

CHAPTER 16. WATER QUALITY TOXICS MANAGEMENT STRATEGY—STATEMENT OF POLICY

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Cross References

This chapter cited in 25 Pa. Code § 91.15 (relating to basin-wide compliance); 25 Pa. Code § 92a.11 (relating to other chapters applicable); 25 Pa. Code § 92a.12 (relating to treatment requirements); 25 Pa. Code § 93.1 (relating to definitions); 25 Pa. Code § 93.8a (relating to toxic substances); and 25 Pa. Code § 252.403 (relating to essential quality control requirements—toxicity testing).

Subchapter A. GUIDELINES FOR DEVELOPMENT OF CRITERIA FOR TOXIC SUBSTANCES AND WATER QUALITY CRITERIA FOR TOXIC SUBSTANCES

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Source

The provisions of this Chapter 16 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059, unless otherwise noted.

Cross References

This section cited in 25 Pa. Code § 93.8a (relating to toxic substances).

INTRODUCTION**§ 16.1. General.**

Water quality criteria are the numeric concentrations, levels or surface water conditions that need to be maintained or attained to protect existing and designated uses. They are designed to protect the water uses listed in Chapter 93 (relating to water quality standards). The most sensitive of these protected uses are generally water supply, recreation and fish consumption, and aquatic life related. Therefore, criteria designed to protect these uses will normally protect the other uses listed in Chapter 93. This chapter specifies guidelines and procedures for development of criteria for toxic substances.

Source

The provisions of this § 16.1 amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial page (352566).

DISCUSSION**§ 16.11. Toxic substances.**

(a) These guidelines cover section 307(a) of The Federal Clean Water Act (33 U.S.C.A. § 1317(a)) priority pollutants and other toxic substances which the Department determines to be of concern due to their verified or suspected presence in wastewater discharges. Priority pollutants are the primary focus of concern because the EPA has determined them to be the most commonly used, persistent and toxic substances in wastewater discharges. They include many heavy metals and solvents.

(b) In November 1980, the EPA published criteria for protection of human health and aquatic life for 104 of the 129 priority pollutants. (There are currently 126 priority pollutants since three have subsequently been deleted.) These criteria were developed in accordance with National guidelines summarized at 45 FR 79318 (1980). The EPA has updated the criteria or issued new criteria since 1980 based upon new data, and more recently, new methodologies for developing human health criteria as summarized in the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004, October 2000) and the *National Recommended Water Quality Criteria* (EPA-822-H-04-001, 2004), as amended and updated. The Department's procedures for establishing criteria for aquatic life and human health protection for priority pollutants, and other toxics of concern are discussed in this subchapter.

Source

The provisions of this § 16.11 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543. Immediately preceding text appears at serial pages (271866) to (271867).

GUIDELINES FOR DEVELOPMENT OF AQUATIC LIFE CRITERIA

§ 16.21. Acute and chronic protection.

To provide for protection of aquatic life, it is necessary to consider both chronic, that is, long-term (reproduction, growth, survival) and acute or short-term (survival) endpoints. Aquatic life can generally survive excursions of elevated concentrations of a pollutant as long as the excursion is of relatively short duration and does not frequently recur. However, to provide protection over a lifetime, a lower concentration shall be maintained. Thus, each aquatic life criterion consists of two magnitudes. The EPA defines these as a criterion maximum concentration (CMC) for acute protection and a criterion continuous concentration (CCC) for chronic protection. Each criterion is defined in terms of magnitude (a scientifically derived number), duration (the period of time over which the number must be achieved), and the maximum desired frequency (the number of repetitions per unit time) of occurrence. Consistent with this approach, the Department whenever possible develops acute and chronic criteria and specifies the applicable magnitude and duration. The frequency of occurrence is accounted for through the specification of factors appropriate to the criteria and in Chapter 96 (relating to water quality standards implementation). Basis for the magnitude, duration and frequency is described in criteria development rationale or other appropriate supporting documentation.

Source

The provisions of this § 16.21 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial page (343891).

§ 16.22. Criteria development.

The Department will establish criteria for toxic substances to provide for protection of aquatic life in accordance with the following guidelines:

- (1) For those toxics for which the EPA has developed criteria in accordance with the National guidelines as set forth in “Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses” (1985), as amended and updated, the Department will review and evaluate the criteria. If the Department determines that the criteria are adequate to protect indigenous aquatic communities in the State’s waters, these criteria will serve as the basis for establishing total maximum daily loads (TMDLs) under Chapter 96 (relating to water quality standards implementation) or NPDES effluent limitations under Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance). If the Department determines that the EPA National criteria are inappropriate, the Department will adjust these criteria in accordance with National guidelines to reflect the levels required for protection of aquatic life in this Commonwealth’s waters.
- (2) For those toxics identified or expected in a discharge for which the EPA has not developed criteria, the Department will develop criteria using EPA-approved National guidelines.

Source

The provisions of this § 16.22 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial page (343892).

Cross References

This section cited in 25 Pa. Code § 16.61 (relating to special provisions for the Great Lakes System).

§ 16.23. Sources of information.

The Department will use the following sources of information in establishing criteria for aquatic life protection:

- (1) United States EPA 1986 Quality Criteria for Water (Goldbook).
- (2) United States EPA Ambient Water Quality Criteria Development Documents and updates.
- (3) Aquatic life toxicity data available in the published scientific literature.
- (4) Aquatic life toxicity data available on EPA computerized databases (for example, ECOTOX, Great Lakes Initiative (GLI) Clearinghouse).

Source

The provisions of this § 16.23 amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343892) to (343893).

§ 16.24. Metals criteria.

(a) Metals criteria are established to control the toxic portion of a substance in the water column. Depending upon available data, aquatic life criteria for metals are expressed as either dissolved or total recoverable. As information develops, the chemical identifiers for the toxic portion may be added, changed or refined. The criteria form one of the bases for water quality-based effluent limitations, which are expressed as total recoverable metal. When calculating equation-based metals criteria for determining effluent limitations, the criteria must be developed in accordance with § 93.8c (relating to human health and aquatic life criteria for toxic substances).

(b) Chemical translators are used to convert dissolved criteria into effluent limitations which are required by Federal regulations to be expressed as total recoverable metal. The default chemical translator used by the Department is the reciprocal of the conversion factor (listed in the Conversion Factors Table located in § 93.8b (relating to metals criteria)) that was used to determine the dissolved criterion. If an NPDES discharger performs a chemical translator study for a dissolved criterion, the study of this site-specific translator should be conducted in accordance with the EPA's "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion" (June 1996), as amended and updated.

(c) NPDES dischargers may request alternate effluent limitations by using site-specific water quality characteristics in a request to modify an existing water quality criterion, in accordance with § 93.8d (relating to development of site-specific water quality criteria). This may be accomplished through one or more of the following methods:

(1) Recalculating a water quality criterion in accordance with the EPA's "Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals, Appendix B: The Recalculation Procedure" (February 1994), as amended and updated. The Recalculation Procedure accounts for corrections, update and additions to the original criterion dataset to create an appropriate dataset to calculate the site-specific criterion. If the optional deletion process is used to evaluate the taxonomic composition, this process should follow the EPA's "Revised Deletion Process for the Site-Specific Recalculation Procedure for Aquatic Life Criteria" (April 2013).

(2) Developing a water quality criterion by performing a Water Effect Ratio (WER) study, which is a factor that expresses the difference between the

measures of the toxicity of a substance in laboratory water and the toxicity in site water. The WER provides a mechanism to account for that portion of a metal which is toxic under certain physical, chemical or biological conditions. WERs are applicable only to certain metals, which are listed by the EPA in “Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals” (February 1994), as amended and updated. WERs should not be used for the development of site specific criteria for copper.

(3) Developing a water quality criterion by performing a Biotic Ligand Model (BLM) study for copper in freshwater systems. The BLM is a metal bioavailability model that uses receiving water body characteristics and monitoring data to develop site-specific water quality criteria. The BLM is used in evaluating the differences in the bioavailability and toxicity of metals. These differences occur as a result of variation in local water chemistry. The BLM may be used to derive site-specific criteria for copper in freshwater systems. The BLM incorporates the best available science for determining site-specific water quality criteria for copper and is therefore preferred by the Department. The Department will require use of BLM for copper in freshwater systems. Subject to Departmental approval of the testing and its results, the Department will evaluate the use of the BLM to establish alternate site-specific criteria. In the absence of available site data to run the BLM, estimates for missing water quality parameters may be developed using EPA’s guidance, “Draft Technical Support Document: Recommended Estimates for Missing Water Quality Parameters for Application in EPA’s Biotic Ligand Model,” (March 2016), as amended and updated.

(4) Developing a water quality criterion using other guidance approved by the Department, which is based on other EPA-approved or scientifically defensible methodologies.

(d) Either the WER or BLM may be combined with a chemical translator study. The WER may also be used in combination with the Recalculation Procedures. If the Recalculation Procedure is selected, the procedure requires the recalculation of the existing criterion before the WER is applied. The BLM cannot be used in combination with the recalculation procedures or the WER.

Source

The provisions of this § 16.24 adopted November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended February 11, 2005, effective February 12, 2005, 35 Pa.B. 1223; corrected June 23, 2006, effective February 12, 2005, 36 Pa.B. 3117; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343893) to (343894).

GUIDELINES FOR DEVELOPMENT OF HUMAN HEALTH-BASED CRITERIA

§ 16.31. Application.

In the development of water quality criteria for human health protection, the principles of risk assessment and risk management are applied in two distinct ways depending upon the toxic effect to be protected against. Traditional toxicology is developed upon a theory that the “dose determines the poison” (any substance is toxic if the dose becomes large enough). It is generally recognized, however, that for most substances there is a safe level below which no adverse effects will be seen. This “threshold level” approach is in contrast to the “no threshold level” approach generally ascribed to carcinogens.

§ 16.32. Threshold level toxic effects.

(a) A threshold effect is defined as an adverse impact that occurs in the exposed individual only after a physiological reserve is depleted. For these effects there exists a dose below which no adverse response will occur. Threshold toxic effects include most systemic effects and developmental toxicity, including teratogenicity. Developmental toxicity includes all adverse effects in developing offspring resulting from prenatal exposure to a causative agent.

(b) Control of threshold toxics is based upon animal testing or epidemiological studies that report no- or lowest-observed adverse effect levels of the substance (NOAEL or LOAEL). In evaluating a particular toxic, toxicologists weigh the merits of all the tests, and choose, in their best professional judgment, the safe level. By applying standard margins of safety to the NOAEL, extrapolations from the laboratory animals to humans (factor of 10), for sensitive subpopulations (10), and from short-term to chronic studies (10) can be taken into account. An additional factor of 10 is used if only a LOAEL is available. Modifying factors (1—10), which account for deficiencies in the toxicity studies, are also considered in determining an acceptable exposure level. The current term for this acceptable level is reference dose (RfD); it was previously called the acceptable daily intake (ADI). Adverse effect levels may be calculated using Benchmark Dose (BMD) Modeling. The purpose of the BMD is to derive a point of departure for calculating a risk value, such as a reference dose or a reference concentration. In the customary approach, the point of departure is the NOAEL or the LOAEL. The BMD values are calculated by dividing a point of departure by the uncertainty factors. This most sensitive effect is also called the critical effect, and it is used as the point of departure in establishing a toxicity benchmark. The RfD, can be calculated using a LOAEL, a NOAEL or BMD. It is adjusted for protection of an average (80 Kg) person. It is then divided by expected exposure conditions to result in an applicable criterion. Exposure conditions by means of water include 2.4 liters per day of drinking water and consumption of 22.0 grams of fish per day. The bioaccumulation of toxics in edible portions of fish is accounted

for by use of bioaccumulation factors (BAF). The BAF is the ratio in liters per kilogram that accounts for the chemical accumulation in aquatic organisms from all potential exposure routes, including water, food and sediment.

(c) The Department will establish criteria for threshold toxics in accordance with the following guidelines:

(1) If the EPA has developed criteria, the Department will evaluate and accept the criteria when it is determined that they are adequate to protect the designated water uses.

(2) If the EPA criteria have been evaluated, and have been determined to be inadequate to protect designated uses, or when no criteria have been developed for a substance identified or expected in a discharge, the Department will develop criteria following EPA's standard toxicological procedures outlined in the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004, October 2000), as amended and updated.

(3) If no data are available to characterize the human health hazard of a chemical, no criterion will be developed. A criterion to protect the next most sensitive use will be used. A threshold criterion will be developed at a future date if information becomes available.

(d) The sources the Department uses to obtain relevant risk assessment values for protection for threshold level toxic effects to human health are as follows:

(1) Verified reference doses, listed in the EPA agency-wide supported data system known as IRIS (Integrated Risk Information System) and other EPA approved data sources referred through IRIS.

(2) Maximum Contaminant Level Goals.

(3) The EPA's CWA § 304(a) health criteria listed under the National Toxics Rule in 40 CFR 131.36 (57 FR 80848, December 22, 1992) (relating to toxics criteria for those States not complying with Clean Water Act section 303(c)(2)(B)), as amended and updated and other final criteria published by the EPA and the Great Lakes Initiative Clearinghouse.

(4) Teratology and other data that have been peer-reviewed may provide information for criteria development.

Source

The provisions of this § 16.32 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2523; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343894) to (343896).

Cross References

This section cited in 25 Pa. Code § 16.33 (relating to nonthreshold effects (cancer)); and 25 Pa. Code § 16.61 (relating to special provisions for the Great Lakes System).

§ 16.33. Nonthreshold effects (cancer).

(a) A nonthreshold effect is defined as an adverse impact, including cancer, for which no exposure greater than zero assures protection to the exposed individual. Thus, in contrast to the threshold concept discussed in § 16.32 (relating to threshold level toxic effects), the nonthreshold approach to toxics control is based upon the premise that there is no safe concentration of the toxic.

(b) The Department has determined that the regulation of carcinogens from a water quality perspective in accordance with the procedure specified in the following subsections will adequately and reasonably protect human health.

(c) The Department accepts the evaluation and extrapolation modeling used by the EPA to quantitate the carcinogenic risk of particular chemicals. Cancer risk level criteria are, therefore, adaptations of the EPA's cancer potency (slope) factors. Criteria based on cancer risk levels are average lifetime exposure values.

(d) The Department's water quality toxics management program controls carcinogens to an overall risk management level of one excess case of cancer in a population of one million (1×10^{-6}). Expressing this another way, the probability of an individual getting cancer from an ambient water exposure to a carcinogen is increased by a factor of one in one million. This level appears to be protective of human health to a significant degree when compared to other risks encountered in life.

(e) The Department uses a 1×10^{-6} cancer risk level as specified in § 93.8a(d) (relating to toxic substances). Attainment of this risk level is predicated on exposure that includes drinking 2.4 liters of water and ingesting 22.0 grams of fish per day over a 70-year lifetime. Bioaccumulation of carcinogenic toxics in edible portions of fish are accounted for by use of bioaccumulation factors (BAFs).

(f) The Department will use the following guidelines in establishing criteria for nonthreshold toxics:

(1) The determination as to whether a substance is a carcinogen will be its identification by the EPA.

(2) For toxics for which (cancer potency) slope factors have been developed as evidenced by listing on IRIS the Department will either use the EPA developed criteria or will develop criteria based upon these potency factors using the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004, October 2000) and the *National Recommended Water Quality Criteria* (EPA-822-H-04-001, 2004), as amended and updated or EPA's Standard Toxicological Procedures outlined in Exhibit 3-2 of the *Water Quality Standards Handbook*, Second Edition, EPA 823-0-94-005A, August, 1994, as amended and updated.

(3) For carcinogens or suspected carcinogens for which cancer potency (slope) factors have not been developed, the Department will use an additional margin of safety (factor of 10) with threshold toxicity data to develop a protective health criterion.

Source

The provisions of this § 16.33 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2523; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343896) to (343897).

Cross References

This section cited in 25 Pa. Code § 16.61 (relating to special provisions for the Great Lakes System).

CRITERIA MODIFICATION

§ 16.41. Changes and additions.

The criteria in Chapter 93, Table 5 and site-specific criteria in Appendix A, Table 1A for toxic substances are based on the best scientific information currently available. These criteria may, however, be added to or modified if the Department determines upon evaluation of new scientific findings and information that a change is warranted. Submittal of data and information will be considered by the Department for this purpose. Site-specific criteria development will be performed in accordance with § 93.8d (relating to development of site-specific water quality criteria). Changes and additions to the tables will be published in the *Pennsylvania Bulletin*.

Source

The provisions of this § 16.41 amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543. Immediately preceding text appears at serial pages (271873) to (271874).

§ 16.42. [Reserved].

Source

The provisions of this § 16.42 adopted April 9, 1993, effective April 10, 1993, 23 Pa.B. 1728; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; reserved November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111. Immediately preceding text appears at serial page (239608).

**WATER QUALITY CRITERIA
FOR TOXIC SUBSTANCES****§ 16.51. Human health and aquatic life criteria.**

(a) Chapter 93, Table 5 lists the human health and aquatic life criteria for toxic substances which the Department uses in development of effluent limitations in NPDES Permits and for other purposes. The Department will maintain a table of site-specific human health and aquatic life criteria that have been developed or reviewed and approved by the Department. The approved analytical procedures and detection limits for these substances will be listed, as appropriate, in Table 2A. The human health criteria, which include exposures from drinking water and fish consumption, are further defined as to the specific effect (that is, cancer or threshold health effects). For those aquatic life criteria which are a function of local water quality conditions and are specified as a formula, such as several of the heavy metals, the hardness and pH values used to derive the appropriate water quality criteria will be determined by instream measurements or best estimates, representative of the median concentrations or conditions of the receiving stream for the applicable time period and design conditions on a case-by-case basis. Some of these criteria may be superseded for the Delaware Estuary, Ohio River Basin, Lake Erie Basin, and Genesee River Basin under interstate and international compact agreements with the Delaware River Basin Commission, Ohio River Valley Sanitation Commission and International Joint Commission respectively. The toxics substances in Chapter 93, Table 5 without a PP NO are State-derived criteria. Water quality criteria for the Great Lakes System are in § 93.8e, Tables 6 and 7. Criteria in § 93.8c, Table 5 may apply to the Great Lakes System for those substances not listed in Table 6. Criteria may be developed for the Great Lakes System for substances other than those listed in Table 5 or 6 under the methodologies in § 16.61 (relating to special provisions for the Great Lakes System).

(b) If the Department determines that the natural quality of a surface water segment is of lower quality than the applicable criteria listed in Chapter 93, Table 5, the natural quality shall constitute the aquatic life criterion for that segment. Notice of all draft natural quality determinations shall be published in the *Pennsylvania Bulletin* and be subject to a minimum 45-day comment period. The Department will maintain a publicly available list of surface waters and parameters where this subsection applies, and will, from time to time, submit appropriate amendments to these chapters. Natural quality determinations are documented in stream investigation reports or water quality criteria rationale documents.

Source

The provisions of this § 16.51 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended December 21, 1990, effective December 22, 1990, 20 Pa.B. 6299; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended December 26, 1997, effective Decem-

ber 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial page (343898).

§ 16.52. Whole Effluent Toxicity Testing (WETT).

The Department may require WETT, under § 92a.21(d)(4) (relating to application for a permit), for any discharges covered by an NPDES permit or other activities where it is determined that the testing is necessary to assure the protection of aquatic life. Where WETT is required, the Department will use the criteria of 0.3 TUA (Toxic Units Acute) and 1 TUC (Toxic Units Chronic) design conditions and other applicable factors as a basis for evaluating test results. WETT shall be conducted in accordance with 40 CFR Part 136 (relating to guidelines establishing test procedures for the analysis of pollutants), Chapter 252 (relating to environmental laboratory accreditation), the NPDES permit, Quality Assurance Quality Control guidance issued by the Department or other protocols approved by the Department.

Source

The provisions of this § 16.52 adopted December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial page (343899).

GREAT LAKES SYSTEM

§ 16.61. Special provisions for the Great Lakes System.

(a) *Definitions.* The following words and terms, when used in this section, have the following meanings, unless the context clearly indicates otherwise:

BAF—Bioaccumulation Factor—The ratio in liters per kilogram of a substance's concentration in tissues of an aquatic organism to its concentration in the ambient water, when both the organism and its food are exposed and the ratio does not change substantially over time.

BCC—Bioaccumulative Chemical of Concern—A chemical that has the potential to cause adverse effects which, upon entering the surface waters, by itself or its toxic transformation product, accumulates in aquatic organisms by a human health BAF greater than 1,000, after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation, under the methodology in 40 CFR Part 132 Appendix B (relating to Great Lakes Water Quality Initiative). Current BCCs are listed in 40 CFR 132.6, Table 6 (relating to pollutants of initial focus in the Great Lakes Water Quality Initiative).

Great Lakes System—The streams, rivers, lakes and other bodies of surface water within the drainage basin of the Great Lakes in this Commonwealth.

(b) *Water quality criteria for the Great Lakes System.*

(1) *Aquatic life criteria.* Aquatic life criteria for toxic substances in the Great Lakes System will be developed under the methodologies in § 16.22 (relating to criteria development) to the extent they are consistent with 40 CFR Part 132, Appendix A (relating to Great Lakes Water Quality Initiative methodologies for developments of aquatic life values). If there are insufficient data to develop aquatic life criteria for a toxic substance identified in a discharge into these waters, the Department will develop or require a discharger to develop, subject to Department approval, protective aquatic life values using the methodologies in 40 CFR Part 132, Appendix A and guidance issued by the Department. For non-BCCs, WETT may be used in lieu of Tier II values to determine aquatic toxicity.

(2) *Human health criteria.* Human health criteria for the Great Lakes System will be developed using the methods in §§ 16.32 and 16.33 (relating to threshold level toxic effects; and nonthreshold effects (cancer)). If criteria for a substance is not available in Chapter 93 Tables 5 or 6, and there are insufficient data to develop human health threshold criteria for a toxic substance identified in a discharge into these waters, the Department will develop, or require the discharger to develop, subject to Department approval, protective human health values using the methodologies in 40 CFR Part 132, Appendix C, Section III, as it relates to Tier II values, in accordance with exposure inputs at §§ 16.32 and 16.33, and guidance issued by the Department.

(3) *BAFs.* Human health criteria for BCCs will be developed under the methodologies in 40 CFR Part 132, Appendix B relating to bioaccumulation factors, and will be listed by the EPA in the GLI Clearinghouse. Because substances other than BCCs (Non-BCCs) bioaccumulate to a much lesser degree, BAFs for Non-BCCs are similar to bioconcentration factors (BCFs). Field measured BAFs, or BAFs equal to BCFs will be used for the development of non-BCC criteria in the Great Lakes.

(4) *Additional requirements.* Additivity of toxic effects for chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans will be accounted for under 40 CFR Part 132, Appendix F, Procedure 4 (relating to Great Lakes Water Quality Initiative implementation procedures).

(c) *Minimum protections.* The Department will follow guidance that is as protective as the final water quality guidance for the Great Lakes System at 40 FR 15366 (March 23, 1995), as updated and amended.

Source

The provisions of this § 16.61 adopted December 26, 1997, effective December 27, 1997, 27 Pa.B. 6817; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended February 11, 2005, effective February 12, 2005, 35 Pa.B. 1223; corrected March 25, 2005, effective March 7, 1998, 35 Pa.B. 1890; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343899) to (343900).

Cross References

This section cited in 25 Pa. Code § 16.32 (relating to threshold level toxic effects); 25 Pa. Code § 16.33 (relating to nonthreshold effects (cancer)); 25 Pa. Code § 16.51 (relating to human health and aquatic life criteria); 25 Pa. Code § 93.8c (relating to human health and aquatic life criteria for toxic substances); and 25 Pa. Code § 93.8e (relating to special criteria for the Great Lakes System).

**Subchapter B. ANALYTICAL METHODS AND
DETECTION LIMITS FOR TOXIC SUBSTANCES****GENERAL PROVISIONS**

Sec.

16.101. Introduction.

16.102. Approved EPA and DEP analytical methods and detection limits.

GENERAL PROVISIONS**§ 16.101. Introduction.**

(a) This subchapter contains information on the final EPA guidelines establishing test procedures for the analysis of priority pollutants under the Federal Water Pollution Control Act, known as the Clean Water Act (33 U.S.C.A. §§ 1251—1376). The procedures of analysis for the organic compounds are contained in 40 CFR 136 (relating to guidelines establishing test procedures). Procedures for inorganic substances are cited in this source, but details are found elsewhere. Analytical procedures for free cyanide are approved by the Department and are contained in Appendix A, Table 2A.

(b) This information provides the expected levels of analytical detectability for toxic priority pollutants. It is intended as a basis for review of NPDES application forms, and for establishing appropriate detection limits and methods of analysis to accompany final effluent limitations in permits.

(c) The Department recommends that clean techniques be employed as appropriate in collecting, handling, storing, preparing and analyzing samples. Clean techniques refer to methods that reduce contamination and enable the accurate and precise measurement of substances, and to related issues concerning detection limits, quality control and quality assurance. Clean techniques are those requirements or practices for sample collection and handling necessary to produce reliable analytical data to at least the microgram per liter ($\mu\text{g}/\text{l}$) or part per billion (ppb) range, or lower as required by the analytical method. The use of clean techniques reduces the incidence of overstatement of environmental concentrations of trace substances.

Source

The provisions of this § 16.101 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended February 11, 2005, effective February 12, 2005, 35 Pa.B. 1223; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543. Immediately preceding text appears at serial page (310144).

§ 16.102. Approved EPA and DEP analytical methods and detection limits.

Appendix A, Table 2A contains approved Department analytical methods and detection limits. The following data elements are to be used as follows:

(1) The Chemical Abstracts Service (CAS) number, a unique chemical identifier, is to be used for completeness of identification. The CAS number should always be verified to ensure proper identification, particularly with chemicals with ambiguous or unfamiliar names, or both.

(2) If the EPA has an approved test method for analysis of a specific pollutant, the NPDES permittee shall use the approved test method (or an approved alternate test method) for the specific pollutant under 40 CFR Part 136 (relating to guidelines establishing test procedures for the analysis of pollutants). Methods are detailed in one or more of the following sources:

(i) EPA-approved analytical methods and guidelines in 40 CFR Parts 122, 136, 141, 143, 430, 455 and 465. EPA-approved analytical methods must be sufficiently sensitive and capable of detecting and measuring the pollutants at or below the applicable water quality criteria or permit limits consistent with the EPA's regulations in 40 CFR Part 122 (relating to EPA administered permit programs: the National Pollutant Discharge Elimination System) and 40 CFR Part 136.

(ii) If an EPA-approved analytical method is not available for a pollutant, an analytical method may be used that is capable of detecting and measuring the pollutant at or below the applicable water quality criterion or permit limit. The analytical method should be consistent with guidelines for developing analytical methods, as described in this Chapter.

(iii) *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, APHA-AWWA-WEF, 1998.

(iv) *Hach Handbook of Wastewater Analysis*, Hach Chemical Company, 1979.

(v) *Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes, Method AES0029*. Applied Research Laboratories, Inc., 1986-Revised 1991, Fison Instruments, Inc.

(vi) *ASTM Annual Book of Standards, Section 11, Water*. American Society for Testing and Materials, 1999.

(3) MDL is the method detection limit for each chemical for each method. The MDL is defined as the minimum concentration that can be measured and

reported with 99% confidence that the value is above zero—that is, something is really there. The MDL achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

(i) When MDLs are not available, detection limits based on other criteria approved by the Department may be used.

(ii) For any pollutant with an effluent limitation below the method detection limit, the permittee is expected to generally achieve the detection limit of the most sensitive method that is below detection available.

(iii) If two approved analytical methods for the same parameter have detection limits that differ by less than 1 µg/l or a factor of 2 (whichever is greater), the permit may be written designating either method as acceptable. The permittee also has the option of using an alternate method approved by the Department and the EPA that the permittee selects as long as the level of detection of the cited method or the numerical water quality-based limit are achieved.

(iv) When the EPA has not performed an MDL study or reported the detection limit, other sources—particularly, Standard Methods—are consulted. When there is no literature on detection limit, the Department's Bureau of Laboratories may develop a detection limit or review and approve a Department-accredited lab's development of a detection limit using an MDL study.

(4) Permittees will be required to meet the detection limits listed in Appendix A, Table 2A.

(5) When permittees cannot meet a listed detection limit, they may be granted case-specific MDLs if they submit complete documentation demonstrating a matrix effect in their particular effluent. The permittees shall follow the procedure for determining MDLs published in Appendix B of 40 CFR Part 136. The Bureau of Laboratories will evaluate the data and advise the regional office of their decision.

Source

The provisions of this § 16.102 adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended February 11, 2005, effective February 12, 2005, 35 Pa.B. 1223; corrected March 18, 2005, effective February 12, 2005, 35 Pa.B. 1761 and 1890; amended July 10, 2020, effective July 11, 2020, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (343902) and (367479).

Cross References

This section cited in 25 Pa. Code § 250.10 (relating to measurement of regulated substances in media).

APPENDIX A**TABLE 1**

[Reserved]

TABLE 1A

[Reserved]

TABLE 2A**APPROVED DEP ANALYTICAL METHODS AND
DETECTION LIMITS**

<i>Parameter (CAS)</i>	<i>Method Number (Description) Source</i>	<i>Detection Limit (µg/l)</i>
* 14M CYANIDE, FREE (00057125)	—(DEP Free CN method, Auto) Not EPA approved	1
— BENZENE METADISULFONIC ACID (00098486)	OR 357A Test America, HPLC/UV or LC/MS/MS	50
— BENZENE MONOSULFONIC ACID (00098113)	OR 357A Test America, HPLC/UV or LC/MS/MS	50
— P-PHENOL SULFONIC ACID (00098679)	OR 357A Test America, HPLC/UV or LC/MS/MS	50

* EPA currently measures “total cyanide” to satisfy cyanide limits and has not yet approved analytical methods for “free cyanide.” Free cyanide is a DEP required analysis, and either of the three listed methods are acceptable for its determination.

TABLE 2B

[Reserved]

TABLE 3

[Reserved]

Source

The provisions of this Appendix A adopted March 10, 1989, effective March 11, 1989, 19 Pa.B. 1059; corrected April 7, 1989, effective March 11, 1989, 19 Pa.B. 1575; amended August 31, 1990, effective September 1, 1990, 20 Pa.B. 4628; amended December 21, 1990, effective December 22, 1990, 20 Pa.B. 6299; amended January 18, 1991, effective January 19, 1991, 21 Pa.B. 234; amended April 9, 1993, effective April 10, 1993, 23 Pa.B. 1727; amended October 15, 1993, effective October 16, 1993, 23 Pa.B. 4906; amended November 17, 1995, effective November 18, 1995, 25 Pa.B. 5067; amended November 17, 2000, effective November 18, 2000, 30 Pa.B. 6111; amended May 15, 2009, effective May 16, 2009, 39 Pa.B. 2543; amended July 19, 2013, effective July 20, 2013, 43 Pa.B. 4103; amended July 10, 2020, effective July 11, 2010, 50 Pa.B. 3485. Immediately preceding text appears at serial pages (367480) to (367500).

Cross References

This appendix cited in 25 Pa. Code § 16.41 (relating to changes and additions); 25 Pa. Code § 16.51 (relating to human health and aquatic life criteria); 25 Pa. Code § 16.102 (relating to approved EPA and DEP analytical methods and detection limits); and 25 Pa. Code § 93.1 (relating to definitions).

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