

# Draft Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion

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## 7 NPDES Implementation Procedures

### 7.1 What are the general considerations in NPDES permitting?

The CWA prohibits the discharge of any pollutant including mercury from a point source into waters of the United States except in compliance with an NPDES or other CWA permit (see CWA sections 301(a) and 402). EPA or states and tribes authorized to administer the NPDES program issue NPDES permits. These permits must contain (1) technology-based effluent limitations, which represent the degree of control that can be achieved by point sources using various levels of pollution control technology (see CWA sections 301, 304, and 306); and (2) more stringent limitations, commonly known as WQBELs, when necessary to ensure that the receiving waters achieve applicable water quality standards (see CWA section 301(b)(1)(C)).<sup>20</sup>

Most WQBELs are expressed as numerical limits on the amounts of specified pollutants that may be discharged. However, WQBELs may also be expressed in narrative form, such as BMPs or pollutant minimization measures (e.g., practices or procedures that a facility follows that result in a reduction of pollutants to waters of the United States) when it is infeasible to calculate a numeric limit (see 40 CFR 122.44(k)(3)). In addition, BMPs may be imposed in the form of NPDES permit conditions to supplement numeric effluent limitations when the permitting authority determines that such requirements are necessary to carry out the purposes and intent of the Act (see CWA section 402(a)(1)(B) and 40 CFR 122.44(k)(4)).

As noted above, NPDES permits must contain WQBELs when necessary to achieve applicable water quality standards. The procedure for determining the need for WQBELs is called a “reasonable potential” determination. Under EPA’s regulations at 40 CFR 122.44(d)(1)(i), effluent limitations must control all pollutants that the permitting authority determines “are or may be discharged at a level [that] will cause, have the reasonable potential to cause, or contribute to an excursion above any [applicable] water quality standard.” Thus, if a pollutant discharge has the reasonable potential to cause or contribute to an exceedence of applicable water quality standards, the discharger’s NPDES permit must contain a WQBEL for that pollutant (See 40 CFR 122.44(d)(1)(iii)-(vi)). The procedure for determining reasonable potential must consider the variability of the pollutant in the effluent, other loading sources, and dilution (when allowed by the water quality standards) (See 40 CFR 122.44(d)(1)(ii)). The procedure, while specifying whether a discharge must have WQBELs, does not specify the actual value of the permit limitation. The *Technical Support Document for Water Quality-based Toxics Control* (TSD) (USEPA 1991) contains EPA’s guidance on determining reasonable potential.

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<sup>20</sup> When developing WQBELs, the permitting authority must ensure that the level of water quality achieved by such limits is “derived from and complies with water quality standards (see 40 CFR 122.44(d)(1)(vii)(A)).

## 7.2 How does EPA recommend implementing the fish tissue criterion for NPDES permits?

As discussed in section 3.1, states and authorized tribes that decide to use the recommended criterion as the basis for new or revised methylmercury water quality standards have the option of adopting the criterion as a fish tissue residue concentration into their water quality standards, adopting it as a traditional water column concentration, or adopting both the criterion as a fish tissue residue concentration and a traditional water column translation. If states or authorized tribes choose to use both approaches, they should clearly describe how each will be used for specific applications in their standards and describe applicable implementation procedures.

EPA recommends three different approaches for implementing the fish tissue-based methylmercury water quality criterion in NPDES permits, depending on the form in which the state or authorized tribe expressed the criterion (i.e., as a fish tissue value or as a water column concentration). Additionally, states and authorized tribes that adopt the recommended criterion as a fish tissue residue value may choose to implement it through NPDES permitting as a water column translation of the fish tissue value. Each of these approaches is discussed in more detail below and is summarized in Figure 5.

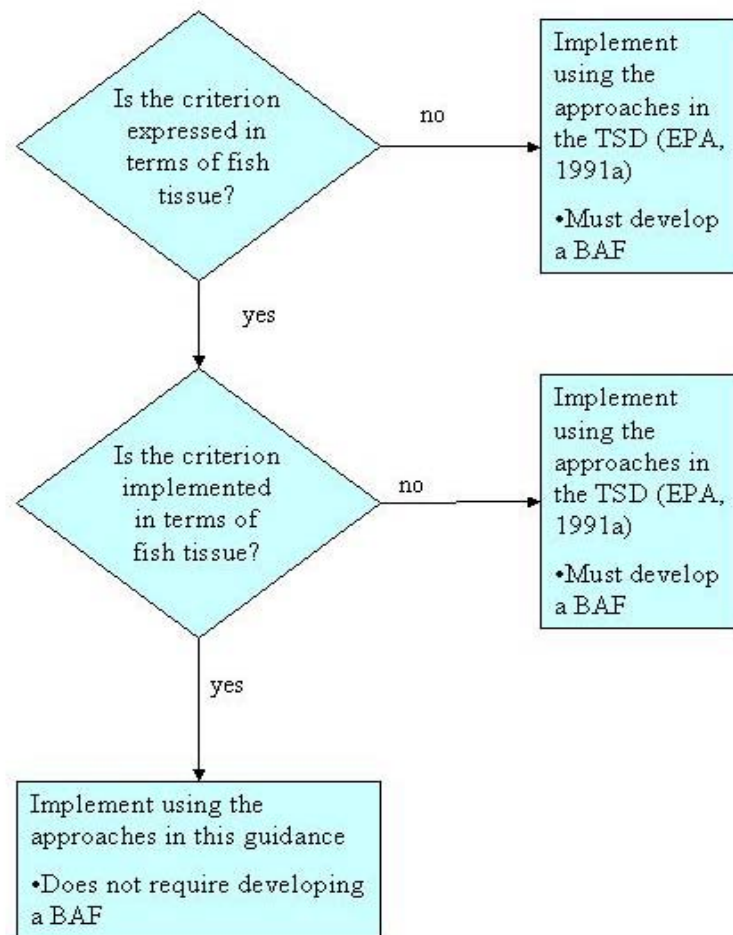


Figure 5. Implementing the fish tissue criterion in NPDES permits

The recommendations below assume that an approved TMDL is not available. If EPA has approved or established a TMDL containing a wasteload allocation for the discharge of mercury, the WQBEL for that mercury discharge must be consistent with the wasteload allocation's assumptions (see 40 CFR 122.44(d)(1)(vii)(B)).

This chapter provides EPA's guidance on how a permitting authority could implement the fish tissue criterion in NPDES permits consistent with the CWA and its implementing regulations. States and authorized tribes retain the discretion to develop and use implementation procedures for determining reasonable potential and establishing effluent limits in NPDES permits that differ from those in the guidance. Such procedures may use other information that is relevant to determining reasonable potential and establishing effluent limits, where appropriate. If a state or authorized tribe develops its own permit implementation procedures, EPA recommends that states and authorized tribes should make the procedures public so that all stakeholders can be aware of the requirements and expectations of the permit program. In addition, the permit's fact sheet or statement of basis should also explain the basis of the permit conditions and effluent limitations and how these are consistent with the state's or authorized tribes' implementation procedures, the CWA, and applicable federal regulations.

### **7.3 What are the implementation procedures when the criterion is adopted as a water column value?**

This approach assumes that a state or authorized tribe decides to adopt a new or revised water quality criterion for methylmercury in the form of a water column concentration value. Expressing a criterion as a water column value is very common, and permitting authorities have considerable historical experience in implementing such criteria in NPDES permits. Under this approach, EPA recommends that the permitting authority make reasonable potential determinations and calculate numeric effluent limitations using procedures consistent with those described in the TSD (USEPA 1991) or equivalent state procedures.

This approach relies upon the measurement of mercury in effluents. Because the level of mercury in many effluents is often very small, the permitting authority should specify that the NPDES regulated discharger use the most sensitive analytical method approved under 40 CFR Part 136 and report the quantitation level associated with that test. Mercury levels in effluents can often be below the quantitation levels of some analytical methods. By specifying the most sensitive method, the permitting authority minimizes the chance that it would not require a WQBEL when one is actually necessary.

### **7.4 What are the implementation procedures when the criterion is adopted as a fish tissue value and the permitting authority uses a water column translation of a fish tissue value?**

This approach assumes that a state or authorized tribe decides to adopt a new or revised water quality criterion for methylmercury in the form of fish tissue, but translates it into a water column value for use in making reasonable potential determinations and developing appropriate numeric WQBEL when necessary. Section 3.1.2.2 of this

guidance discusses the procedures for translating the fish tissue criterion into a water column value for water quality standards purposes. These procedures may also be used to translate a fish tissue criterion into a water column value for reasonable potential determinations and numeric WQBELs. Once the criterion has been translated into a water column value, the TSD (USEPA 1991) or equivalent state procedures can be used to complete a reasonable potential determination and develop numeric WQBELs.

Because the level of mercury in many effluents is often very small, the permitting authority should specify that the NPDES regulated discharger use the most sensitive analytical method approved under 40 CFR Part 136 for total mercury and report the quantitation level associated with that test. Federal regulations at 40 CFR 122.45(c) generally require effluent monitoring for metal using the total form of the metal.

In addition, the permitting authority may also specify effluent monitoring using draft EPA Method 1630 where the permitting authority is concerned about the level of methylmercury (as opposed to total mercury) being discharged. Federal regulations at 122.41(j)(4) generally require that effluent monitoring results must be conducted according to the test procedures approved under Part 136, unless other test procedures have been specified in the permit.

### **7.5 What are the implementation procedures when the criterion is adopted as a fish tissue value and the permitting authority does not use a water column translation of the fish tissue value?**

This approach assumes that a state or authorized tribe decides to adopt a new or revised water quality criterion for methylmercury in the form of fish tissue and directly implements the criterion without translating it into a water column concentration. As a result, the permitting authority will use a different approach than it has used before for determining reasonable potential and expressing effluent limits. EPA recommends the approach described below, which is summarized in Figure 6.

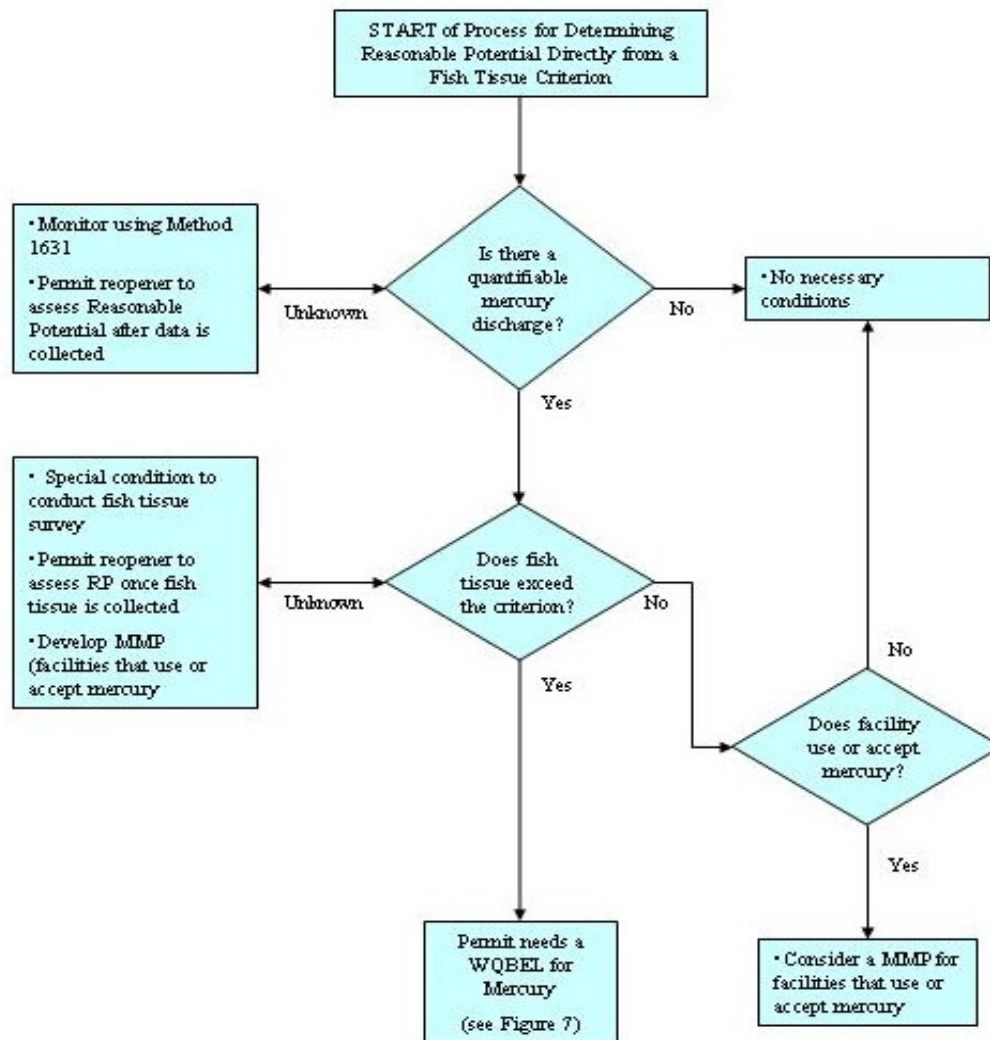


Figure 6. Determining reasonable potential

### 7.5.1 How to determine the need for permit limits to control mercury (i.e., how to determine reasonable potential)

As discussed in section 3.1.2.1. of this document, EPA recommends that states and authorized tribes adopt new or revised methylmercury water quality criteria in the form of a fish tissue residue concentration. When adopted in standards as a tissue value, states and authorized tribes do not translate from a traditional water column value to a tissue residue value using BAFs, which can vary highly by location and can be expensive. This section provides recommendations for how a permitting authority could determine reasonable potential in the absence of an available translation of the fish tissue value to a water column value.

When determining reasonable potential, the permitting authority must determine whether the discharge “causes, has reasonable potential to cause, or contributes” to an excursion above the applicable water quality criterion (see 40 CFR 122.44(d)(1)(ii)). The NPDES

permit fact sheet should provide the rationale and assumptions used in determining whether WQBELs proposed in the associated draft permit are appropriate. The recommendations in this guidance could be applied on a permit-by-permit basis where appropriate to support the reasonable potential determination that satisfies CWA section 301(b)(1)(C) and 40 CFR 122.44(d)(1)(ii) with respect to a water quality criteria for methylmercury expressed as fish tissue value, in the absence of a water column translation of that value.

EPA believes that, depending on the particular facts, a permitting authority could reasonably conclude that reasonable potential exists if two conditions are present (1) the NPDES permitted discharger has mercury in its effluent at a quantifiable level and (2) fish tissue from the waterbody into which the discharger discharges exceeds the fish tissue water quality criterion. Under these circumstances, the effluent data indicates that the mercury loadings in the effluent contribute to the mercury load to the waterbody, and the fish tissue indicates that the mercury load causes a water quality criterion excursion. This approach is also consistent with federal regulations pertaining to the Great Lakes Basin that contained an approach for determining reasonable potential using fish tissue data (see 40 CFR Part 132, Appendix F, Procedure 5.F.4). EPA recommends that permitting authorities use this approach because it has the advantage of significantly reducing environmental monitoring costs and does not involve developing a site-specific BAF for each waterbody in a state.

EPA recognizes that the mere presence of mercury at a quantifiable level in an effluent is not necessarily an indication that the mercury discharge is the sole cause of the fish contamination or even a substantial contributor of such contamination. However, mercury in an effluent discharge may contribute to the mercury present in fish tissue at levels above the fish tissue criterion, and therefore the discharge may be found, in some circumstances, to exhibit the reasonable potential to cause or contribute to the excursion above applicable water quality standards. EPA notes that the reasonable potential procedures as a whole are intended as conservative screening procedures to determine when a permit should contain a WQBEL to reduce the contribution to existing contamination or to prevent further possible degradation.

EPA notes that, unlike typical water quality criteria that are expressed as water column values, the fish tissue residue water quality criterion integrates spatial and temporal complexity and the cumulative effects of loadings from point and nonpoint sources that occur in aquatic systems that affect methylmercury bioaccumulation, including the effluent variability of point sources. Therefore, EPA believes that comparing the fish tissue residue concentration in receiving water directly to the applicable criterion expressed as a fish tissue value appropriately accounts for the factors specified in 40 CFR 122.44(d)(1)(ii) for a criterion expressed as a fish tissue residual value.

#### **7.5.1.1 How to determine that the NPDES permitted discharger has mercury in its effluent at quantifiable levels**

EPA recommends that permitting authorities require some monitoring using the appropriate version of Method 1631 to characterize the discharger's effluent for mercury from all facilities for which the mercury levels are unknown or undetected. Method 1631 is relatively new, and the facility might not have used it to analyze its effluent. As a



result, previous monitoring might show undetectable levels of mercury when use of Method 1631 would show detectable or quantifiable amounts. As a result, EPA recommends monitoring using Method 1631 to help identify all facilities that contribute to mercury water quality impairment. At time of permit issuance, the permitting authority should have at least one data point using Method 1631 as part as the permit application submitted by the facility.

One of three outcomes will be reached in answering the first condition of the above described reasonable potential analysis:

- It is unknown whether the discharge includes quantifiable amounts of mercury.
- The discharge does not include quantifiable amounts of mercury.
- The discharge includes quantifiable amounts.

The recommended reasonable potential determination and recommended permit conditions for each of the outcomes is described in detail below.

**7.5.1.1.1 *What are the recommended permit conditions when it is unknown whether the discharge includes quantifiable amounts of mercury because there are limited or no effluent data to characterize the discharge of mercury using Method 1631?***

In this situation, EPA recommends the permitting authority include permit conditions comprised of:

- Effluent monitoring using the appropriate version of Method 1631 to characterize the discharger's effluent for mercury
- A reopener clause to identify the actions that the permitting authority may take should the monitoring information indicate that a mercury effluent limit is necessary

EPA recommends that permitting authorities require some monitoring, using the appropriate version of Method 1631, by all facilities for which the mercury levels are unknown or previously undetected to characterize the discharger's effluent for mercury, unless prior testing was done using Method 1631. Method 1631 is relatively new, and the facility might not have used it to analyze its effluent. As a result, the previous monitoring might show undetectable levels of mercury when using Method 1631 would show detectable or quantifiable amounts. As a result, EPA recommends this additional monitoring to help identify all facilities that contribute to mercury water quality impairment. The permitting authority could obtain this monitoring data either as part of the permit application, by requiring periodic (e.g., quarterly to annually) monitoring as part of the permit, or the permitting authority could invoke its authority under CWA section 308 to require NPDES facilities to collect information necessary for the development of NPDES permit limits. The permit should include a reopener clause such that, as soon as there is complete information and an indication that a more stringent limit is required, the permitting authority can establish the necessary requirements. The permitting authority may also decide to no longer require the monitoring if the information shows that the facility is not discharging mercury at quantifiable levels.

EPA recommends that when selecting the monitoring frequency, permitting authorities consider the factors in section 5.7.5 of the *Technical Support Document for Water Quality-based Toxics Control* (USEPA 1991). This section acknowledges that EPA has not recommended a specific monitoring frequency, but recognizes that the choice of a monitoring frequency is a site-specific decision and provides the permitting authority a number of factors to consider when making these decisions.

Until the permitting authority has sufficient data to determine whether there is reasonable potential, and depending on the particular facts, these permit conditions might be considered as being as stringent as necessary to meet water quality standards, as required by CWA section 301(b)(1)(C).

**7.5.1.1.2 *What are the recommended permit conditions when the discharge is analyzed using Method 1631 and does not include quantifiable amounts of mercury?***

In this situation, EPA recommends the permitting authority first review the monitoring data to determine if it is representative of the effluent. If the permitting authority believes the monitoring data are representative and all data are below the level of quantification, no further permit conditions may be necessary. If the discharge is below the level of quantification, EPA does not consider the discharge to have reasonable potential to cause or contribute to an excursion of the applicable fish tissue water quality criterion. In contrast, if the permitting authority believes the data are not representative, the authority should consider requiring additional monitoring, as described in section 7.5.1.1.1 above.

**7.5.1.1.3 *What are the recommended actions for discharges that include quantifiable amounts of mercury?***

In this case, the permitting authority should evaluate data on the concentrations of mercury in the fish tissue from the waterbody into which the discharger discharges and determine appropriate permit conditions (see section 7.5.1.2 below).

**7.5.1.2 How to determine appropriate permit conditions for facilities discharging quantifiable amounts of mercury**

When applying EPA's recommended fish tissue reasonable potential procedure, once the permitting authority has concluded that the first condition of the two-part reasonable potential analysis has been satisfied (i.e., that the NPDES permitted discharger has mercury in its effluent at a quantifiable level), the permitting authority should then address the second condition. That is, does the fish tissue from the waterbody into which the discharger discharges exceed the fish tissue water quality criterion?

One of three outcomes will be reached in answering this question:

- The fish tissue concentration of mercury is unknown.
- The fish tissue concentration of mercury does not exceed the criterion.
- The fish tissue concentration of mercury exceeds the criterion.

For discharges with quantifiable levels of mercury, the recommended reasonable potential determination and recommended permit conditions for each of the outcomes is described in detail below.

EPA recognizes that when evaluating reasonable potential, the permitting authority should exercise discretion and careful judgment in determining whether fish tissue data are representative of current ambient conditions. EPA guidance for sampling strategies for fish tissue monitoring is provided in section 4.2 of this guidance.

**7.5.1.2.1 *What are the recommended permit conditions for facilities discharging quantifiable amounts of mercury but the concentrations of mercury in tissue of fish in the receiving waterbody are unknown?***

In waterbodies for which there are no fish tissue data, a permitting authority cannot determine whether there is reasonable potential using a fish tissue approach. Therefore, EPA recommends the permitting authority include permit conditions comprised of:

- A permit special condition to conduct a mercury fish tissue survey for the receiving water
- A reopener clause to identify the actions that the permitting authority may take should the monitoring information indicate that a mercury effluent limit is necessary
- A permit special condition under the authority of CWA section 402(a)(1)(B) and 40 CFR 122.44(k)(4) to develop a mercury minimization plan for facilities that use mercury in any aspect of their operations or accept wastewaters that may contain mercury

In this instance, the permitting authority should start a process for collecting fish tissue data in the vicinity of the facility. One approach for collecting this information is for the permitting authority to invoke its authority under CWA section 308 (state permitting authorities would use comparable state authorities) to require NPDES facilities to collect information necessary for the development of NPDES permit limits. In this case, the permitting authority could issue a section 308 letter or include special conditions in the permit to require the permittee to conduct a methylmercury fish tissue monitoring study. EPA recommends that the permitting authority require that the study design be consistent with the recommendations on conducting ambient monitoring in section 4.2 of this guidance.

EPA recommends that the permitting authority require only one study per waterbody. The authority could do this by contacting all facilities that discharge into the waterbody and encourage them to jointly work to conduct the study. Additionally, in waterbodies where the permitting authority expects to find high water column values or believes it will need a site-specific BAF to complete issuing the permits, the authority should consider requiring the facility to measure water column concentrations of mercury as part of the study.

EPA further recommends that the permit should include a reopener clause such that, as soon as there is complete information and an indication that a more stringent limit is required, the permitting authority can establish the necessary requirements.

Additionally, in this situation EPA recommends that the permit should also include a pollutant minimization plan for the reasons as described in section 7.5.1.2.2 below.

**7.5.1.2.2 What are the recommended permit conditions for facilities discharging quantifiable amounts of mercury but the concentrations of mercury in tissue of fish in the receiving waterbody do not exceed the criterion?**

If the concentration of mercury in tissue of fish in the receiving water does not exceed the criterion, depending on the particular facts, the permitting authority might reasonably conclude that the discharge does not have reasonable potential to cause or contribute to an excursion of the applicable fish tissue water quality criterion.

In such situations, EPA recommends the permitting authority consider including permit conditions comprised of a permit special condition under the authority of CWA section 402(a)(1)(B) and 40 CFR 122.44(k)(4) to develop a mercury minimization plan for facilities that use mercury in any aspect of their operations or accept wastewaters that may contain mercury.

A mercury minimization plan helps ensure that the discharge continues to have no reasonable potential to cause or contribute to an exceedence of water quality standards. The recommendation to consider including in the permit a requirement to develop a mercury minimization plan is also based on the extent of potential mercury impairment across the country and the scientific complexities of and uncertainties when assessing mercury loadings and evaluating these effects. Given these uncertainties, a permit requirement that a permittee at least develop a plan to minimize the discharge of mercury would ensure that if the monitoring data demonstrates that a discharge does have reasonable potential, the permittee and the permit writer are prepared to establish a limit as stringent as necessary. Furthermore, EPA believes that a requirement simply to develop a mercury minimization plan may provide dischargers of mercury with sufficient information to voluntarily and economically reduce the discharge of mercury into our nation's waters.

EPA recommends that facilities, when developing mercury minimization plans, start with their existing best management plans and spill prevention and containment control plans. Many of the activities covered by these plans can also serve to reduce mercury sources to wastewater. In addition, for facilities that do not use mercury in any aspect of their operations or accept wastewaters that may contain mercury, EPA does not believe these facilities have pollution prevention opportunities and, thus, should not be required to develop a mercury minimization plan.

The facility should determine the content of a mercury minimization plan on a case-by-case basis. After reviewing many PMPs, EPA recommends that a plan include at least the following elements:

- The identification and evaluation of current and potential mercury sources
- For POTWs, the identification of both large industrial sources and other commercial or residential sources that could contribute large mercury loads to the POTW
- Monitoring to confirm current or potential sources of mercury

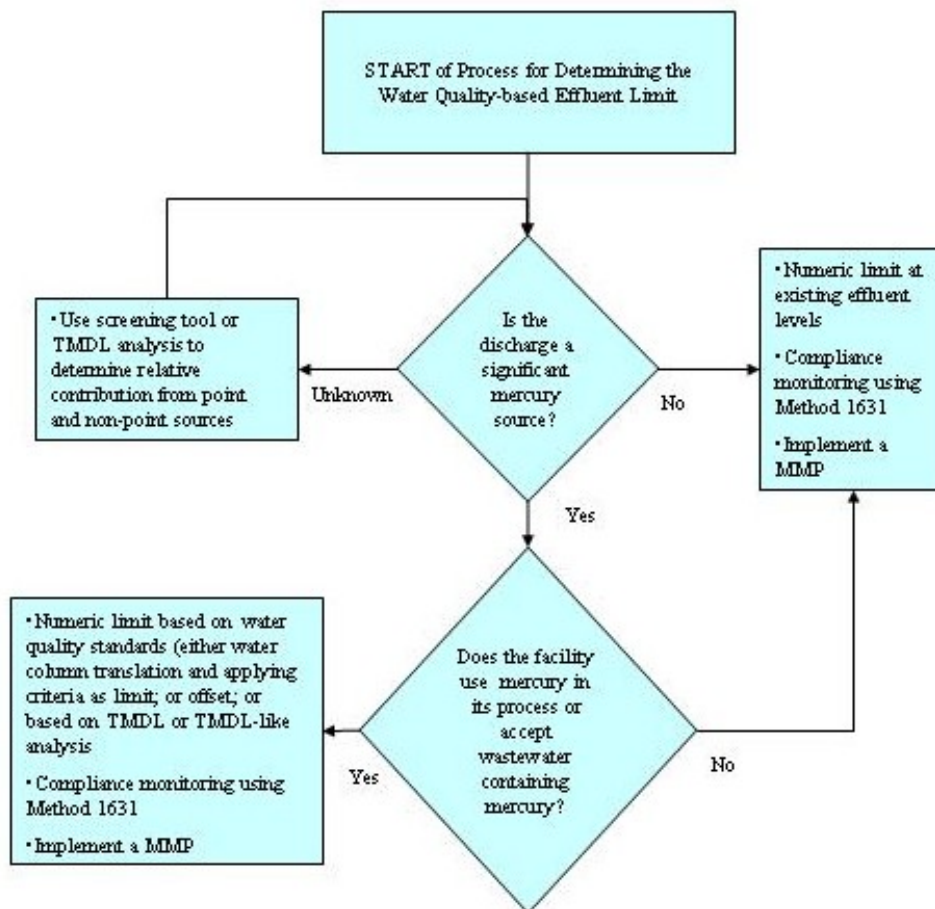
- The identification of potential methods for reducing or eliminating mercury, including requiring BMPs or assigning limits to all potential sources of mercury to a collection system, material substitution, materials recovery, spill control and collection, waste recycling, process modifications, housekeeping and laboratory use and disposal practices, and public education
- Implementation of appropriate minimization measures identified in the plan
- Monitoring to verify the results of pollution minimization efforts

**7.5.1.2.3 *What are the recommended permit conditions for facilities discharging quantifiable amounts of mercury and the concentrations of mercury in tissue of fish in the receiving waterbody exceed the criterion?***

EPA believes that, depending on the particular facts, a permitting authority might reasonably conclude that reasonable potential exists if two conditions are present (1) the NPDES permitted discharger has mercury in its effluent at quantifiable levels, and (2) the concentrations of mercury in tissue of fish from the waterbody into which the discharger discharges exceed the fish tissue water quality criterion. When reasonable potential exists, it is necessary to establish an appropriately protective WQBEL in the permit. For guidance on how to develop appropriate WQBELs, see the following section.

**7.5.2 *Where reasonable potential exists, how can WQBELs be derived from a tissue value?***

As discussed in section 3.1.2.1 of this document, EPA recommends that states and authorized tribes adopt new or revised methylmercury water quality criteria in the form of a fish tissue residue concentration. When adopted in standards as a tissue value, states and authorized tribes do not translate from a tissue residue value to a traditional water column value using BAFs, which can vary highly by location and can entail extensive costs to develop. When developing WQBELs, the permitting authority must ensure that the level of water quality to be achieved by such limits is “derived from and complies with water quality standards” (see 40 CFR 122.44(d)(1)(vii)). This section provides recommendations for how a permitting authority could derive appropriate WQBELs in the absence of an available translation of the fish tissue value to a water column value. The process described in this section is shown in Figure 7.



**Figure 7. Process for determining the WQBEL**

EPA recommends that the permitting authority, when establishing appropriate WQBELs, first determine whether the discharge is a significant source of mercury. EPA recommends different WQBELs depending on whether the discharge is considered to be significant or not significant, as described in 7.5.2.3 and 7.5.2.2, respectively. EPA’s guidance on how to determine whether a discharge is significant is described in section 7.5.2.1 below. Additionally, EPA recommends that the permitting authority, when establishing appropriate WQBELs for a significant discharger, consider whether the facility uses or accepts mercury in its process.

The NPDES permit fact sheet must provide an explanation that how the WQBELs proposed in the associated draft permit are appropriate. The recommendations in this guidance could be applied on a permit-by-permit basis where appropriate to support effluent limitations and other conditions that satisfy CWA section 301(b)(1)(C) and 40 CFR 122.44(d)(1) with respect to mercury.

**7.5.2.1 How to determine if the discharge is a “significant” source of mercury**

When determining the sufficiency of a WQBEL to attain and maintain water quality standards, the permitting authority may consider the effluent controls in conjunction with the other point and nonpoint source controls (including expected mercury reductions

from airborne deposition as a result of existing or expected controls on air emissions) and their cumulative effect on water quality standards attainment. Because air deposition and other nonpoint sources are expected to play a significant role in the mercury loading to many waters, EPA recommends that permitting authorities take into account these loadings—and their potential change—when determining what WQBELs are appropriate. One way of doing this is to use a screening level approach, such as that used in Mercury Maps<sup>21</sup> (USEPA 2001d). The Mercury Maps report identified watersheds where EPA believed mercury air deposition likely contributed greater than 95 percent of mercury concentrations in fish tissue. For example, mercury mines, large-producer gold mines, and mercury-cell chlor-alkali facilities were considered significant sources on the basis of simple presence in the watershed. Municipal wastewater treatment plants and pulp and paper mills were considered significant when their estimated cumulative load contributed greater than 5 percent of the estimated waterbody-delivered air deposition load. Another option for determining the relative significance of point source discharges is to do a TMDL, or TMDL-like analysis, as part of the permit. Depending on the facts in each case, permitting authorities should determine what sources are potentially large sources of mercury other than air deposition.

For a discharge not to be considered “significant,” under existing loading conditions, EPA recommends that the loading of the point source (or cumulative loading of all point sources) to the receiving water are expected to account for a small or negligible component of the current total mercury loadings and that, upon implementation of the permit’s mercury minimization program requirements, any further reductions from the point source(s) would result in no discernible improvement in water quality. This is not a situation where a wasteload allocation to a point source is increased because of an assumption that loads from nonpoint sources will be reduced. To the contrary, this is a situation where mercury minimization activities will maintain or reduce current point source loadings of mercury to levels at which there are no discernible impacts to water quality.

If permitted discharges are regulated consistent with the recommendations described in this guidance, EPA believes that the discharge is likely to have no discernible effect on water quality. EPA believes that discharger mercury loadings that remain following implementation of the minimization program requirements would have no discernible impact to water quality because, due to the large contribution of mercury from nonpermitted sources, even entirely eliminating the point source discharges of mercury would cause no discernible improvement to water quality. Therefore, EPA believes, depending on the particular facts, limits on these point sources consistent with this guidance are likely to be as stringent as necessary to implement water quality standards.

EPA notes that point source discharges of bioaccumulative chemicals like mercury might have particular local significance apart from their contribution to the cumulative load. Point source discharges by their nature could create hot spots where observed elevated concentrations have potential impact on human health if fish stay in the immediate area. Consequently, comparing contributions from the air and water sources at long distances downstream from the point source could conceal the real impact of mercury from point

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21 For more information about Mercury Maps see section 4.2.2.

source discharges. Instead, permitting authorities should evaluate the relative contributions of point sources to the total load at the point of discharge. In some cases, elevated receiving water concentrations may be dictated caused solely by the mercury concentration in the effluent as opposed to the mercury delivered from air deposition.

#### **7.5.2.2 What are EPA's recommended permit conditions for discharges that are not significant sources of mercury?**

Here, a permitting authority is addressing the situation where there are data showing that there is reasonable potential and thus a WQBEL is necessary. However, if one's mercury discharge is determined to be insignificant, EPA believes that an appropriate WQBEL could be comprised of both of the following:

- A numeric effluent limit for the mass loading of mercury established at the existing effluent level (or any existing numeric limit, whichever is more stringent) including compliance monitoring using the appropriate version of Method 1631
- A permit condition to implement appropriate mercury minimization measures identified in a mercury minimization plan

EPA believes these minimum permit conditions may be appropriate because they help to ensure the discharge does not cause or contribute to an exceedence of water quality standards, to protect against possible localized impacts, and to minimize the discharge of mercury. EPA also believes that, depending on the particular facts, when the discharge is not a significant source of mercury, permit numeric effluent limits established at the existing effluent quality (or any existing numeric limit, whichever is more stringent) and implementation of a mercury minimization plan are likely to be as stringent as necessary to meet water quality standards.

EPA believes that mercury reductions achieved through implementation of mercury minimization programs could potentially result in important reductions in mercury loadings. EPA bases this belief on its study of pollutant minimization programs and their success in reducing loadings of mercury to the environment. See the *Mercury Report to Congress* (USEPA 1997b) and draft *Overview of P2 Approaches at POTWs* (USEPA 1999). These reports show that POTWs and industrial dischargers have implemented source controls, product substitution, process modification, and public education programs with great success. These minimization practices focus on sources and wastes that originate with and are under the reasonable control of a facility, and not pollutants in rainwater or source water.

As an example, POTWs can educate the public to prevent pollution by avoiding household products that contain high levels of mercury or substituting those products for ones that are mercury-free or more environmentally friendly. The most cost-effective approach for POTWs to substantially reduce mercury discharges appears to be pollution prevention and waste minimization programs that focus on high concentration, high volume discharges to the collection system, with considerable effort also directed at high concentration, low volume discharges such as medical and dental facilities.

Using pollutant minimization or prevention programs can also reduce the transfer from wastewater to other media via disposal of mercury-containing sludge that may reenter the



environment. For example, mercury removed at a POTW through treatment is likely to reenter the environment through POTW sludges that are then either incinerated or applied to land (although some is captured by air emission controls on incineration). EPA believes that a better approach for reducing mercury releases to the environment is to prevent mercury from entering the wastewater collection system at the source through product substitution, waste minimization or process modification, or remove and recycle mercury at the source (i.e., source controls) using state-of-the-art technology. These measures aimed at reducing influent loads to POTWs also reduce the use of mercury in the community, which could also reduce the amount of mercury entering the environment through other media or sources (e.g., products that contain low levels of mercury may be disposed of as a nonhazardous solid waste and incinerated, releasing mercury to the air). Where pollution prevention approaches have been implemented, substantial reductions in mercury concentrations in POTW influents, sludges, and effluents have been achieved. For a discussion of this, see the draft *Overview of P2 Approaches at POTWs* (USEPA 1999). For an example of guidance on how to develop a mercury minimization plan, see the EPA Region 5 final document *Mercury Minimization Program Guidance* dated November 2004 ([http://www.epa.gov/region5/water/npdestek/mercury\\_pmp\\_nov\\_04\\_guidance.pdf](http://www.epa.gov/region5/water/npdestek/mercury_pmp_nov_04_guidance.pdf)). Many of the recommendations contained in the document are drawn from existing guidance and practice of the state permitting authorities in Region 5.

Finally, mercury is a bioaccumulative, persistent pollutant that has been linked to adverse health effects. For example, children who are exposed to low concentrations of methylmercury prenatally might be at risk of poor performance on neurobehavioral tests, such as those measuring attention, fine motor function, language skills, visual-spatial abilities, and verbal memory. In this scenario, EPA believes, as a matter of policy, that point sources that can cost effectively reduce their mercury discharges should do so. Because air sources or historical contamination are likely dominant causes of impairment this does not mean that point sources should not implement cost-effective, feasible pollution prevention measures to reduce their contribution of mercury, however small, to the environment. In short, EPA believes it is reasonable to expect that NPDES permittees implement cost-effective, feasible, and achievable measures to reduce the amount of mercury they discharge into the environment and that, depending on the particular facts, permit limits that require such implementation are likely to derive from and comply with water quality standards as required by EPA regulations at 40 CFR 122.44(d)(vii)(A).

### **7.5.2.3 What are EPA's recommended permit conditions for discharges that are significant sources of mercury?**

If a facility is a significant source of mercury, the permitting authority should first consider whether or not the facility uses mercury in its process or accepts wastewater containing mercury when deciding on appropriate WQBELs.

**7.5.2.3.1 What are appropriate WQBELs for significant dischargers that do not use mercury and do not accept wastewater containing mercury in their processes?**

For significant dischargers that do not use mercury in their processes and do not accept wastewater containing mercury, EPA believes that the permitting authority may express the WQBEL that is comprised of the following:

- A numeric effluent limit for the mass loading of mercury established at the existing effluent level of mercury (or any existing numeric limit, whichever is more stringent) including compliance monitoring using the appropriate version of Method 1631
- A permit condition to implement appropriate mercury minimization measures identified in a mercury minimization plan

If such a discharge has the reasonable potential to cause or contribute to an exceedence of water quality standards and the discharge is significant, EPA believes that during the first term of the permit and depending on the particular facts, permit terms that limit the discharge of mercury to existing effluent quality (or any existing numeric limit, whichever is more stringent), require the facility to develop and implement a mercury minimization plan, and require monitoring are likely to be as stringent as necessary to meet water quality standards. Given the extent of mercury impairment across the United States mostly due to nonpoint sources such as air deposition or previous contamination, and that assuming these dischargers do not use or accept mercury in their processes but rather receive it from diffuse sources, EPA believes that, depending on the particular facts, permit conditions that prohibit an increase of mass loadings of mercury and mandate a reduction of loadings when consistent with a mercury minimization plan are likely to be as stringent as necessary to meet standards as required by CWA section 301(b)(1)(C). EPA generally believes these minimum permit conditions are appropriate and sufficient to ensure the discharge does not cause or contribute to an exceedence of water quality standards, protect against possible localized impacts, and minimize the discharge of mercury. EPA believes these permit terms are appropriate in cases where the facility itself does not use mercury in its processes. EPA expects that the implementation of a mercury minimization plan will reduce the discharge of mercury. However, if at the end of the first permit term, data and information indicate that a more stringent limit is necessary to ensure that the discharge does not cause or contribute to an exceedence of water quality standards, including localized effects, the permit should be revised at renewal.

**7.5.2.3.2 What are appropriate WQBELs for significant dischargers that use mercury in their processes or accept wastewater containing mercury?**

For significant dischargers that use mercury in their processes or accept wastewater containing mercury, EPA believes that the permitting authority may express the WQBEL that is comprised of the following:

- A numeric WQBEL for the mass loading of mercury. Such a limit could be based on a TMDL, a TMDL-like analysis, an offset, or established using the criteria as the effluent limit (through development of a site-specific BAF) including compliance monitoring using the appropriate version of EPA Method 1631

- A permit condition to implement appropriate mercury minimization measures identified in a mercury minimization plan

Because there are significant direct water inputs of mercury from these facilities, states and authorized tribes should carefully consider making these watersheds a priority for TMDL development so that the TMDL can provide the basis for the appropriate permit limits. Cumulative loads from point sources and localized nonpoint sources such as abandoned mines, contaminated sediments, and naturally occurring sources can potentially combine to cause localized impairment due to mercury. These situations are more complicated because the specific location and magnitude of each source could be significant as to its effect on fish tissue concentrations. For these situations, a TMDL provides the best basis for developing the appropriate permit limits, and thus, these situations should receive a higher priority for completion.

Once EPA has approved or established a TMDL containing a wasteload allocation for the discharge of mercury, the permitting authority develops a WQBEL for a point source discharge that is consistent with the requirements and assumptions of the wasteload allocation in the TMDL (See 40 CFR 122.44(d)(1)(vii)(B)). Besides developing a WQBEL, the permitting authority also specifies monitoring requirements for the WQBEL (See 40 CFR 122.44(i) and 122.48). EPA recommends that permitting authorities require the permittee to use the version of Method 1631 then in effect to assure that even trace levels of mercury are quantified.

In addition, EPA recommends that the permit require the dischargers to implement appropriate mercury minimization measures identified through the mercury minimization plan if the monitoring data shows that mercury is present in the final effluent. In many instances, the mercury minimization plan may be a recommended part of the wasteload allocation. Where it is not, EPA believes that implementing the plan should help the facility achieve the WQBEL.

In the absence of a final TMDL, a permitting authority could develop an analysis similar to what would be provided in a TMDL. Such a TMDL-like analysis that applied similar factors used in a TMDL could be included in the fact sheet of the draft permit as a justification for the effluent limit being as stringent as necessary to attain the water quality standard.

It is also possible for the permitting authority to issue a discharger a permit prior to TMDL development where it is demonstrated that other pollutant source reductions (such as nonpoint source reductions implemented by the discharger or other sources) will offset the discharge in a manner consistent with water quality standards. The ultimate result of this type of “offset” may be a net decrease in the loadings of the pollutant of concern in the CWA section 303(d) listed water, and therefore, the point source being permitted might be considered as not causing or contributing to a violation of water quality standards.

Establishing the proper WQBEL in a specific permit is a fact-based determination. There are a number of ways to develop a permit that ensure that a discharge does not cause or contribute to an exceedence of water quality standards. Historically, EPA has not considered a discharge with effluent limitations at or below either the numeric water

quality criteria or a quantification of a narrative water quality criterion to “cause or contribute to a violation of water quality standards.”

For these significant dischargers, a state or authorized tribe may decide to translate the fish tissue criterion into a water column value for use in making reasonable potential determinations and developing appropriate numeric WQBELs. Section 3.1.2.2 of this guidance discusses the procedures for translating the fish tissue criterion into a water column value for water quality standards purposes. These procedures may also be used to translate a fish tissue criterion into a water column value for reasonable potential determinations and numeric WQBELs. Once the criterion has been translated into a water column value that accounts for the effects of bioaccumulation, the TSD (USEPA 1991) or equivalent state procedures can be used to complete a reasonable potential determination and develop numeric WQBELs. Once such a water column criteria concentration value is developed, a WQBEL established at the criterion concentration would be appropriate for receiving waters that exceed the fish tissue criterion.

#### **7.5.2.4 What are EPA’s recommendations for indirect dischargers to POTWs that are significant sources of mercury?**

POTWs are required to prohibit discharges from Industrial Users in amounts that result in or cause a violation of any requirement of the POTW’s NPDES permit. (See 40 CFR 403.2(a) and (b), 403.3(i) and 403.3(n)). POTWs that accept mercury in their collections systems may need to ensure that their pretreatment program protects the POTW’s effluent from contributing to excursions of the fish tissue criterion. The General Pretreatment Regulations (40 CFR 403) require that each POTW required to develop an approved pretreatment program must protect against pass through and interference which may be caused by industrial discharges to the treatment facilities by developing local limits for mercury and other pollutants or demonstrating that limits are not necessary for these pollutants. POTWs are also required to prohibit discharges from Industrial Users in amounts that result in or cause a violation of any requirement of the POTW’s NPDES permit. (See 403.2(a) and (b), 403.3(i) and 403.3(n)).

Federal categorical pretreatment standards, which are applicable to certain classes of industries, establish technology-based minimum pretreatment standards. However, the categorical standards do not address POTW-specific problems which may arise from discharges by categorically regulated industries. In addition, many types of industries that discharge significant quantities of pollutants are not regulated by the categorical standards. Hence, there is a need for many POTWs to establish site-specific discharge limits in order to protect the treatment facilities, receiving water quality, and worker health and safety, and to allow for beneficial use of sludge.

As described above, this guidance typically recommends that permit limits for POTWs consist of a numeric effluent limit and a requirement to develop and implement appropriate mercury minimization measures. EPA expects that a POTW’s numeric limit for mercury would be the basis for the development of local limits in the pretreatment program consistent with guidance on the development of local limits. The mercury minimization program requirements could also be the basis for establishing pollutant minimization program requirements for dischargers to the collection system.

## 7.6 What are the recommended analyses for new sources or new dischargers discharging quantifiable amounts of mercury?

Additional permitting requirements apply to new sources or new dischargers that will be discharging new or increasing concentrations of pollutants. The NPDES regulations at 40 C.F.R. §122.4(i) currently prohibit the issuance of a permit to a new source or new discharger whose discharge will cause or contribute to a violation of water quality standards.

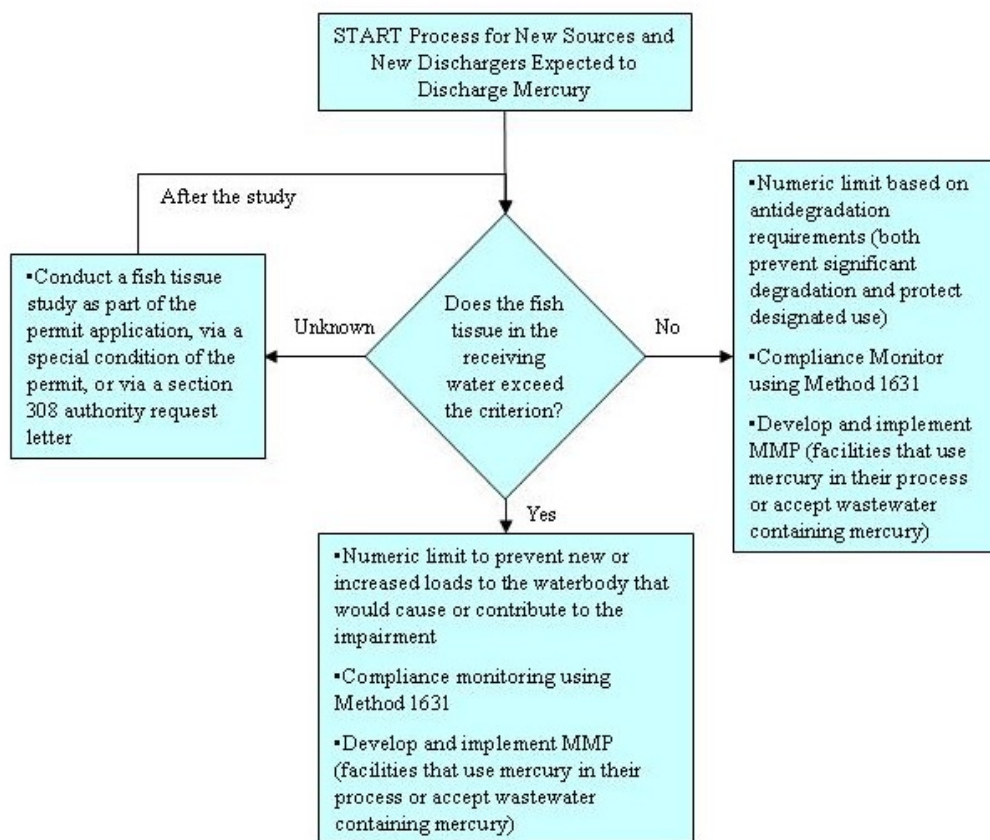
In addition, such increased discharges of mercury must be consistent with the applicable antidegradation policy. Federal regulations at 40 CFR 131.6 specify that tribal or state water quality standards must include an antidegradation policy. Federal Regulations at 40 CFR 131.12 identify the elements of an acceptable antidegradation policy. The Federal antidegradation policy is composed of three levels of protection commonly referred to as tiers. The first element identified at 40 CFR 131.12(a)(1) protects the minimum level of water quality necessary to support existing uses and applies to all waters. This element prohibits lowering water quality to the point where existing uses are impaired. The second element is found at 40 CFR 131.12(a)(2), and protects water quality where water quality is better than that needed to support designated uses in and on the water. Where these conditions exist, the water body is considered not impaired and water quality must be maintained and protected unless it is demonstrated that lowering water quality is necessary to support important social and economic development and that existing uses will be fully protected. The third element at 40 CFR 131.12(a)(3) involves the protection of water quality in water bodies that are of exceptional ecological, aesthetic or recreational significance. Water quality in such water bodies, identified and specifically designated by States as Outstanding National Resource Waters must be maintained and protected.

One potential means of satisfying antidegradation (and 40 CFR 122.4(i) for new sources or new dischargers to water quality limited segments) may be a demonstration that other mercury source reductions (such as nonpoint source reductions implemented by the discharger) will offset the new or increased discharge. The ultimate result of this type of “offset” might be a net decrease in the loadings of mercury to the receiving water, and therefore, depending on the particular facts, the discharge might not be considered an increased loading. EPA’s recommendations for addressing mercury in new sources and new discharges are summarized in Figure 8.

### **7.6.1 What are the recommendations for permitting authorities when considering issuing permits for new sources or new dischargers where the fish tissue concentrations in the receiving waterbody are unknown?**

In waterbodies for which there are no fish tissue data, a permitting authority cannot determine the applicable antidegradation requirements. In these instances, the permitting authority should start a process for collecting such data in the vicinity of the facility. One approach for collecting this information is for the permitting authority to invoke its authority under CWA section 308 to require point sources to collect information necessary for the development of NPDES permit limits. In this case, the permitting authority could issue a section 308 letter to require the permittee to conduct a methylmercury fish tissue monitoring study prior to issuance of a permit. EPA

recommends that the permitting authority require that the study design be consistent with the recommendations on conducting ambient monitoring in section 4.2 of this guidance.



**Figure 8. Procedures for addressing new sources and new discharges**

Once the permitting authority has determined the appropriate antidegradation requirements on the basis of the fish tissue concentrations in the receiving water, the permitting authority can then determine the appropriate permit requirements for new sources or new dischargers, as described below.

**7.6.2 What are the recommended permit conditions for new sources or new dischargers where the fish tissue in the receiving water does not exceed the criterion?**

In this situation, EPA believes that the permitting authority may establish permit conditions that are comprised of the following:

- A numeric effluent limitation, the level to which the discharger is ultimately allowed to lower water quality (on the basis of the applicable antidegradation requirements) including compliance monitoring using the appropriate version of Method 1631

- A permit condition to implement appropriate mercury minimization measures identified through the mercury minimization plan if the facility uses mercury in its process or accepts wastewater containing mercury

In this case, the receiving water does not currently exceed the fish tissue criterion. EPA believes that new sources or new dischargers that increase the discharge of mercury should be required to implement mercury minimization plans and should be allowed to discharge at levels as determined by the antidegradation analysis.

Permits for proposed new sources or new dischargers of mercury that would lower water quality in a high-quality water must be consistent with the applicable antidegradation provisions of a state's or authorized tribe's water quality standards. Under EPA's antidegradation regulations for water quality standards, the quality of waters better than levels necessary to protect human health can be lowered only if the state or authorized tribe determines that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located (see 40 CFR 131.12(a)(2)). EPA encourages states and authorized tribes to regard *any* increase in mercury used in a discharger's process or in wastewater accepted by a discharger as a significant lowering of water quality for the purposes of triggering a tier 2 antidegradation review. If the state's or authorized tribe's antidegradation analysis determines that the proposed lowering of water quality should not be allowable, the permitting authority would not authorize or allow any such new or increased discharge. Where the state's or authorized tribe's antidegradation analysis determines that a lowering of water quality is allowable, the level to which the discharger is ultimately allowed to lower water quality (on the basis of the applicable antidegradation requirements) would then be subject to a reasonable potential analysis. Also, EPA's antidegradation regulations for water quality standards protect the minimum level of water quality necessary to support existing uses by prohibiting lowering water quality to the point where existing uses are impaired (see 40 CFR 131.12(a)(1)).<sup>22</sup>

EPA recognizes that an increase in the discharge of mercury may be due to the presence in stormwater or input process water that does not originate with and is not under the reasonable control of a facility. While an mercury minimization plan, to the extent that there are available BMPs to minimize mercury discharges, may still be appropriate in such circumstances, EPA would not generally expect that such dischargers would trigger the need for an antidegradation review or numeric WQBELs, unless they were causing or contributing to a significant lowering of water quality.

In addition, EPA recommends that the permit require the dischargers to implement appropriate mercury minimization measures identified through the mercury minimization plan if the facility uses mercury in its process or accepts wastewater containing mercury.

<sup>22</sup> This part of the antidegradation analysis is similar to the reasonable potential determination and WQBEL development process that a permitting authority conducts for an existing discharger. See sections 7.5.1.2.2 and 7.5.2 for more details.

### **7.6.3 What are recommended permit conditions for new sources or new dischargers where the fish tissue in the receiving water exceeds the criterion?**

In this situation, EPA believes that the WQBEL may be comprised of the following:

- A numeric WQBEL for the mass loading of mercury established at levels consistent with 40 CFR 122.4(i) and 122.44(d)(1)(vii). Such a limit could be based on a TMDL, a TMDL like analysis, or via an offset, including compliance monitoring using the appropriate version of Method 1631
- A permit condition to implement appropriate mercury minimization measures identified through the mercury minimization plan if the facility uses mercury in its process or accepts wastewater containing mercury

Existing EPA regulations do not establish an absolute prohibition on new or increasing discharges for point sources on water quality limited segments. Instead, the NPDES regulations at 40 CFR 122.4(i) prohibit the issuance of a permit to a new source or new discharger whose discharge will cause or contribute to a violation of water quality standards, including the applicable antidegradation policy. A permit may be issued if the discharge would not cause or contribute to the exceedence of the water quality standards. For example, it is possible for a discharger to be issued a permit, under appropriate circumstances, where it is demonstrated that other pollutant source reductions will offset the discharge in a manner consistent with water quality standards. The ultimate result of this type of offset may be a net decrease in the loadings of the pollutant of concern in the impaired water and, therefore, be considered not to “cause or contribute to a violation of water quality standards.” This regulation applies only to “new sources” and “new dischargers” as defined in sections 122.2 and 122.29 of the NPDES regulations. Existing dischargers and increases in existing discharges are not subject to this regulation.

Existing dischargers, as well as new sources and new dischargers, are subject to the regulation at 40 CFR 122.44(d)(1)(vii) (A). That regulation provides that when developing water quality-based permit effluent limitations, the permitting authority is to set the limitations to ensure that the level of water quality to be achieved “is derived from, and complies with all applicable water quality standards.” This would necessarily be a permit-by-permit determination. After a TMDL has been established, the regulation provides that the effluent limitations must be consistent with the assumptions and requirements of any approved wasteload allocation (see 40 CFR 122.44(d)(1)(vii)(B)).

Where a facility has a currently effective effluent limit for mercury and seeks a less stringent limit, the permitting authority must also comply with anti-backsliding requirements (see CWA section 402(o) and 40 CFR 122.44(l); see also CWA section 303(d)(4)). These requirements are described in EPA’s *NPDES Permit Writers Manual* (USEPA 1996a).



## 7.7 What are the special conditions for mercury in a facility's intake?

### 7.7.1 *How to consider mercury intakes with a reasonable potential approach*

For some dischargers, the only source of mercury in a facility's discharge might be the intake water from the same body of water as where the facility discharges. An example of this is a discharge of cooling water where the source of the cooling water is upstream of the discharge. In these situations, where there are no known sources or additional contributions of mercury at the facility, the permitting authority could decide that there is no reasonable potential for the discharge to exceed water quality standards. Furthermore, any slight increase in concentration after discharge (due to evaporation or other water loss) should not have an effect on the bioaccumulation of methylmercury in the fish unless the fish are known to frequently inhabit the water immediately in the area of the discharge. In making this decision, the permitting authority should conduct monitoring of both the intake and discharge to verify that there are no known sources of additional contributions of mercury at the facility. Also, EPA recommends that permitting authorities consider requiring an evaluation of whether the methylmercury concentration significantly increases for facilities with anaerobic conditions in the discharge. This approach is also consistent with federal regulations pertaining to the Great Lakes Basin that contained an approach for determining reasonable potential using fish tissue data (see 40 CFR Part 132, Appendix F, Procedure 5.D).

### 7.7.2 *How to consider mercury in intakes in WQBELs*

For facilities that take in water from the same body of water that they discharge into, a no net increase limit may be appropriate. This type of effluent limit allows a facility to discharge into a waterbody no more mercury than it takes out of the waterbody when the concentration of mercury in the waterbody above the facility already exceeds the water quality criterion. EPA recommends that permits for these type of facilities contain:

- Effluent limits that constrain the mass discharges to not exceed the mass intake of mercury from the waterbody, or if proper operation and maintenance of a facility's treatment system results in removal of a pollutant, effluent limits that reflect these reductions from the influent loading
- Monitoring of the influent and effluent using the current version of EPA Method 1631 to quantify the amount of mercury entering and exiting the facility
- A requirement to develop a mercury minimization plan

This approach is also consistent with federal regulations pertaining to the Great Lakes Basin that contained an approach for determining reasonable potential using fish tissue data (see 40 CFR Part 132, Appendix F, Procedure 5.E).

