as new facilities, permit writers should consider using data from other sources such as similar facilities. With that information, the permit writer can use the equation in Table 1 to estimate the calculated value for the intermittent water column element that would be protective on the days when a discharge would occur and could then calculate a WQBEL for the intermittent discharge. The permit writer would determine RP and establish selenium limits using the applicable implementation guidance (i.e., state or tribal implementation procedures) that is used for analysis of other water quality criteria, and the projected WQBEL would be calculated using the intermittent water column criterion element.

Q3-2: Can an NPDES permitting authority develop WQBELs using the fish tissue criterion element(s) of the four-part selenium criterion (i.e., egg-ovary or whole body and/or muscle) rather than the water column elements?

A3-2: Any of the criterion elements in EPA's four-part selenium criterion can be used for deriving WQBELs. However, implementation guidance (i.e. state or tribal implementation procedures) for the water column criterion element, as described in this document, are currently available to develop and establish WQBELs in NPDES permits.⁹ As described by EPA (2021c), if a state or authorized tribe believes that the default national water column criterion element is not appropriate for a water body capable of supporting fish, it can develop a site-specific value for a water column element using the procedures provided in Appendix K (Translation of a Selenium Fish Tissue Criterion Element to a Site-Specific Water Column Value) by EPA (2021a). Any site-specific WQC that is used for the NPDES permits program must be either approved by EPA or derived through an EPA-approved water column translation procedure (e.g., performance-based approach). The procedures outlined in Appendix K of USEPA 2021a do not apply to fishless waters.

While the water column criterion element is one approach for WQBEL calculations, the unique nature of the four-part selenium criterion and the recommended primacy of the egg-ovary criterion element (see FAQ A1-3) may lead state permitting authorities to develop innovative implementation guidance (i.e., state or tribal implementation procedures) for the expression of WQBELs. EPA supports the development of such innovative approaches to implement water quality criteria based on EPA's CWA section 304(a) recommended selenium criterion; however, as with any WQBEL expression, the limit included in the NPDES permit must be consistent with the requirements of CWA section 301(b)(1)(C) as well as 40 CFR 122.44(d) and 122.45. See FAQ A1-4.

Q3-3: Can the selenium WQBEL be expressed in units of mg/kg selenium in ambient fish tissue, measured by dry weight?

A3-3: No. The WQBEL must limit the amount of selenium discharged by the NPDES permittee. 40 CFR § 122.44(d)(1)(i) requires that WQBELs control pollutants when the permitting

⁹ Note that many states have not established implementation procedures for use in deriving WQBELs from fish tissue data, so the water column element may be the only available choice that is consistent with the state's established procedures.

authority determines that a pollutant may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above the WQS. The limit must be expressed as a maximum effluent pollutant concentration or maximum effluent pollutant mass load or both, as necessary to meet applicable water quality standards. See 40 CFR 122.45(f).

Q3-4: The national CWA section 304(a) recommended selenium criterion does not include an acute expression. Must permits contain both short- and long-term limit expressions?

A3-4: EPA's NPDES permit regulations at 40 CFR 122.45(d)(1) require that, for continuous discharges, all permit limits shall, unless impracticable, be stated as maximum daily and average monthly limitations for all dischargers other than publicly owned treatment works (POTWs). For POTWs, NPDES permit limits should be stated as average weekly or 7-day average and average monthly or 30-day average limitations.

Consistent with 40 CFR 122.45(d)(1), where permitting authorities determine the need for WQBELs for selenium, permits must establish both short- and long-term limit expressions, or the record must describe why such limits are impracticable. Where the permitting authority derives WQBELs from the water-column criterion element of the chronic WQC, EPA's 1991 TSD provides a detailed statistical methodology to calculate both short- and long-term WQBELs from a single criterion value.

A common misperception is that short-term WQBELs (e.g., maximum daily limits [MDLs]) implement acute water quality criteria and long-term limits (e.g., average monthly limits [AMLs]) implement chronic water quality criteria. This is inconsistent with the procedures described in EPA's TSD (USEPA 1991). Chapter 5 of EPA's TSD (USEPA 1991) provides methods to derive both short- and long-term WQBELs from one or more ambient criteria values with a range of duration components. EPA's TSD procedure quantifies the observed variability of the pollutant of concern in the effluent (expressed as the coefficient of variation [CV]) (USEPA 1991). EPA's TSD (USEPA 1991) procedure then calculates a long-term average (LTA) effluent performance concentration necessary to achieve the desired wasteload allocation (WLA), taking into account the duration component of the water column criterion element. Multiple WQBELs can then be statistically derived from the LTA value and can be set at any desired averaging period (e.g., daily, weekly, or monthly). Thus, the WQBELs derive from the underlying water quality criteria, but account for the observed effluent variability to establish the daily, weekly, or monthly effluent quality that will ensure WQC are achieved.

Many of EPA's WQC and many EPA-approved state or authorized tribal WQC include only a single criterion expression, yet state permitting authorities routinely establish both short- and long-term effluent limits. For example, most EPA human health criteria are expressed as a single ambient concentration not to be exceeded. For this situation, EPA's 1991 TSD uses the statistical procedure described above to take a single long-term criterion expression and develop WQBELs expressed as MDL and AML values (see EPA's 1991 TSD section 5.4.4).

While EPA's 1991 TSD guidance provides a recommended approach to develop both short- and long-term WQBELs, the regulations provide an exception where the permitting authority determines that such an approach is "impracticable." If the permitting authority establishes selenium criteria that differ from EPA's 304(a) criteria, or where the state's or authorized tribe's

implementation guidance (i.e., state or tribal implementation procedures) differ from EPA's 1991 TSD, the permitting authority could provide the "impracticability" justification in the permit record. The justification would need to explain why the limit expressions required in 40 CFR 122.45(d)(1) were impracticable and demonstrate that the WQBELs included in the permit derive from and ensure attainment with the applicable WQS.

Q3-5: Should the selenium WQBEL be expressed as total recoverable selenium? If so, how should an NPDES permitting authority translate the dissolved selenium water column criterion element of the national CWA section 304(a) recommended selenium criterion to a total recoverable selenium concentration for a NPDES permit limit?

A3-5: Yes, WQBELs for selenium should be expressed as total recoverable selenium. While EPA's CWA section 304(a) recommended selenium criterion water column elements are expressed as dissolved selenium, the particulate, as well as dissolved selenium, can have deleterious effects on aquatic life. Total recoverable selenium is further discussed in EPA's *Aquatic Life Ambient Water Quality Criterion for Selenium—Freshwater 2016* (USEPA 2021a). In the absence of site-specific data, EPA recommends that it may be appropriate to use a total recoverable-to-dissolved selenium ratio of 1.00 to determine RP and calculate NPDES permit WQBELs for selenium. A ratio of 1.00 means that the concentration of total recoverable selenium is equal to the concentration of dissolved selenium, which may be a valid assumption for some surface waters, especially certain lotic waters, based on geochemistry.

The geochemical conditions governing solubility of selenium will affect the ratio of total-to-dissolved selenium in a water body. Selenate (SeO_4^{2-}) and selenite (SeO_3^{2-}) oxyanions are typically the dominant species under the pH and redox conditions of most surficial aquatic environments (Presser and Luoma 2010). Selenate is highly mobile due to the solubility of its salts, whereas selenite is more likely to be immobilized by adsorption onto particulates, particularly iron oxyhydroxides (Presser and Luoma 2010). An oxygenated water with neutral to slightly alkaline pH favors selenate (Presser and Luoma 2010). Under such conditions, selenate will be the dominant form and the ratio of dissolved-to-total for selenium in the water column would be 1.00 and this is the reason why EPA recommended the use of a ratio of 1.00.

EPA is aware of alternative total:dissolved selenium translators that have been developed by states for specific waterbodies. Water quality data collected by a state or tribe, U.S. Geological Survey, EPA, and others should be consulted when considering such translators for a given NPDES permit. Additionally, EPA has provided previous guidance on procedures for translating a criterion based on the concentrations of dissolved constituent(s) to total recoverable permit limits; EPA's guidance also includes recommendations for sampling and analysis (USEPA 1996).

4. NPDES Monitoring (Basis for RP and WQBELs, Compliance Monitoring)

Q4-1: What EPA analytical test methods are recommended for analyzing water and fish tissue samples for selenium under EPA's NPDES permits program?

A4-1: EPA provides analytical test methods approved for measuring selenium in wastewater effluent at 40 CFR Part 136.3 (also see Appendix L in USEPA 2021a). Use of any other method for permit compliance monitoring must first be approved through the alternate test procedures approval process (see 40 CFR 136.4 and 136.5). For selenium fish tissue sampling, EPA has developed *Technical Support for Fish Tissue Monitoring for Implementation of EPA's 2016 Recommended Selenium Criterion, Draft*, which describes analytical methods that may be used for measuring selenium in fish tissue samples (USEPA 2021c).

5. Compliance Schedules in NPDES Permits

Q5-1: Would a compliance schedule be allowed in a renewed, modified, or reissued NPDES permit in which an existing WQBEL is being replaced with a more stringent NPDES permit limit or a new NPDES permit limit based on an EPA-approved state or tribal selenium criterion reflecting EPA CWA section 304(a) recommended selenium criterion?

A5-1: A compliance schedule may be allowed in cases where the NPDES permitting authority determines that one is appropriate and the applicable state or authorized tribal WQS authorize the use of compliance schedules for meeting NPDES permit limits. Decisions to allow compliance schedules are made on a case-by-case basis, taking into account the facility and site-specific conditions. EPA's WQS regulations at 40 CFR 131.15 specify that if a state or authorized tribe intends to allow the use of schedules of compliance for WQBELs in NPDES permits, that state or authorized tribe must adopt a permit compliance schedule authorizing provision in its WQS. Additionally, any schedule developed must be consistent with the requirements established for compliance schedules in 40 CFR 122.2 and 122.47.

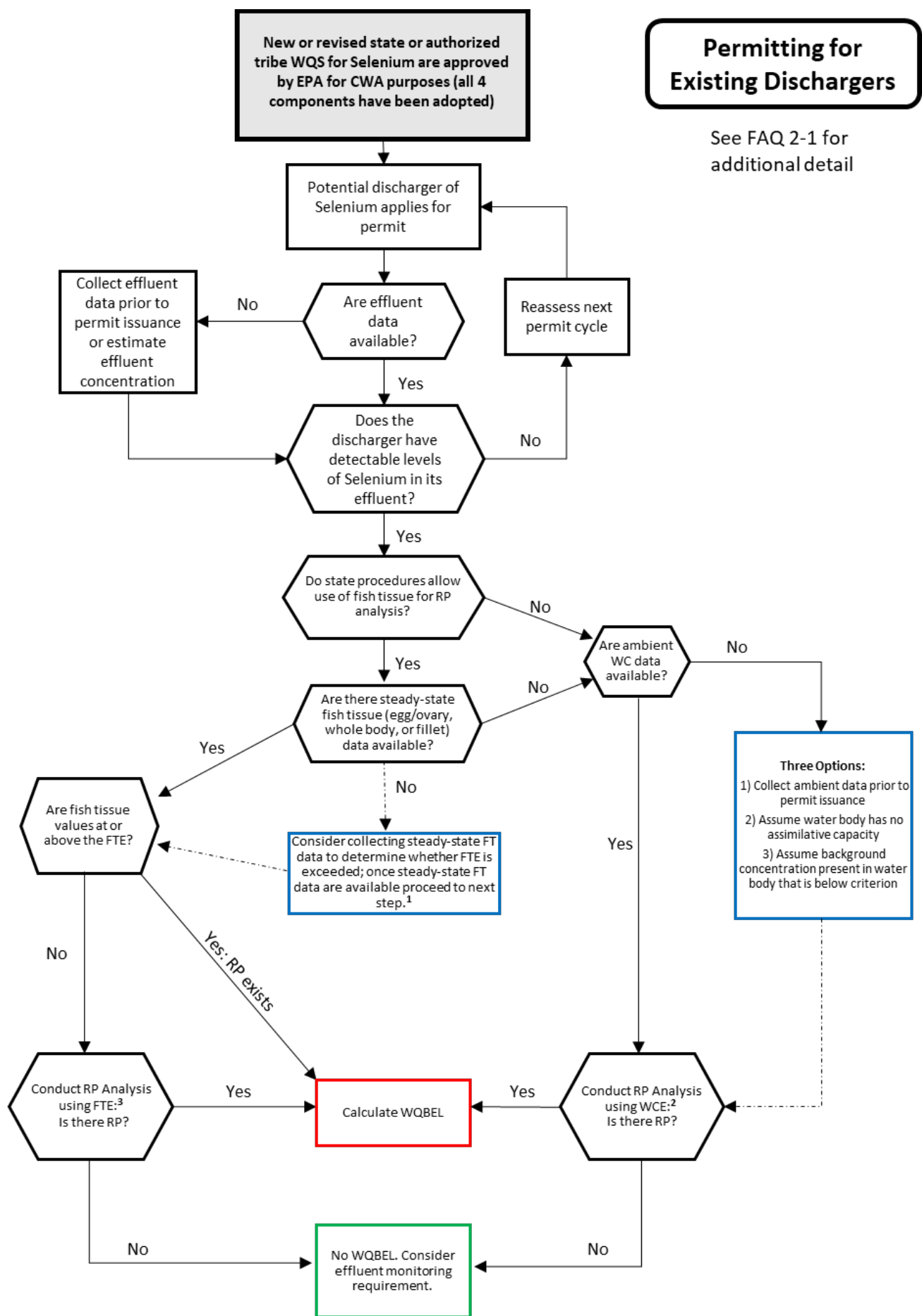
References

- Jones, A. M. 1997. *Environmental Biology* (Routledge Introductions to Environment: Environmental Science). Routledge. New York, NY. 216 pp.
- Presser, T.S. and S.N. Luoma. 2010. *A Methodology for Ecosystem-Scale Modeling of Selenium*. Integrated Env. Ass. and Man. Vol 6(4): 685 – 710.
- USEPA (U.S. Environmental Protection Agency). 1991. *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, March 1991). U.S. Environmental Protection Agency, Office of Water, Washington, DC. <http://www.epa.gov/npdes/pubs/owm0264.pdf>.
- USEPA. 1996. *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion*. EPA 823-B-96-007. U.S. Environmental Protection Agency, Office of Water, Washington, DC. https://www3.epa.gov/npdes/pubs/metals_translator.pdf.
- USEPA. 2000. *USEPA Review and Approval of State and Tribal Water Quality Standards* 65 Fed. Reg. 24641 (Apr. 27, 2000).
- USEPA. 2003. *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000) Volume 2: Development of National Bioaccumulation Factors*. EPA-882-R-03-030. U.S. Environmental Protection Agency, Office of Water, Washington, DC. pp. 1-4. <https://nepis.epa.gov/Exe/ZyPDF.cgi/P1005EZQ.PDF?Dockey=P1005EZQ.PDF>
- USEPA. 2014. General Policies. Chapter 5 in *Water Quality Standards Handbook*. EPA 820-B-14-004. U.S. Environmental Protection Agency, Office of Water, Washington, DC. <http://www.epa.gov/wqshandbook>.
- USEPA. 2021a. *2021 Revision to: Aquatic Life Ambient Water Quality Criterion for Selenium–Freshwater 2016*. EPA 822-R-21-006. U.S. Environmental Protection Agency, Office of Water, Washington, DC. <https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf>
- USEPA. 2021b. *Technical Support for Adopting and Implementing EPA’s 2016 Selenium Criterion in Water Quality Standards*. Draft. EPA-823-D-21-001. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. <https://www.epa.gov/wqc/aquatic-life-criterion-selenium>.
- USEPA. 2021c. *Technical Support for Fish Tissue Monitoring for Implementation of EPA’s 2016 Selenium Criterion*. Draft. EPA-823-D-21-002. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC. <https://www.epa.gov/wqc/aquatic-life-criterion-selenium>.
- USEPA. 2021d. *Frequently Asked Questions (FAQs): Implementing the 2016 Recommended Selenium Criterion in Clean Water Act Section 303(d) and 305(b) Assessment, Listing, and Total Maximum Daily Load (TMDL) Programs*. Draft. EPA-823-D-21-004 U.S. Environmental

Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.
<https://www.epa.gov/wqc/aquatic-life-criterion-selenium>.

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Attachment 1:
EPA's Recommended Flowcharts for Implementing the National CWA
Section 304(a) Recommended Selenium Criterion in NPDES Permits
Program

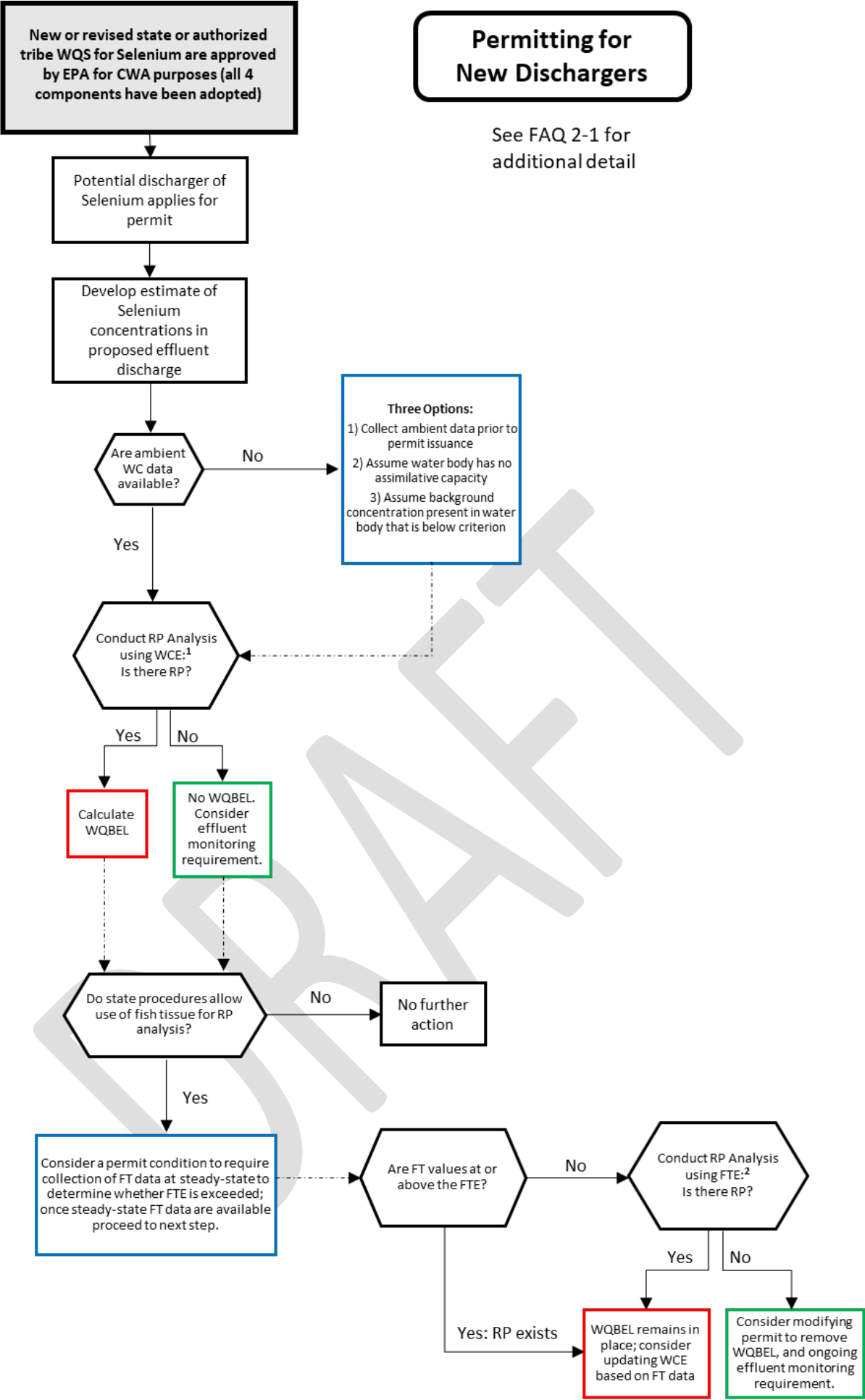


¹ – RP analysis should not be unreasonably delayed pending collection of fish tissue data.

² – RP analysis may consider dilution consistent with state WQS and procedures.

³ – RP analysis using fish tissue must consider the effects of effluent variability and other environmental factors to determine the “potential” for possible excursions of the FTE.

* “Water Column Criterion Element” refers to either:
 1. the national default water column criterion element;
 2. a state- or site-specific water column value approved by EPA;
 3. a site-specific water column value developed from performance-based approach approved by EPA.



¹ – RP analysis may consider dilution consistent with state WQS and procedures.

² – RP analysis using fish tissue must consider the effects of effluent variability and other environmental factors to determine the “potential” for possible excursions of the FTE.

- WCE: Water Column Criterion Element*
 - WC: Water Column (Ambient) Selenium Concentration
 - RP: Reasonable Potential
 - WQBEL: Water Quality Based Effluent Limit
 - FT: Fish Tissue
 - FTE: Fish Tissue Criterion Element
- RP has been determined
- Transition box
- No RP
- Optional pathway



* “Water Column Criterion Element” refers to either:

1. the national default water column criterion element;
2. a state- or site-specific water column value approved by EPA;
3. a site-specific water column value developed from performance-based approach approved by EPA.