PROPOSED RULEMAKING

ENVIRONMENTAL QUALITY BOARD

[25 PA. CODE CH. 93]

Triennial Review of Water Quality Standards

The Environmental Quality Board (Board) proposes to amend Chapter 93 (relating to water quality standards) to read as set forth in Annex A.

This proposed rulemaking was adopted by the Board at its meeting of July 11, 2023.

A. *Effective Date*

This proposed rulemaking will be effective upon final-form publication in the *Pennsylvania Bulletin*. Once approved by the United States Environmental Protection Agency (EPA), water quality standards are used to implement the Federal Clean Water Act (CWA) (33 U.S.C. §§ 1251—1389).

B. *Contact Persons*

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C. *Statutory and Regulatory Authority*

This proposed rulemaking is authorized under sections 5(b)(1) and 402 of The Clean Streams Law (CSL) (35 P.S. §§ 691.5(b)(1) and 691.402), which authorize the Board to develop and adopt rules and regulations to implement the CSL (35 P.S. §§ 691.1—691.1001), and section 1920-A of The Administrative Code of 1929 (71 P.S. § 510-20), which grants the Board the power and duty to formulate, adopt and promulgate rules and regulations for the proper performance of the work of the Department. In addition, sections 101(a)(2) and 303 of the CWA (33 U.S.C. §§ 1251(a)(2) and 1313) set forth requirements for water quality standards, which states must meet to implement the CWA in this Commonwealth.

D. *Background and Purpose*

Water quality standards are instream water quality goals that are implemented by imposing specific regulatory requirements and permit conditions (such as treatment requirements, effluent limits and best management practices (BMP)) on individual sources of pollution. They include protected water uses, the specific numeric and narrative criteria necessary to achieve and maintain those water uses, and antidegradation requirements. Section 303(c)(1) of the CWA and the Federal regulations at 40 CFR 131.20 (relating to state review and revision of water quality standards) require states to periodically, but at least once every 3 years, review and revise as necessary their water quality standards. Under this Federal regulation, a state must provide an explanation to the EPA if the state does not adopt criteria that the EPA has published.

The surface waters of this Commonwealth are protected for a variety of water uses including: aquatic life; drinking water supplies for humans, livestock and wildlife; irrigation for crops, turf and other horticultural activities; industrial water supplies; fish consumption; recreation; and special protection. Water quality criteria are those elements of water quality standards representing the quality of water that support protected water uses and can be expressed as constituent concentrations or narrative statements. Water quality criteria represent the conditions sufficient for maintenance or attainment of the chemical, physical and biological integrity of water bodies and water uses. Since states must adopt scientifically defensible criteria that protect water uses, criteria recommendations are made independent of other considerations.

Water quality standards are an important element of the Commonwealth's water quality management program and have existed in this Commonwealth for over 75 years. The program began with the establishment of the Sanitary Water Board (SWB) in 1923. The SWB was abolished on January 19, 1971, and the responsibilities for developing and maintaining the water quality criteria and standards were transferred to the Department of Environmental Resources (DER). New or revised specific water quality criteria and standards were developed by DER for all surface waters in this Commonwealth, and formally adopted into Chapter 93 on September 10, 1971.

DER completed its first triennial review of the Commonwealth's water quality standards in 1979. Since the CWA requires that states periodically review and revise their water quality standards, DER completed additional revisions in 1985, 1989 and 1994. The Conservation and Natural Resources Act (71 P.S. §§ 1340.101—1340.1103), enacted in 1995, replaced DER with the Department of Conservation and Natural Resources and the Department. The Department subsequently completed additional revisions to the Commonwealth's water quality standards in 2000, 2004, 2009, 2013 and 2020. This proposed rulemaking fulfills the Commonwealth's obligation to periodically review and revise its water quality standards and updates the water quality standards to ensure the surface waters of this Commonwealth are afforded the appropriate level of protection.

The EPA provided recommendations to the Department for this triennial review of water quality standards in a letter dated March 11, 2022. These recommendations included the following: consideration of all new or updated EPA criteria recommendations, developed by the EPA under section 304(a) of the CWA (33 U.S.C. § 1314(a)), that have been published since May 30, 2000, and not yet adopted by the Commonwealth; clarification of the duration and frequency components of the Commonwealth's aquatic life criteria; consideration of the EPA's 2012 methodology for the development of secondary contact recreational water quality criteria; and the addition of a cross reference to the Department's compliance schedule provision in Chapter 92a (relating to National Pollutant Discharge Elimination System permitting, monitoring and compliance).

On November 17, 2022, the Department met with the Water Resources Advisory Committee (WRAC) to discuss the proposed amendments to Chapter 93. WRAC voted to support presentation of this proposed rulemaking to the

Board. In addition, on December 8, 2022, the Department provided to the Agricultural Advisory Board a regulatory review that included this triennial review of water quality standards.

E. *Summary of Regulatory Requirements*

The following is a detailed description of proposed amendments to Chapter 93.

§ 93.1. Definitions

The Board proposes to delete a reference to Appendix A, Table 1A from the definition of "toxic substance" in § 93.1 (relating to definitions). This table was deleted from Chapter 16 (relating to water quality toxics management strategy—statement of policy) in the previous triennial review of water quality standards and the amended policy was published in the *Pennsylvania Bulletin* at 50 Pa.B. 3426 (July 11, 2020).

§ 93.7. Specific water quality criteria—Table 3

The Board proposes to add language to § 93.7(a) (relating to specific water quality criteria) that clarifies the duration period for the aquatic life use criteria found in Table 3. Unless otherwise specified in § 93.7, the duration period of the aquatic life criteria with minimum or maximum values, and of the pH criterion, is a one-hour average as defined in § 93.1. Aquatic life criteria consist of a magnitude, duration and frequency. In general, the EPA recommends a duration period of one-hour for acute criteria in accordance with the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985) and the EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991).

§ 93.8c. Human health and aquatic life criteria for toxic substances

The Board proposes to add subsection (c) that clarifies the duration periods for the aquatic life criteria in Table 5. Unless otherwise specified in § 93.8c (relating to human health and aquatic life criteria for toxic substances), the aquatic life criteria duration periods for criteria maximum concentration (CMC) values and criteria continuous concentrations (CCC) values are a one-hour average and a four-day average, respectively, as defined in § 93.1. These criteria duration periods are part of the CWA section 304(a) criteria recommendations that were previously adopted by the Department and are otherwise consistent with the EPA's criteria duration recommendations as published in the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985) and the EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991).

The Board proposes additions and amendments to the human health and aquatic life criteria in Table 5—Water Quality Criteria for Toxic Substances. These additions and amendments are proposed to reflect the latest scientific information and are consistent with the Department's Water Quality Toxics Management Strategy—Statement of Policy, and §§ 16.22 and 16.32 (relating to criteria development; and threshold level toxic effects). Additionally, the proposed criteria are consistent with existing EPA policies outlined in the *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (EPA 2000) and the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985). The Board is proposing updated or new aquatic life and human health criteria for cadmium, carbaryl, tributyltin, acetone, barium, boron, chloroform, formaldehyde, methyl ethyl ketone, metolachlor, resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,4-dioxane, chlorophenoxy herbicide (known as 2,4-D) and xylene.

The Board also proposes to update the acronyms and footnotes to Table 5. These updates include the following: the replacement of the existing H and CRL column with a new "Notes" column; the replacement of the word "footnotes" with "notes" in "Acronyms and Footnotes to Table 5"; the replacement of the existing footnote symbols with numerals; the replacement of the existing H and CRL acronyms with numerals; and the addition of a numeral to clarify that several aquatic life criteria have duration periods that are instantaneous and 24-hour.

Summary of Table 5 proposed criteria

Cadmium is a relatively rare, naturally occurring metal found in mineral deposits that is widely distributed at low concentrations in the environment. Cadmium enters the environment through both anthropogenic and natural pathways including mining, agriculture, urban activities, industrial waste, manufacturing, coal ash, use of fossil fuels, incineration, municipal effluent, weathering and erosion of rocks and soils, and natural combustion from volcanoes and forest fires. The concentration of cadmium in unpolluted freshwaters is usually very low and often nondetectable, but solubility is dependent upon factors such as pH, hardness, alkalinity and organic matter. Increased hardness has been shown to ameliorate the toxic effects of cadmium in freshwater animals. Cadmium is a non-essential metal that has no biological function in animals, and it is acutely toxic to aquatic animals. Cadmium is a known teratogen, carcinogen and a probable mutagen. The EPA published updated section 304(a) aquatic life criteria recommendations for cadmium in 2016. The Department completed a comprehensive review of the EPA's 2016 recommendations as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Aquatic Life Use—Cadmium* (DEP 2022c) and determined they are appropriate for this Commonwealth. The Board's proposed acute and chronic cadmium criteria for the protection of aquatic life are equation-based and will be dependent upon instream hardness. These criteria are consistent with the EPA's current section 304(a) criteria recommendations.

Carbaryl is a broad-spectrum insecticide, commonly known as Sevin®. In addition to being a broad-spectrum insecticide, carbaryl is also registered for use as a mosquito adulticide, a molluscicide, in pet care products and to thin fruit in orchards to enhance fruit size and repeat bloom. Since carbaryl is moderately mobile in soils, it enters aquatic environments primarily through stormwater runoff from areas where it has been applied, including agricultural and urbanized areas. Carbamate insecticides inhibit acetylcholinesterase in animals, which can lead to uncontrolled movement, paralysis, convulsions, tetany and possibly death. The EPA published section 304(a) aquatic life criteria recommendations for carbaryl in 2012. The Department completed a comprehensive review of the EPA's 2012 recommendations as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Aquatic Life Use—Carbaryl* (DEP 2022d) and determined they are appropriate for this Commonwealth. The Board's proposed criteria

for the protection of aquatic life from carbaryl toxicity are 2.1 µg/L for acute toxicity and 2.1 µg/L for chronic toxicity. These criteria are consistent with the EPA's current section 304(a) criteria recommendations.

Tributyltin, also known as TBT, falls within a large class of chemicals described as organotins. Organotins, such as TBT, are used extensively in the manufacturing of plastic products and less extensively as biocides and as preservatives for wood, textiles, paper, leather and electrical equipment. The largest direct release of TBT into aquatic environments is most likely the result of antifouling paints being used on ships, boats, nets, crab pots, docks and water cooling towers. TBT is the most toxic organotin to aquatic life. TBT disrupts the normal flow of ions across cell membranes leading to cell death. It is also an endocrine-disrupting chemical that causes masculinization of certain female gastropods (for example, snails). The EPA published section 304(a) aquatic life criteria recommendations for TBT in 2004. The Department completed a comprehensive review of the EPA's 2004 recommendations as detailed in the Department's criteria rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Aquatic Life Use—Tributyltin* (DEP 2022e) and determined they are appropriate for this Commonwealth. The Board's proposed criteria for the protection of aquatic life from TBT toxicity is 0.46 µg/L for acute toxicity and 0.072 µg/L for chronic toxicity. These criteria are consistent with the EPA's current section 304(a) criteria recommendations.

Acetone is an organic solvent that has industrial, laboratory, medical and domestic applications. Human exposure to acetone may occur through inhalation, dermal absorption or ingestion of food and water. Acetone is generally produced by the human body in small quantities. However, individuals who choose a ketogenic diet or take ketone supplements may be at increased risk of exposure. Among the general public, cigarette smokers and individuals who frequently use acetone-based nail polish removers are also at increased risk. In addition, professional painters, salon workers, factory workers and commercial and household cleaning professionals are more likely to be exposed to acetone at higher concentrations. The Department is making updates to the existing acetone water quality criterion, which was previously approved by the EPA in 2000, based on new toxicity information and exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for acetone utilizing current toxicity information published in the EPA's Integrated Risk Information System (IRIS) database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for acetone has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 6,000 µg/L.

Barium is a naturally occurring metal found in underground mineral deposits that has many important industrial uses and some medical uses. Human exposure to barium may occur through inhalation or ingestion of food and water. High amounts of barium can be found in some foods including Brazil nuts, seaweed, fish and certain plants. Individuals working in industries that make or use barium compounds have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing barium water quality criterion, which was previously approved by the EPA in 2000, based on new toxicity information and exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for barium utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for barium has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 1,000 µg/L.

Boron is a naturally occurring element found in the earth's crust. When boron combines with oxygen, it forms compounds called borates including boric acid, boron oxide and sodium tetraborates (that is, borax). Borates are used in the manufacture of industrial and consumer products including fire retardants, pesticides, glass, ceramics, soaps, bleaches and detergents. Human exposure to boron may occur through inhalation, dermal contact or ingestion of food and water. High amounts of boron can be found in some foods including nuts, dried fruits, avocado and peanuts. Individuals working in industries that make or use borate compounds have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing boron water quality criterion, which was previously approved by the EPA in 2000, based on new toxicity information and exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for boron utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for boron has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 1,000 µg/L.

Chloroform is a colorless, volatile liquid. Chloroform produced in the United States today is primarily used to make other chemicals, such as refrigerants. However, it can also form as a byproduct of adding chlorine to water, which is a common practice in the treatment of drinking water and wastewater. Human exposure to chloroform may occur through inhalation, dermal contact or ingestion of food and water. Individuals living near or working in industries that make or use chloroform, living near municipal and industrial wastewater treatment plants and incinerators or paper and pulp plants, and receiving water from contaminated water sources have the greatest known risk of exposure to high concentrations. The EPA published an updated section 304(a) human health criterion recommendation for chloroform in 2015. The Depart-

ment completed a comprehensive review of the EPA's 2015 recommendation as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a) and determined it is appropriate for this Commonwealth. The Board's proposed criterion is 60 µg/L, which is consistent with the EPA's current section 304(a) criterion recommendation.

Formaldehyde is a colorless, flammable gas at room temperature. Formaldehyde can be found in many household items including antiseptics, medicines, cosmetics, dish-washing detergents, fabric softeners, carpet cleaners, glues and adhesives, lacquers, plastics, paper and some types of wood products. It is also used in the production of sugar, fertilizers, paper, well-drilling fluids, latex, leather (tanning process), photographic film, embalming fluid, plywood and urea-formaldehyde resins. Human exposure to formaldehyde occurs primarily through inhalation but may also occur through ingestion of food and water. Individuals living near or working in industries that make or use formaldehyde have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing formaldehyde water quality criterion, which was previously approved by the EPA in 2000, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for formaldehyde utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for formaldehyde has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 1,000 µg/L.

Methyl ethyl ketone, also known as 2-butanone, is an organic, colorless liquid. Methyl ethyl ketone is used in the production of synthetic leathers, transparent paper and aluminum foil. It is also used as a solvent for paints, lacquers, rubber cement, printing inks, paint removers, vinyl films, resins, rosins, polystyrene, chlorinated rubber, polyurethane, acrylic coatings and cleaning solutions. Human exposure to methyl ethyl ketone may occur through inhalation, dermal contact or ingestion of food and water. Individuals working in industries that use methyl ethyl ketone have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing methyl ethyl ketone water quality criterion, which was previously approved by the EPA in 2000, based on new toxicity information and exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for methyl ethyl ketone utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for methyl ethyl ketone has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 4,000 µg/L.

Metolachlor is an organic compound that is widely used as an agricultural and commercial herbicide. Human exposure to metolachlor may occur through inhalation, dermal contact or ingestion of food and water. Individuals living within or very near to areas of heavy agricultural use or who are involved in the production, formulation, handling or application of metolachlor have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing metolachlor water quality criterion, which was previously approved by the EPA in 2008, based on new toxicity information and exposure inputs developed by the EPA. In 2004, the EPA announced that chemicals used as pesticides would not be reassessed by the IRIS program. The Department has recalculated the Commonwealth's human health criterion for metolachlor utilizing current toxicity information published in the EPA's *Reregistration Eligibility Decision (RED) Metolachlor* (RED document, EPA 1995) and updated human health exposure inputs for body weight, drinking water intake and fish intake. Based on its low potential for bioaccumulation, the human health criterion for metolachlor has been calculated with a total bioaccumulation factor of 1. According to the RED document, a cancer potency factor was recommended in 1991 but later retracted in 1994. In 1994, the Health Effects Division Peer Review Committee recommended a margin of exposures (MOE) approach for metolachlor since there was no supportable mutagenicity concern and in light of new information on the relative metabolism of metolachlor. The MOE was calculated from a no-observed-adverse-effect-level (NOAEL) of 15 mg/kg/day. Since the reference dose is based on a NOAEL of 9.7 mg/kg/day, cancer concerns are adequately addressed. The Department had previously applied an additional safety factor of 10 to the reference dose since the EPA had not published a cancer potency factor, but this cancer safety factor has been removed based on the 1995 RED document information. The Board's proposed criterion is 700 µg/L.

Resorcinol is a white crystalline compound. It is largely used by the rubber industry in the manufacture of tires and other fiber-reinforced rubber mechanical goods, such as conveyor and driver belts. Resorcinol is also used in manufacture of dyes, pharmaceuticals, flame retardants, agricultural chemicals, fungicidal creams and lotions, explosive primers, antioxidants and specialty chemicals. Human exposure to resorcinol may occur through inhalation, dermal contact or ingestion of food and water. Individuals working in industries that manufacture or use resorcinol have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing resorcinol water quality criterion, which was previously approved by the EPA in 2013, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for resorcinol utilizing the previously used toxicity information and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol,*

1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for resorcinol has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 3,000 µg/L.

1,2,3-trichloropropane is a colorless, non-naturally occurring liquid. It is commonly used as a chemical intermediate in the production of other chemicals. 1,2,3-trichloropropane was also used as a solvent and extraction agent in the past. Human exposure to 1,2,3-trichloropropane may occur through inhalation, dermal contact or ingestion of food and water. Individuals living near or working in industries that manufacture 1,2,3-trichloropropane have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing 1,2,3-trichloropropane water quality criterion, which was previously approved by the EPA in 2000, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for 1,2,3-trichloropropane utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for 1,2,3-trichloropropane has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 30 µg/L.

1,2,4-trimethylbenzene is a colorless liquid. It is used as a solvent in the manufacture of dyes, perfumes and resins; in the manufacture of pharmaceuticals; as an industrial solvent and paint thinner; and as a fuel additive. Human exposure to 1,2,4-trimethylbenzene may occur through inhalation, dermal contact or ingestion of food and water. Individuals living near or working in industries that manufacture or use 1,2,4-trimethylbenzene have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing 1,2,4-trimethylbenzene water quality criterion, which was previously approved by the EPA in 2013, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for 1,2,4-trimethylbenzene utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). The total bioaccumulation used in the calculation of the 1,2,4-trimethylbenzene criterion is 439. This value was provided by the EPA as a bioconcentration factor (EPA 1994). The Board's proposed criterion is 10 µg/L.

1,3,5-trimethylbenzene is a colorless liquid. It is used as a solvent in the manufacture of dyes, perfumes and resins; and as an industrial solvent and paint thinner. Human exposure to 1,3,5-trimethylbenzene may occur through inhalation, dermal contact or ingestion of food and water. Individuals living near or working in industries that manufacture or use 1,3,5-trimethylbenzene have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing 1,3,5-trimethylbenzene water quality criterion, which was previously approved by the EPA in 2013, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for 1,3,5-trimethylbenzene utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). The total bioaccumulation used in the calculation of the 1,3,5-trimethylbenzene criterion is 439. This value was provided by the EPA as a bioconcentration factor (EPA 1994). The Board's proposed criterion is 10 µg/L.

1,4-dioxane is a synthetic, clear, colorless liquid at room temperature. It is primarily used as a solvent, but it was historically used as a stabilizer for the solvent 1,1,1-trichloroethane and can show up as a contaminant in ethoxylated surfactants. These substances are commonly used in consumer cosmetics, detergents and shampoos. Human exposure to 1,4-dioxane may occur through inhalation, dermal contact and ingestion of food and water. Individuals who work in industries that manufacture or use 1,4-dioxane have the greatest known risk of exposure to high concentrations. The Department has calculated the Commonwealth's human health criterion for 1,4-dioxane utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—1,4-Dioxane* (DEP 2022b). Based on its low potential for bioaccumulation, the human health criterion for 1,4-dioxane has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 0.3 µg/L.

Chlorophenoxy herbicide (2,4-D) is an herbicide used to control broad-leaved weeds in cereals, grain crops, roadsides and farm buildings. 2,4-D is currently registered as a pesticide by the EPA and is one of the most widely used agricultural herbicides in the United States. Human exposure to 2,4-D may occur through inhalation, dermal contact and ingestion of food and water. Individuals living within or very near to areas of heavy agricultural use or who are involved in the production, formulation, handling or application of 2,4-D have the greatest known risk of exposure to high concentrations. The EPA published an updated section 304(a) human health criterion recommendation for 2,4-D in 2015. The Department completed a comprehensive review of the EPA's 2015 recommendation as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a) and determined it is appropriate for this

Commonwealth. The Board's proposed criterion is 1,300 µg/L, which is consistent with the EPA's current section 304(a) criterion recommendation.

Xylene is primarily a synthetic, colorless, flammable liquid produced from petroleum. It is commonly produced in the United States and is used as an industrial solvent, a paint thinner, a cleaning agent, in the manufacture of plastics, and as a material in chemical, plastics and synthetic fiber industries. Human exposure to xylene may occur through inhalation, dermal contact or ingestion of food and water. Individuals living near or working in industries that manufacture xylene have the greatest known risk of exposure to high concentrations. The Department is making updates to the existing xylene water quality criterion, which was previously approved by the EPA in 2000, based on new exposure inputs developed by the EPA. The Department has recalculated the Commonwealth's human health criterion for xylene utilizing current toxicity information published in the EPA's IRIS database and updated human health exposure inputs for body weight, drinking water intake and fish intake as detailed in the Department's criterion rationale document titled *Rationale for the Development of Ambient Water Quality Criteria for Protection of Human Health—Acetone, Barium, Boron, Chloroform, Formaldehyde, Methyl ethyl ketone, Metolachlor, Resorcinol, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, 1,3,5-Trimethylbenzene, Chlorophenoxy herbicide (2,4-D), and Xylene* (DEP 2022a). Based on its low potential for bioaccumulation, the human health criterion for xylene has been calculated with a total bioaccumulation factor of 1. The Board's proposed criterion is 1,000 µg/L.

§ 93.8e. Special criteria for the Great Lakes System

The Board proposes to add subsection (b.1) that clarifies the duration periods for the aquatic life criteria in Table 6—Great Lakes Aquatic Life and Human Health Criteria. Unless otherwise specified in § 93.8e (relating to special criteria for the Great Lakes System), the aquatic life criteria duration periods for CMC values and CCC values are a one-hour average and a four-day average, respectively, as defined in § 93.1.

The Board also proposes to update the acronyms and footnotes to Table 6. These updates include: the replacement of the existing H and CRL column with a new "Notes" column; the replacement of the word "footnotes" with "notes" in "Acronyms and Footnotes to Table 6"; the replacement of the existing footnote symbols with numerals; and the replacement of the existing H and CRL acronyms with numerals.

§ 93.9. Designated water uses and water quality criteria

The Board proposes to add language to subsection (a) that clarifies the duration period for certain criteria listed as "exceptions to specific criteria" in the following drainage lists in § 93.9e (relating to Drainage List E), § 93.9o (relating to Drainage List O), and § 93.9x (relating to Drainage List X). A duration period of a one-hour average, defined in § 93.1, applies to those criteria. The EPA recommends a duration period of one-hour for acute criteria in accordance with the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Stephan et al. 1985) and its *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991).

Exceptions for fishable/swimmable waters

The triennial review of water quality standards requires that states reexamine water body segments, where the fishable or swimmable designated uses specified in section 101(a)(2) of the CWA, have been removed, to determine if those uses are now attainable. There are two waterbodies in this Commonwealth where the fishable or swimmable uses have been removed including the Harbor Basin and entrance channel to Outer Erie Harbor/Presque Isle Bay (§ 93.9x), and several zones in the Delaware Estuary (§ 93.9e and § 93.9g (relating to Drainage List G)).

The Water Contact Sports (WC) designation was deleted from the Harbor Basin and entrance channel demarcated by United States Coast Guard buoys and channel markers on Outer Erie Harbor/Presque Isle Bay. This decision to remove the WC protected use was supported by a Use Attainability Analysis (UAA) study conducted in 1985 by DER. Because the same conditions exist today, as described in the UAA, no change is proposed to the designated use for Outer Erie Harbor/Presque Isle Bay.

In April 1989, DER cooperated with the Delaware River Basin Commission (DRBC), the Federal government and other DRBC signatory states on a comprehensive UAA study in the lower Delaware River and Delaware Estuary. This study resulted in recommendations regarding the DRBC's primary contact recreation designated use (synonymous with this Commonwealth's WC protected use), which the DRBC included in its regulations for water use classifications and water quality criteria for portions of the tidal Delaware River in May 1991. The DRBC standards are referenced in §§ 93.9e and 93.9g.

In addition, limited aquatic life uses for Zones 3 and 4, and upper Zone 5 of the Delaware Estuary basin were also incorporated into §§ 93.9e and 93.9g, which also date back to the original Article 301—Water Quality Criteria that were added to the SWB's rules and regulations in 1967. These are described in §§ 93.9e and 93.9g as Warm Water Fishes (WWF) (Maintenance Only) and Migratory Fishes (MF) (Passage Only) for tidal portions of the basin, from river mile 108.4 to the Pennsylvania-Delaware state border. The current designated uses within these zones refer to the DRBC's water quality standards regulations which were developed to protect only maintenance of resident fish and other aquatic life and passage of anadromous fish.

Recent data and observations suggest recovery is occurring in propagation for some species in portions of these zones. Therefore, the DRBC initiated an evaluation of available data for resident and anadromous fishes collected since 2000 to quantify spawning and early life stages, and the extent of successful reproduction for estuarine species.

Although this review continues, the DRBC found that for all nine fish species evaluated (Atlantic Sturgeon, American Shad, Striped Bass, White Perch, Bay Anchovy, Atlantic Silverside, Alewife, Blueback Herring and Atlantic Menhaden) successful reproduction was clearly demonstrated in one or more of these estuary zones. In addition, moderate to strong reproduction was demonstrated for multiple species in each zone, indicating substantial recovery in the propagation use for Zones 3 and 4, and upper Zone 5 (DRBC 2015).

The Department continues to work in cooperation with the DRBC, the Federal government and other DRBC signatory states to determine the appropriate designated use or uses that should apply in the lower Delaware River and Delaware Estuary. The parties continue to implement DRBC Resolution 2017-4 (as modified) describing the DRBC's next steps for protecting and improving the recovery taking place in the lower Delaware River

and Delaware Estuary. The parties remain committed to enhancing the surface water quality of the lower Delaware River and Delaware Estuary.

While the Department continues to work in cooperation with the DRBC, the Federal government and other DRBC signatory states to determine the appropriate designated use or uses, the Department will protect existing uses in accordance with § 93.4c(a) (relating to implementation of antidegradation requirements).

F. *Benefits, Costs and Compliance*

Benefits

Overall, this Commonwealth's residents and visitors and its natural resources benefit from providing the appropriate level of protection to preserve the integrity of existing and designated uses of surface waters in this Commonwealth. Protecting water quality provides economic value to present and future generations in the form of a clean water supply for human consumption, wildlife, irrigation and industrial use. It also protects aquatic life and provides for recreational opportunities such as fishing (including fish consumption), water contact sports and boating.

This Commonwealth's residents and visitors, both present and future, will benefit from having clean water that is protected and maintained at appropriate levels of water quality. A reduction in the total toxic load in this Commonwealth's surface waters is likely to have a positive effect on the human health of its residents. This will translate into a yet unknown economic benefit through avoided cleanup or remediation costs that would have been incurred later in time, as well as avoided costs for the treatment and caring for persons with diseases and disabilities that can be reasonably attributed to environmental contaminants in surface waters.

Reduced toxics in the Commonwealth's surface waters positively impacts the recreational fishing and tourism industries by increasing the availability and use of swimming and fishing locations throughout this Commonwealth. Additionally, cleaner rivers and fish may lead to increased birding and wildlife viewing opportunities, as the benefits of cleaner water and less contaminated fish cascade up the food chain, resulting in substantial economic benefits. Persons who recreate on this Commonwealth's surface waters and who fish, both for sport and consumption, in those waters will benefit from better water quality protection.

A reduction in toxics found in the waterways of this Commonwealth may also lead to increased property values for properties located near rivers or lakes. Epp and Al-Ani (1979) used real estate prices to determine the value of improvements in water quality in small rivers and streams in this Commonwealth. Water quality, whether measured in pH or by the owner's perception, has a significant effect on the price of adjacent property. The analysis by Epp and Al-Ani (1979) showed a positive correlation between water quality and housing values. They concluded that buyers are aware of the environmental setting of a home and that differences in the quality of nearby waters affect the price paid for a residential property.

A 2006 study from the Great Lakes region (Braden et al. 2006) estimated that property values were significantly depressed in two regions associated with toxic contaminants (polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and heavy metals). The study showed that a portion of the Buffalo River region (approximately 6 miles long) had depressed property values of between $83 million and $118 million for single-family homes, and between $57 million and $80 million for multifamily homes, as a result of toxic sediments. Braden et al. (2006) estimated that a portion of the Sheboygan River (approximately 14 miles long) had depressed property values of between $80 million and $120 million as the result of toxics. While this study related to the economic effect of contaminated sediment in other waters in the Great Lakes region, the idea that toxic pollution depresses property values applies in this Commonwealth. A reduction in toxic pollution in this Commonwealth's surface waters has a substantial economic benefit to property values in close proximity to waterways.

Southwick Associates has prepared several reports for the Theodore Roosevelt Conservation Partnership that analyze the economic contribution of outdoor recreation in this Commonwealth. A 2018 report (Southwick Associates 2018) found that during 2016 there were more than 390,000 jobs supported by outdoor recreation activities in this Commonwealth, and that, for comparison, this was more than the number of jobs in this Commonwealth that supported the production of durable goods during the same year. This report also found that, in 2016, outdoor recreation had an economic contribution in this Commonwealth of almost $17 billion in salaries and wages paid to employees and generated over $300 million in Federal, State and local tax revenue. An updated report (Southwick Associates 2020) revealed that economic contributions from outdoor recreation increased from nearly $17 billion in salaries and wages paid to employees in 2016 to nearly $20 billion in 2020. The 2020 report also continued to highlight the fact that "more Pennsylvania jobs are supported by outdoor recreation than by the production of durable goods." The 2020 report found that, in 2020, outdoor recreation activities supported more than 430,000 jobs and contributed more than $32 billion to the Commonwealth's state gross domestic product and generated over $6.5 billion in tax revenue at the Federal, State and local levels, which is a significant increase from the 2016 tax revenue total of over $300 million.

There are also economic benefits to be gained by having clearly defined remediation standards for surface waters. Under the Commonwealth's Land Recycling and Environmental Remediation Standards Act (35 P.S. §§ 6026.101—6026.908), liability relief is available, by operation of law, if a person demonstrates compliance with the environmental remediation standards established by the law. Surface water quality criteria are used to develop remediation standards under the law. Persons performing remediation depend upon these criteria to obtain a liability relief benefit under the law. Industrial land redevelopers will benefit from these regulations by having financial certainty when choosing a surface water cleanup standard and by being eligible for liability relief under State law.

It is important to realize these benefits and to ensure opportunities and activities continue in a manner that is environmentally, socially and economically sound. Protection and maintenance of water quality at appropriate levels as supported by the latest science ensures that the surface waters of this Commonwealth can support all current and potential future uses.

Compliance costs

This proposed rulemaking is necessary to improve total pollution control in this Commonwealth and may impose additional compliance costs on the regulated community.

The expenditures necessary to meet new compliance requirements may exceed that which is required under existing regulations.

The proposed amendments will be implemented through the Department's permit and approval actions as new and renewed permits are issued. Persons with existing permitted discharges or proposing to add new discharge points to a stream could be adversely affected upon permit issuance or permit renewal if they need to provide new or higher levels of treatment to meet any new or updated water quality standard established by this proposed rulemaking. For example, increased costs may take the form of higher engineering, construction or operating cost for point source discharges. Treatment costs and BMPs are site-specific and depend upon the size of the discharge in relation to the size of the stream and many other factors. It is therefore not possible to precisely predict the actual change in costs. Economic impacts would primarily involve the potential for increased monitoring and sampling costs and higher treatment costs for new or expanded discharges to streams to meet any new or updated water quality standards. The initial costs resulting from the installation of technologically advanced wastewater treatment processes and BMPs may be offset by potential savings from and increased value of improved water quality through more cost-effective and efficient treatment over time.

There are approximately 10,300 facilities across this Commonwealth that hold permits issued under Chapter 92a. The Department identified 274 active National Pollutant Discharge Elimination System (NPDES) permits with effluent limitations for one or more of the toxic substances included in this proposed rulemaking. These 274 active NPDES permits include permits for treated sewage, industrial waste, groundwater remediation and stormwater associated with industrial activities.

The Department reviewed sampling cost information for each toxic substance that was available in the National Environmental Monitoring Index (NEMI). NEMI is a freely available compendium of information on a variety of environmental analytical test methods that was developed by the National Water Quality Monitoring Council in collaboration with partners in the Federal, State and private sectors. A review of the EPA-approved analytical test methods for each toxic substance revealed that the average cost per sample for many of these substances ranges between $201 and $400. A few of the analytical test methods, such as Method 4500-B B for boron, have an estimated cost per sample of less than $50 while other analytical methods, such as Method 1624 for methyl ethyl ketone, have an estimated cost per sample of over $400. Costs estimates were available in NEMI for each of the toxic substances in this proposed rulemaking except for tributyltin. Note that no additional costs will be incurred by the 274 NPDES permit holders that currently have effluent limitations for one or more of these substances as a result of this proposed rulemaking since these entities are already required to monitor for these substances. Additional costs may be incurred for new or renewed permits if new water-quality-based effluent limitations are required to achieve any new or updated water quality criteria for the toxic substances in this proposed rulemaking.

Compliance assistance plan

This proposed rulemaking has been developed as part of an established program that has been implemented by the Department since the early 1980s. This proposed rulemaking is consistent with and based on existing Department regulations. The proposed amendments extend appropriate protections to all surface waters in this Commonwealth and are consistent with antidegradation requirements established by the CWA and the CSL. Surface waters in this Commonwealth are afforded a minimum level of protection through compliance with the Commonwealth's water quality standards, which prevent pollution and protect existing water uses.

The proposed amendments will be implemented through the Department's permit and approval actions. For example, the NPDES permitting program bases effluent limitations on the protected water uses of the stream, and the water quality criteria developed to maintain those uses. These effluent limits are established to ensure water quality is protected and maintained.

Paperwork requirements

This proposed rulemaking should not generate new paperwork requirements on the Commonwealth, local governments, political subdivisions or the private sector. This proposed rulemaking will be implemented using existing permitting and other paperwork.

References cited in this preamble

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DEP. 2022b. Rationale for the development of ambient water quality criteria for protection of human health—1,4-dioxane. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

DEP. 2022c. Rationale for the development of ambient water quality criteria for protection of aquatic life use—cadmium. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

DEP. 2022d. Rationale for the development of ambient water quality criteria for protection of aquatic life use—carbaryl. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.

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Stephan, C. E., D. I. Mount, D. J. Hansen, J. H. Gentile, G. A. Chapman and W. A. Brungs. 1985. Guidelines for deriving numerical national water quality criteria for the protection of aquatic organisms and their uses. National Technical Information Service No. PB85-227049. Springfield, VA.

G. *Pollution Prevention*

The Federal Pollution Prevention Act of 1990 (42 U.S.C. §§ 13101—13109) established a National policy that promotes pollution prevention as the preferred means for achieving state environmental protection goals. The Department encourages pollution prevention, which is the reduction or elimination of pollution at its source, through the substitution of environmentally-friendly materials, more efficient use of raw materials and the incorporation of energy efficiency strategies. Pollution prevention practices can provide greater environmental protection with greater efficiency because they can result in significant cost savings to facilities that permanently achieve or move beyond compliance.

Water quality standards are a major pollution prevention tool because they protect water quality and designated and existing uses. The proposed amendments will be implemented through the Department's permit and approval actions. For example, the NPDES program will establish effluent limitations in permits based on the more stringent of technology-based or water quality-based effluent limits. Water quality-based effluent limits are determined by the protected water uses of the receiving stream and the water quality criteria necessary to achieve those designated and existing uses.

H. *Sunset Review*

These regulations will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulations effectively fulfill the goals for which they were intended.

I. *Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on September 6, 2023, the Department submitted a copy of this proposed rulemaking and a copy of the Regulatory Analysis Form to the Independent Regulatory Review Commission (IRRC) and to the Chairpersons of the House and Senate Environmental Resources and Energy Committees. A copy of this material is available to the public upon request.

Under section 5(g) of the Regulatory Review Act, IRRC may convey comments, recommendations or objections to the proposed rulemaking within 30 days of the close of the public comment period. The comments, recommendations or objections must specify the regulatory review criteria in section 5.2 of the Regulatory Review Act (71 P.S. § 745.5b) which have not been met. The Regulatory Review Act specifies detailed procedures for review prior to final publication of the rulemaking by the Department, the General Assembly and the Governor.

J. *Public Comments*

Interested persons are invited to submit to the Board written comments, suggestions, support or objections regarding this proposed rulemaking. Comments, suggestions, support or objections must be received by the Board by November 21, 2023.

Comments may be submitted to the Board online, by e-mail, by mail or express mail as follows. Comments submitted by facsimile will not be accepted.

Comments may be submitted to the Board by accessing eComment at http://www.ahs.dep.pa.gov/eComment.

Comments may be submitted to the Board by e-mail at RegComments@pa.gov. A subject heading of this proposed rulemaking and a return name and address must be included in each transmission.

If an acknowledgment of comments submitted online or by e-mail is not received by the sender within 2 working days, the comments should be retransmitted to the Board to ensure receipt.

Written comments should be mailed to the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477. Express mail should be sent to the Environmental Quality Board, Rachel Carson State Office Building, 16th Floor, 400 Market Street, Harrisburg, PA 17101-2301.

K. *Public Hearings*

The Board will hold one virtual public hearing for the purpose of accepting comments on this proposed rulemaking. The hearing will be held on November 14, 2023, at 1 p.m.

Persons wishing to present testimony at a hearing are requested to contact Casey Damicantonio for the Department and the Board, (717) 783-8727 or RA-EPEQB@pa.gov, at least 1 week in advance of the hearing to reserve a time to present testimony. Language interpretation services are available upon request. Persons in need of language interpretation services must contact Casey Damicantonio by 5 p.m. on November 6, 2023.

Oral testimony is limited to 5 minutes for each witness. Organizations are limited to designating one witness to present testimony on their behalf at one hearing. Witnesses may provide testimony by means of telephone or Internet connection. Video demonstrations and screen sharing by witnesses will not be permitted.

Witnesses are requested to submit a written copy of their verbal testimony by e-mail to RegComments@pa.gov after providing testimony at the hearing.

Information on how to access the virtual public hearing will be available on the Board's webpage found through the Public Participation tab on the Department's web site at www.dep.pa.gov (select "Public Participation," then "Environmental Quality Board"). Prior to a hearing, individuals are encouraged to visit the Board's webpage for the most current information for accessing the hearing.

Members of the public wishing to observe a virtual public hearing without providing testimony are also directed to access the Board's webpage.

Persons in need of accommodations as provided for in the Americans with Disabilities Act of 1990 should contact the Board at (717) 787-8727 or through the Pennsylvania Hamilton Relay Service at (800) 654-5984 (TDD) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

RICHARD NEGRIN,
Chairperson

(*Editor's Note*: See 53 Pa.B. 6191 (October 7, 2023) for a proposed statement of policy relating to this proposed rulemaking.)

Fiscal Note: 7-577. No fiscal impact; recommends adoption.

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 93. WATER QUALITY STANDARDS

GENERAL PROVISIONS

§ 93.1. Definitions.

* * * * *

Toxic substance—A chemical or compound in sufficient quantity or concentration which is, or may become, harmful to human, animal or plant life. The term includes, but is not limited to, priority pollutants and those substances, which are identified in Tables 5 and 6 **(relating to water quality criteria for toxic substances; and Great Lakes aquatic life and human health criteria)**. **[Additional toxic substances are also described in Chapter 16 Appendix A, Table 1A (relating to site-specific water quality criteria for toxic substances).]**

* * * * *

WATER QUALITY CRITERIA

§ 93.7. Specific water quality criteria.

(a) Table 3 displays specific water quality criteria and associated critical uses. The criteria associated with the Statewide water uses listed in § 93.4, Table 2 apply to all surface waters, unless a specific exception is indicated in §§ 93.9a—93.9z. These exceptions will be indicated on a stream-by-stream or segment-by-segment basis by the words "Add" or "Delete" followed by the appropriate symbols described elsewhere in this chapter. Other specific water quality criteria apply to surface waters as specified in §§ 93.9a—93.9z. All applicable criteria shall be applied in accordance with this chapter, Chapter 96 (relating to water quality standards implementation) and other applicable State and Federal laws and regulations. **Unless otherwise specified in Table 3, the duration of aquatic life criteria with "minimum" or "maximum" values is a one-hour average. The duration of the pH criterion in Table 3 is a one-hour average.**

* * * * *

§ 93.8c. Human health and aquatic life criteria for toxic substances.

(a) Table 5 **(relating to water quality criteria for toxic substances)** and the table of site-specific criteria maintained by the Department list the aquatic life and human health criteria for toxic substances which the Department uses in development of effluent limitations in NPDES Permits and for other purposes. The human health criteria, which include probable modes of exposure (such as, but not limited to ingestion from drinking water and fish consumption, inhalation and dermal absorption), 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 values used for the local water quality condition to derive the appropriate water quality criteria shall be determined by instream measurements or best estimates based on reference waters that are representative of the median concentrations or conditions of the receiving water for the applicable time period and design conditions. Instream measurements for the water quality condition will be gathered using Department data collection protocols. The priority pollutants are a set of specific chemical pollutants regulated by EPA. The priority pollutant numbers (PP NO) used by the EPA to identify priority pollutants are included in Table 5 for reference purposes. The toxics without a PP NO are nonpriority pollutants or State-derived criteria.

(b) 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. Water quality criteria for the Great Lakes System are contained in § 93.8e (relating to special criteria for the Great Lakes System) and Table 6 (relating to Great Lakes **[Aquatic Life and Human Health Criteria]** **aquatic life and human health criteria**). Criteria in 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 Tables 5 and 6, under the methodologies in § 16.61 (relating to special provisions for the Great Lakes system).

(c) Unless otherwise specified in this section, the aquatic life criteria in Table 5 have the following duration periods:

(1) One-hour average for criteria maximum concentrations.

(2) Four-day average for criteria continuous concentrations.

TABLE 5

WATER QUALITY CRITERIA FOR TOXIC SUBSTANCES

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
1M	ANTIMONY	7440360	220	1100	5.6 **[†]**	**[H] 2,5**
2M	ARSENIC	7440382	150 (As3+)	340 (As3+)	10	**[H] 2**
3M	BERYLLIUM	7440417	N/A	N/A	N/A	-
4M	CADMIUM	7440439	**[*]**{1.101672-(ln[H]x0.041838)} x	**[*]**{1.136672-(ln[H]x0.041838} x	N/A	**[-] 3**
			[Exp(0.7409xln[H]−4.719)] Exp(0.7977 x ln([H])−3.909)	**[Exp(1.0166xln[H]−3.924)] Exp(0.9789 x ln([H])−3.866)**		
			(ex: @H=100, CCC=**[0.25]0.72**)	(ex: @H=100, CMC=**[2.0]1.8**)		
			(ex: @ H=50, CCC= 0.43)	**(ex: @ H=50, CMC= 0.94)**		
			(ex: @ H=25, CCC= 0.25)	**(ex: @ H=25, CMC= 0.49)**		
5M	CHROMIUM III	16065831	**[*]**0.860xExp(0.819xln[H]+0.6848)	**[*]**0.316xExp(0.819xln[H]+3.7256)	N/A	**[-] 3**
			(ex: @H=100, CCC=74)	(ex: @H=100, CMC=570)		
5M	CHROMIUM VI	18540299	**[*]**11	**[*]**16	N/A	**[-] 3**
6M	COPPER	7440508	**[*]**0.960xExp(0.8545xln[H]-1.702)	**[*]**0.960xExp(0.9422xln[H]-1.700)	N/A	**[-] 3**
			(ex: @H=100, CCC=9.0)	(ex: @H=100, CMC=13)		
7M	LEAD	7439921	**[*]**{1.46203-(ln[H] x0.145712)} x	**[*]**{1.46203-(ln[H]x0.145712)}	N/A	**[-] 3**
			Exp(1.273xln[H]-4.705)	Exp(1.273xln[H]-1.460)		
			(ex: @H=100, CCC=2.5)	(ex: @H=100, CMC=65)		
8M	MERCURY	7439976	**[*]**0.77 (Hg2+)	**[*]**1.4 (Hg2+)	0.05	**[H] 2,3**
9M	NICKEL	7440020	**[*]**0.997xExp(0.846xln[H]+0.0584)	**[*]**0.998xExp(0.846xln[H]+2.255)	610 **[†]**	**[H] 2,3,5**
			(ex: @H=100, CCC=52)	(ex: @H=100, CMC=470)		
10M	SELENIUM	7782492	**[*]**4.6	N/A	N/A	**[-] 3**
11M	SILVER	7440224	N/A	**[*]**0.850xExp(1.72xln[H]-6.590)	N/A	**[-] 3**
				(ex: @H=100, CMC=3.2)		
12M	THALLIUM	7440280	13	65	0.24 **[†]**	**[H] 2,5**
13M	ZINC	7440666	**[*]**0.986xExp(0.8473xln[H] +0.884)	**[*]**0.978xExp(0.8473xln[H]+0.884)	N/A	**[-] 3**
			(ex: @H=100, CCC=120)	(ex: @H=100, CMC=120)		
14M	CYANIDE, FREE	57125	5.2	22	4	**[H] 2**
1A	2-CHLOROPHENOL	95578	110	560	30	**[H] 2**
2A	2,4-DICHLOROPHENOL	120832	340	1700	10	**[H] 2**

PP NO	Chemical Name	CAS Number	Fish and Aquatic Life Criteria		Human Health Criteria	Notes
			Criteria Continuous	Criteria Maximum		
			[**Concentrations (ug/L)**] **Concentration (µg/L)**	Concentration [**(ug/L)**] **(µg/L)**	[**(ug/L)**] **(µg/L)**	
3A	2,4-DIMETHYLPHENOL	105679	130	660	100	[**H**] **2**
4A	4,6-DINITRO-o-CRESOL (2 METHYL-4,6-DINITROPHENOL)	534521	16	80	2	[**H**] **2**
5A	2,4-DINITROPHENOL	51285	130	660	10	[**H**] **2**
E	DINITROPHENOLS	25550587	N/A	N/A	10	[**H**] **2**
6A	2-NITROPHENOL	88755	1600	8000	N/A	-
7A	4-NITROPHENOL	100027	470	2300	N/A	-
8A	P-CHLORO-m-CRESOL (3 METHYL-4-CHLOROPHENOL)	59507	30	160	500	[**H**] **2**
9A	PENTACHLOROPHENOL	87865	Exp(1.005x[pH]-5.134)	Exp(1.005x[pH]-4.869)	0.03	[**CRL**] **1**
			@pH= 6.5 7.8 9.0	@pH= 6.5 7.8 9.0		
			Crit= 4.1 15 50	Crit= 5.3 19 65		
10A	PHENOL	108952	N/A	N/A	4000	[**H**] **2**
E	2,4,5-TRICHLOROPHENOL	95954	N/A	N/A	300	[**H**] **2**
11A	2,4,6-TRICHLOROPHENOL	88062	91	460	1.5	[**CRL**] **1**
1V	ACROLEIN	107028	3.0	3.0	3	[**H**] **2**
2V	ACRYLONITRILE	107131	130	650	0.06	[**CRL**] **1,4**
3V	BENZENE	71432	130	640	0.58	[**CRL**] **1**
5V	BROMOFORM	75252	370	1800	7	[**CRL**] **1**
6V	CARBON TETRACHLORIDE	56235	560	2800	0.4	[**CRL**] **1**
7V	CHLOROBENZENE	108907	240	1200	100	[**H**] **2**
8V	CHLORODIBROMO-METHANE	124481	N/A	N/A	0.8	[**CRL**] **1**
9V	CHLOROETHANE	75003	N/A	N/A	N/A	-
10V	2-CHLOROETHYL VINYL ETHER	110758	3500	18000	N/A	-
11V	CHLOROFORM	67663	390	1900	[**5.7**] **60**	[**H**] **2**
12V	DICHLOROBROMO-METHANE	75274	N/A	N/A	0.95	[**CRL**] **1**
14V	1,1-DICHLOROETHANE	75343	N/A	N/A	N/A	-
15V	1,2-DICHLOROETHANE	107062	3100	15000	9.9	[**CRL**] **1**
16V	1,1-DICHLOROETHYLENE	75354	1500	7500	33	[**H**] **2**

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
17V	1,2-DICHLOROPROPANE	78875	2200	11000	0.9	**[CRL] 1**
18V	1,3-DICHLOROPROPENE	542756	61	310	0.27	**[CRL] 1**
19V	ETHYLBENZENE	100414	580	2900	68	**[H] 2**
20V	METHYL BROMIDE	74839	110	550	100	**[H] 2**
21V	METHYL CHLORIDE	74873	5500	28000	N/A	-
22V	METHYLENE CHLORIDE	75092	2400	12000	20	**[CRL] 1**
23V	1,1,2,2-TETRACHLOROETHANE	79345	210	1000	0.2	**[CRL] 1**
24V	TETRACHLORO-ETHYLENE	127184	140	700	10	**[CRL] 1**
25V	TOLUENE	108883	330	1700	57	**[H] 2**
26V	trans-1,2-DICHLOROETHYLENE	156605	1400	6800	100	**[H] 2**
D	1,2 cis-DICHLORO-ETHYLENE	156592	N/A	N/A	12	**[H] 2**
27V	1,1,1-TRICHLOROETHANE	71556	610	3000	10000	**[H] 2**
28V	1,1,2-TRICHLOROETHANE	79005	680	3400	0.55	**[CRL] 1**
29V	TRICHLOROETHYLENE	79016	450	2300	0.6	**[CRL] 1**
31V	VINYL CHLORIDE	75014	N/A	N/A	0.02	**[CRL] 1**
1B	ACENAPHTHENE	83329	17	83	70	**[H] 2**
2B	ACENAPHTHYLENE	208968	N/A	N/A	N/A	-
3B	ANTHRACENE	120127	N/A	N/A	300	**[H] 2**
4B	BENZIDINE	92875	59	300	0.0001	**[CRL] 1**
5B	BENZO(a)-ANTHRACENE	56553	0.1	0.5	0.001	**[CRL] 1**
6B	BENZO(a)PYRENE	50328	N/A	N/A	0.0001	**[CRL] 1**
7B	3,4-BENZO-FLUOR-ANTHENE (BENZO(b)FLUORANTHENE)	205992	N/A	N/A	0.001	**[CRL] 1**
8B	BENZO(ghi)-PERYLENE	191242	N/A	N/A	N/A	-
9B	BENZO(k)-FLUORANTHENE	207089	N/A	N/A	0.01	**[CRL] 1**
E	BIS(CHLOROMETHYL)-ETHER	542881	N/A	N/A	0.0002	**[CRL] 1**
10B	BIS(2-CHLOROETHOXY)-METHANE	111911	N/A	N/A	N/A	-

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
11B	BIS(2-CHLOROETHYL)-ETHER	111444	6000	30000	0.03	**[CRL] 1**
12B	BIS(2-CHLORO-1-METHYLETHYL) ETHER	108601	N/A	N/A	200	**[H] 2**
13B	BIS(2-ETHYLHEXYL)-PHTHALATE	117817	910	4500	0.32	**[CRL] 1**
14B	4-BROMOPHENYL PHENYL ETHER	101553	54	270	N/A	-
15B	BUTYLBENZYL PHTHA-LATE	85687	35	140	0.1	**[H] 2**
16B	2-CHLORONAPHTHALENE	91587	N/A	N/A	800	**[H] 2**
17B	4-CHLOROPHENYL PHENYL ETHER	7005723	N/A	N/A	N/A	-
18B	CHRYSENE	218019	N/A	N/A	0.12	**[CRL] 1**
19B	DIBENZO(a,h)ANTHRACENE	53703	N/A	N/A	0.0001	**[CRL] 1**
20B	1,2-DICHLOROBENZENE	95501	160	820	1000	**[H] 2**
21B	1,3-DICHLOROBENZENE	541731	69	350	7	**[H] 2**
22B	1,4-DICHLOROBENZENE	106467	150	730	300	**[H] 2**
23B	3,3-DICHLOROBENZIDINE	91941	N/A	N/A	0.05	**[CRL] 1**
24B	DIETHYL PHTHALATE	84662	800	4000	600	**[H] 2**
25B	DIMETHYL PHTHALATE	131113	500	2500	2000	**[H] 2**
26B	DI-N-BUTYL PHTHALATE	84742	21	110	20	**[H] 2**
27B	2,4-DINITROTOLUENE	121142	320	1600	0.05 for dinitro-toluene	**[CRL] 1**
28B	2,6-DINITROTOLUENE	606202	200	990	See 27B	**[CRL] 1**
29B	DI-N-OCTYL PHTHALATE	117840	N/A	N/A	N/A	-
30B	1,2-DIPHENYLHYDRAZINE	122667	3	15	0.03	**[CRL] 1**
31B	FLUORANTHENE	206440	40	200	20	**[H] 2**
32B	FLUORENE	86737	N/A	N/A	50	**[H] 2**
33B	HEXACHLOROBENZENE	118741	N/A	N/A	0.00008	**[CRL] 1**
34B	HEXACHLOROBUTADIENE	87683	2	10	0.01	**[CRL] 1**
35B	HEXACHLOROCYCLO-PENTADIENE	77474	1	5	4	**[H] 2**

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
36B	HEXACHLOROETHANE	67721	12	60	0.1	**[CRL] 1**
37B	INDENO(1,2,3-cd)PYRENE	193395	N/A	N/A	0.001	**[CRL] 1**
38B	ISOPHORONE	78591	2100	10000	34	**[H] 2**
39B	NAPHTHALENE	91203	43	140	N/A	-
40B	NITROBENZENE	98953	810	4000	10	**[H] 2**
41B	N-NITROSODIMETHYL-AMINE	62759	3400	17000	0.0007 **[†]**	**[CRL] 1,5**
42B	N-NITROSODI-N-PROPYLAMINE	621647	N/A	N/A	0.005 **[†]**	**[CRL] 1,5**
43B	N-NITROSODIPHENYL-AMINE	86306	59	300	3.3 **[†]**	**[CRL] 1,5**
E	PENTACHLOROBENZENE	608935	N/A	N/A	0.1	**[H] 2**
44B	PHENANTHRENE	85018	1	5	N/A	-
45B	PYRENE	129000	N/A	N/A	20	**[H] 2**
E	1,2,4,5-TETRACHLOROBENZENE	95943	N/A	N/A	0.03	**[H] 2**
46B	1,2,4-TRICHLOROBENZENE	120821	26	130	0.07	**[H] 2**
1P	ALDRIN	309002	0.1	3	0.0000008	**[CRL] 1**
2P	alpha-HEXACHLORO-CYCLOHEXANE (HCH)	319846	N/A	N/A	0.0004	**[CRL] 1**
3P	beta-HEXACHLORO-CYCLOHEXANE (HCH)	319857	N/A	N/A	0.008	**[CRL] 1**
4P	gamma-HEXACHLOROCYCLO-HEXANE (HCH) (LINDANE)	58899	N/A	0.95	4.2	**[H] 2**
5P	delta-BHC	319868	N/A	N/A	N/A	-
E	**CARBARYL**	**63252**	**2.1**	**2.1**	**N/A**	**-**
6P	CHLORDANE	57749	0.0043	2.4	0.0003	**[CRL] 1,4**
E	CHLOROPHENOXY HERBICIDE (2,4-D)	94757	N/A	N/A	**[1400] 1300**	**[H] 2**
E	CHLOROPHENOXY HERBICIDE (2,4,5-TP)	93721	N/A	N/A	100	**[H] 2**
7P	4,4-DDT	50293	0.001	1.1	0.00003	**[CRL] 1,4**

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
8P	4,4-DDE	72559	0.001	1.1	0.00002	**[CRL] 1**
9P	4,4-DDD	72548	0.001	1.1	0.0001	**[CRL] 1**
10P	DIELDRIN	60571	0.056	0.24	0.000001	**[CRL] 1**
11P	alpha-ENDOSULFAN	959988	0.056	0.22	20	**[H] 2,4**
12P	beta-ENDOSULFAN	33213659	0.056	0.22	20	**[H] 2,4**
13P	ENDOSULFAN SULFATE	1031078	N/A	N/A	20	**[H] 2**
14P	ENDRIN	72208	0.036	0.086	0.03	**[H] 2**
15P	ENDRIN ALDEHYDE	7421934	N/A	N/A	1	**[H] 2**
16P	HEPTACHLOR	76448	0.0038	0.52	0.000006	**[CRL] 1**
17P	HEPTACHLOR EPOXIDE	1024573	0.0038	0.5	0.00003	**[CRL] 1**
E	HEXACHLOROCYCLO-HEXANE (HCH)-TECHNICAL	608731	N/A	N/A	0.007	**[CRL] 1**
E	METHOXYCHLOR	72435	N/A	N/A	0.02	**[H] 2**
18P	PCB		0.014	N/A	0.000064 for PCBs **[†]**	**[CRL] 1,4,5**
25P	TOXAPHENE	8001352	0.0002	0.73	0.0007	**[CRL] 1**
PP	2,3,7,8-TCDD	1746016	N/A	N/A	5.0 E-9 **[†]**	**[CRL] 1,5**
E	**TRIBUTYLTIN**		**0.072**	**0.46**	**N/A**	**-**
D	ACETONE	67641	86000	450000	**[3500] 6000**	**[H] 2**
D	ACRYLAMIDE	79061	N/A	N/A	0.07	**[CRL] 1**
D	ALUMINUM	7429905	N/A	750	N/A	-
D	BARIUM	7440393	4100	21000	**[2400] 1000**	**[H] 2**
D	BENZENE METADISULFONIC ACID	98486	1600000	2600000	N/A	-
D	BENZENE MONOSULFONIC ACID	98113	1200000	2000000	N/A	-
D	BENZYL CHLORIDE	100447	N/A	N/A	0.2	**[CRL] 1**
D	BORON	7440428	1600	8100	**[3100] 1000**	**[H] 2**
D	2-BUTOXY ETHANOL	111762	N/A	N/A	700	**[H] 2**
D	COBALT	7440484	19	95	N/A	-

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
D	p-CRESOL	106445	160	800	N/A	-
D	CYCLOHEXYLAMINE	108918	N/A	N/A	1000	**[H]** 2
E	DIAZINON	333415	0.17	0.17	N/A	-
D	**1,4-DIOXANE**	**123911**	**N/A**	**N/A**	**0.3**	**1**
D	FORMALDEHYDE	50000	440	2200	**[700]** **1000**	**[H]** 2
D	2-HEXANONE	591786	4300	21000	N/A	-
D	LITHIUM	7439932	N/A	N/A	N/A	-
D	METHYL ETHYL KETONE	78933	32000	230000	**[21000]** **4000**	**[H]** 2
D	METHYL ISOBUTYL KETONE	108101	5000	26000	N/A	-
D	METOLACHLOR	51218452	N/A	N/A	**[69]** 700	**[H]** 2
D	NONYLPHENOL	84852153	6.6	28	N/A	-
D	P-PHENOL SULFONIC ACID	98679	1400000	3500000	N/A	-
D	1-PROPANOL	71238	46000	230000	N/A	-
D	2-PROPANOL	67630	89000	440000	N/A	-
D	RESORCINOL	1084603	7200	28000	**[2700]** **3000**	**[H]** 2
D	STRONTIUM	7440246	N/A	N/A	4000	**[H]** 2
D	1,2,3-TRICHLOROPROPANE	96184	N/A	N/A	**[210]** 30	**[H]** 2
D	1,2,4-TRIMETHYLBENZENE	95636	N/A	N/A	**[72]** 10	**[H]** 2
D	1,3,5-TRIMETHYLBENZENE	108678	N/A	N/A	**[72]** 10	**[H]** 2
D	VANADIUM	7440622	100	510	N/A	-
D	XYLENE	1330207	210	1100	**[70000]** **1000**	**[H]** 2

Acronyms and **[Footnotes]** **Notes** to Table 5

[1] **Indicates a human health criterion based on a cancer potency factor and cancer risk level at 1 × 10^{-6} (CRL); where no cancer potency factor exists the human health criterion is based on threshold toxicity data plus additional safety factors.**

[2] **Indicates a human health criterion based on threshold effect (H).**

[*][3] Indicates dissolved **[metal]** **aquatic life** criterion; others are total recoverable **[metals]**. Each listed dissolved criterion in Table 5 is equal to the corresponding total recoverable criterion before rounding (from the EPA National Ambient Water Quality Criteria Documents) multiplied by the conversion factor (from the Conversion Factors Table); a criterion that is expressed as a hardness (H)-based equation is shown in Table 5 as the conversion factor (listed) multiplied by the hardness criterion equation; an example criterion at hardness=100mg/L is included.

[4] **Indicates duration for aquatic life criteria; CMC = instantaneous; CCC = 24 hour average.**

[†][5] Indicates **human health** criterion is based on the exposure inputs of 2 liters per day of drinking water and consumption of 17.5 grams of fish per day, for protection of a 70 Kg person.

CAS—Chemical Abstract Service number

[CRL—Cancer risk level at 1 × 10^{-6}]

D—DEP developed criteria

E—EPA developed criteria

[H—Threshold effect human health criterion; incorporates additional uncertainty factor for some Group C carcinogens.

ln [H]] **ln[H]**—Natural Logarithm of the Hardness of stream as mg/l $CaCO_3$

[ug/L] **µg/L**—Micrograms per liter

N/A—Criterion not developed

PP NO—Priority Pollutant Number

§ **93.8e. Special criteria for the Great Lakes System.**

* * * * *

(b) *Water quality criteria for the Great Lakes System.* Human health and aquatic life criteria for the Great Lakes System are contained in Table 6 (relating to Great Lakes aquatic life and human health criteria). For any pollutant not listed in the table, criteria in Table 5 **(relating to water quality criteria for toxic substances)** may be used to protect existing and designated uses, or criteria will be developed by the Department, as needed, in accordance with this chapter and § 16.61 (relating to special provisions for the Great Lakes System).

(b.1) Unless a different duration is indicated by the Notes in Table 6, the aquatic life criteria in Table 6 have the following duration periods:

(1) One-hour average for criteria maximum concentrations.

(2) Four-day average for criteria continuous concentrations.

TABLE 6

GREAT LAKES AQUATIC LIFE AND HUMAN HEALTH CRITERIA

PP NO	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
2M	Arsenic	7440382	**[*]**148 (As3+)	**[*]**340 (As3+)	N/A	**[-]** 3
4M	Cadmium	7440439	**[*]**{1.101672-(ln[H]x0.041838)}× Exp(0.7852xln[H]-2.715)	**[*]**{1.136672-(ln[H]x0.041838)}× Exp(1.128xln[H]-3.6867)	N/A	**[-]** 3
			(ex: @H=100, CCC=2.24)	(ex: @H=100, CMC=4.26)		
5M	Chromium, III	16065831	**[*]**0.860xExp(0.819xln[H]+0.6848)	**[*]**0.316xExp(0.819xln[H]+3.7256)	N/A	**[-]** 3
			(ex: @H=100, CCC=74)	(ex: @H=100, CMC=570)		
5M	Chromium, VI	18540299	**[*]**10.56	**[*]**15.73	N/A	**[-]** 3
6M	Copper	7440508	**[*]**0.960xExp(0.8545xln[H]-1.702)	**[*]**(0.960xExp(0.9422xln[H]-1.700)	N/A	3
			(ex: @H=100, CCC=8.96)	(ex: @H=100, CMC=13.44)		
8M	Mercury	7439976	**[*]**0.77	**[*]**1.44	0.0031	**[H]** 2,3

PP / *NO*	*Chemical Name*	*CAS Number*	*Fish and Aquatic Life Criteria*		*Human Health Criteria*	***Notes***
			Criteria Continuous	*Criteria Maximum*		
			[*Concentrations (ug/L)*] *Concentration (µg/L)*	*Concentration* **[*(ug/L)*]** ***(µg/L)***	**[*(ug/L)*] *(µg/L)***	
9M	Nickel	7440020	**[*]**0.997xExp(0.846xln[H]+0.0584 (ex: @H=100, CCC=52.01)	**[*]**0.998xExp(0.846xln[H]+2.255) (ex: @H=100, CMC=468.24)	N/A	**[H] 2,3**
10M	Selenium	7782492	**[*]**4.61	N/A	N/A	**[-] 3**
13M	Zinc	7440666	**[*]**0.986xExp(0.8473xln[H]+0.884) (ex: @H=100, CCC=118.14)	**[*]**0.978xExp(0.8473xln[H]+0.884) (ex: @H=100, CMC=117.18)	N/A	**3**
14M	Cyanide, Free	57125	5.2	22	600	**[H] 2**
3A	2,4-Dimethyl-phenol	105679	N/A	N/A	450	**[H] 2**
5A	2,4-Dinitro-phenol	51285	N/A	N/A	55	**[H] 2**
9A	Pentachlorophenol	87865	Exp(1.005[pH]-5.134) @pH= 6.5 7.8 9.0 Crit = 4.05 14.95 49.95	Exp (1.005[pH]-4.869) @pH = 6.5 7.8 9.0 Crit = 5.28 19.49 65.10	N/A	-
3V	Benzene	71432	N/A	N/A	1.2	**[CRL] 1**
7V	Chloro-benzene	108907	N/A	N/A	470	**[H] 2**
22V	Methylene Chloride	75092	N/A	N/A	4.7	**[CRL] 1**
25V	Toluene	108883	N/A	N/A	5600	**[H] 2**
29V	Trichloro-ethylene	79016	N/A	N/A	2.9	**[CRL] 1**
33B	Hexachloro-benzene	118741	N/A	N/A	0.000045	**[CRL] 1**
36B	Hexachloro-ethane	67721	N/A	N/A	0.53	**[CRL] 1**
4P	gamma-BHC (Lindane)	58899	N/A	0.95	0.47	**[H] 2**
6P	Chlordane	57749	N/A	N/A	0.000025	**[CRL] 1**
7P	4,4-DDT	50293	N/A	N/A	0.000015	**[CRL] 1**
10P	Dieldrin	60571	0.056	0.24	0.00000065	**[CRL] 1**
14P	Endrin	72208	0.036	0.086	N/A	-
18P	PCBs		N/A	N/A	0.00000039	**[CRL] 1**
25P	Toxaphene	8001352	N/A	N/A	0.0000068	**[CRL] 1**
PP	2,3,7,8-TCDD	1746016	N/A	N/A	8.6 E-10	**[CRL] 1**
—	Parathion	56382	0.013	0.065	N/A	-

Acronyms and **[Footnotes]** **Notes** to Table 6

[1] Indicates a human health criterion based on a cancer potency factor and cancer risk level at 1 × 10^{-6} (CRL); where no cancer potency factor exists the human health criterion is based on threshold toxicity data plus additional safety factors.

[2] Indicates a human health criterion based on threshold effect (H).

[*][3] Indicates dissolved **[metal]** **aquatic life** criterion; others are total recoverable **[metals]**. Each listed dissolved criterion in Table 6 is equal to the corresponding total recoverable criterion before rounding (from the EPA National Ambient Water Quality Criteria Documents) multiplied by the conversion factor (from the Conversion Factors Table); a criterion that is expressed as a hardness (H)-based equation is shown in Table 6 as the conversion factor (listed) multiplied by the hardness criterion equation; an example criterion at hardness=100mg/L is included.

CAS—Chemical Abstract Service number

[CRL—Cancer risk level at 1 x 10^{-6}

H—Threshold effect human health criterion; incorporates additional uncertainty factor for some Group C carcinogens.

ln [H]] **ln[H]**—Natural Logarithm of the Hardness of stream as mg/l $CaCO_3$

[ug/L] **µg/L**—Micrograms per liter

N/A—Criterion not developed

PP NO—Priority Pollutant Number

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DESIGNATED WATER USES AND WATER QUALITY CRITERIA

§ 93.9. Designated water uses and water quality criteria.

(a) The tables in §§ 93.9a—93.9z display designated water uses and water quality criteria in addition to the water uses and criteria specified in Tables 2 and 3. Designated uses shall be protected in accordance with Chapters 95 and 96 (relating to wastewater treatment requirements; and water quality standards implementation) and any other applicable State and Federal laws and regulations. The tables also indicate specific exceptions to Tables 2 and 3 on a stream-by-stream or segment-by-segment basis by the words "add" or "delete" followed by the appropriate symbols described elsewhere in this chapter. **A one-hour average duration period applies to: the Tur_1 and Tur_2 criteria in § 93.9e (relating to Drainage List E); the dissolved oxygen criterion for the Yellow Breeches in § 93.9o (relating to Drainage List O); and the pH criterion in § 93.9x (relating to Drainage List X).** The county column in §§ 93.9a—93.9z indicates the county in which the mouth of the stream or the downstream limit of the zone described for that entry is located. Abbreviations used in the Stream and the "Zone" columns are as follows:

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