

## PROPOSED RULEMAKING

### ENVIRONMENTAL QUALITY BOARD [ 25 PA. CODE CHS. 93 AND 96 ]

#### Water Quality Standard for Manganese and Implementation

The Environmental Quality Board (Board) proposes to amend 25 Pa. Code Chapter 93 (relating to water quality standards) and 25 Pa. Code Chapter 96 (relating to water quality standards implementation). The amendments propose to delete manganese from Table 3 at § 93.7 (relating to specific water quality criteria) and add manganese to Table 5 at § 93.8c (relating to human health and aquatic life criteria for toxic substances). Additionally, the amendments propose two alternatives for a point of compliance with the manganese water quality standard: the point of all existing or planned surface potable water supply withdrawals; or all surface waters (i.e., near the point of discharge). The proposed regulations, set forth in Annex A, support both alternatives.

This proposed rulemaking was adopted by the Board at its meeting on \_\_\_\_\_.

#### **A. Effective Date**

This proposed rulemaking will go into effect upon final-form publication in the *Pennsylvania Bulletin*. Subsequent approval by the United States Environmental Protection Agency (EPA) of water quality standards is required to implement the Federal Clean Water Act (33 U.S.C.A §§ 1251-1388).

#### **B. Contact Persons**

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#### **C. Statutory and Regulatory Authority**

This proposed rulemaking is being made under the authority of 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). Additional authority for this proposed rulemaking includes sections 1920-A(b) and (j) of The Administrative Code of 1929 (71 P.S. § 510-20(b) and (j)), which grants to the Board the power and duty to formulate, adopt and promulgate rules and regulations for the proper performance of the work of the Department and mandates that the Board “promulgate regulations under the act of June 22, 1937 (P.L. 1987, No. 394), known as The Clean Streams Law, or other laws of this

Commonwealth that require that the water quality criteria for manganese established under 25 Pa. Code Ch. 93 (relating to water quality standards) shall be met, consistent with the exception in 25 Pa. Code § 96.3(d) (relating to water quality protection requirements).” Sections 101(a)(2) and 303 of the Federal Clean Water Act (CWA) (33 U.S.C.A. §§ 1251(a)(2) and 1313) set forth requirements for water quality standards, which states must meet to implement the CWA in the Commonwealth. Section 101(a)(3) of the CWA declares the national policy that the discharge of toxic pollutants in toxic amounts be prohibited (33 U.S.C.A. § 1251(a)(3)).

#### **D. Background and Purpose**

##### ***General background information***

Water quality standards are in-stream water quality targets that are implemented by imposing specific regulatory requirements and permit conditions (such as treatment requirements, effluent limitations and best management practices (BMPs)) on individual sources of water pollution. The water quality standards include the existing and designated uses of the surface waters of the Commonwealth, along with the specific numeric and narrative criteria necessary to achieve and maintain those uses, and antidegradation requirements. The purpose and goals of this proposed rulemaking are: to comply with Act 40 of 2017 (71 P.S. § 510-20(j)); to delete the existing manganese numeric water quality criterion from Table 3 at § 93.7 (relating to specific water quality criteria) which was established for the protection of the Potable Water Supply use; to add a manganese criterion to Table 5 at § 93.8c (relating to human health and aquatic life criteria for toxic substances) designed to protect human health from the neurotoxicological effects of manganese which will also ensure adequate protection of all water uses; and to identify the point of compliance for the criterion.

On October 30, 2017, subsection (j) (known as “Act 40”) was added to section 1920-A of The Administrative Code of 1929. This subsection states:

(j) The board shall promulgate regulations under the act of June 22, 1937 (P.L. 1987, No. 394), known as "The Clean Streams Law," or other laws of this Commonwealth that require that the water quality criteria for manganese established under 25 Pa. Code Ch. 93 (relating to water quality standards) shall be met, consistent with the exception in 25 Pa. Code § 96.3(d) (relating to water quality protection requirements). Within ninety days of the effective date of this subsection, the board shall promulgate proposed regulations.

Act 40 directed the Board to propose a regulation that moves the point of compliance for manganese from the point of discharge to any downstream public water supply intake.

In addition to Act 40, the Department needs to consider other environmental statutes like the CSL and the Pennsylvania Safe Drinking Water Act (35 P.S. §§ 721.1 – 721.17). For instance, section 4(1) of the CSL declares that clean, unpolluted streams are absolutely essential if Pennsylvania is to attract new manufacturing industries and to develop Pennsylvania’s full share of the tourist industry. 35 P.S. § 691.4(1). Similarly, section 4(3) declares that an objective of the CSL is to prevent pollution and restore streams that are presently polluted. 35 P.S. §

691.4(1). Sections 4(4) and 5(b)(1) of the CSL provide that the Department has the duty to formulate regulations that prevent and eliminate water pollution. (35 P.S. §§ 691.4(4) and 691.5(b)(1)) “Pollution” is defined as “contamination of any waters of the Commonwealth such as ... to render such waters harmful, detrimental or injurious to public health..., or to domestic, municipal, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life....” 35 P.S. § 691.1.

In adopting rules and regulations under the CSL, to carry out the purposes of the act, the Department needs to consider, where applicable, the following: (1) water quality management and pollution control in the watershed as a whole; (2) the present and possible future uses of particular waters; (3) the feasibility of combined or joint treatment facilities; (4) the state of scientific and technological knowledge; and (5) the immediate and long-range economic impact upon the Commonwealth and its citizens. 35 P.S. § 691.5(a).

Where a pollutant found in discharges to surface waters is toxic to human health or aquatic life, the Commonwealth’s regulations require development of appropriate water quality criteria to control pollution. 25 Pa. Code § 93.8a specifically provides that “[t]he waters of this Commonwealth may not contain toxic substances attributable to point or nonpoint source waste discharges in concentrations or amounts that are inimical to the water uses to be protected.”

Section 303(c) of the federal CWA and 40 CFR Part 131 require states to develop water quality standards that consist of designated uses, water quality criteria to protect those uses, and antidegradation requirements. Such standards must “protect the public health or welfare and enhance the quality of water” (33 U.S.C.A. § 1313(c)). In addition, such standards must take into consideration water uses including public water supplies, propagation of fish and wildlife, recreational purposes, agricultural purposes, and industrial purposes. Section 101(a)(3) of the CWA declares the national policy that the discharge of toxic pollutants in toxic amounts be prohibited (33 U.S.C.A. § 1251(a)(3)).

Furthermore, the Pennsylvania Safe Drinking Water Act (SDWA) provides that an adequate supply of safe, pure drinking water is essential to the public health, safety and welfare and that such a supply is an important natural resource in the economic development of the Commonwealth. (35 P.S. §§ 721.2). Moreover, among other things, the Department is required to develop a safe drinking water program necessary to assume enforcement responsibility of the Federal Safe Drinking Water Act, 42 U.S.C. §§ 300f to 300j-27. 35 P.S. § 721.5. On November 30, 1984, the Department assumed responsibility under the Federal act. 50 FR 342 (January, 3, 1985). Public water suppliers must achieve the Secondary Maximum Contaminant Level (SMCL) for manganese of 0.05 mg/L in finished water based on the Federal standard found at 40 CFR § 143.3.

Section 1920-A of the Administrative Code of 1929 authorizes the Board to formulate, adopt and promulgate such rules and regulations as may be determined by the Board for proper performance of the work of the Department.

This proposed regulation takes the statutory directives of the CWA, CSL, SDWA, and the Administrative Code into consideration.

Manganese is found in discharges in the Pennsylvania waters and was last evaluated by the Commonwealth in 1967. The Department is required to protect surface waters based on the most current toxicological data and science. Current data and science demonstrate manganese is a neurotoxin to humans when levels necessary to maintain adequate health are exceeded. The Department took the provisions of Act 40, the CWA, the CSL, and the Pennsylvania SDWA into account in this evaluation.

Following the passage of Act 40, the Department solicited information for the development of the proposed regulations through an Advance Notice of Proposed Rulemaking (ANPR) published on January 18, 2018 at 48 Pa.B. 605. The Department sought scientific and current toxicological information to comprehensively review the manganese standard as it relates to the water uses identified in § 93.3 (relating to protected water uses) and, in particular, to determine the need to develop manganese toxics criteria related to human health and aquatic life exposure. Additionally, because Act 40 directed the Board to propose a regulation that moves the point of compliance for manganese from the point of discharge to the point of all existing or planned surface potable water supply withdrawals, the Department requested information on the financial and economic impact of compliance with the manganese water quality standard, including costs associated with adding manganese treatment to public water supply facilities, and manganese treatment process information.

The Department received comments on the ANPR from 15 organizations, including EPA, American Rivers, PA American Water, PennFuture, Pennsylvania Public Utility Commission (PUC), Pennsylvania Fish and Boat Commission (FBC), City of Lancaster Public Works, Philadelphia Water Department, the Manganese Interest Group, SUEZ-FCGA, CONSOL Energy, Pennsylvania Anthracite Council, Pennsylvania Coal Alliance, Corsa Coal Corporation, and Rosebud Mining Company.

The Department's evaluation resulted in the proposed criterion in Table 5 of § 93.8c. Chapters 93 and 96 implement the CSL and the CWA. Pursuant to these chapters, a pollutant identified as a toxic substance requires control of the substance in all surface waters to protect all water uses. No toxic substances are currently identified in section 96.3(d), which identifies exceptions to the control of substances in all surface waters. By adding a toxic substance to the list of pollutants in section 96.3(d), intervening water uses between the point of discharge and the point of potable water supply withdrawal may not be protected. Also, changing the point of compliance to the point of withdrawal will shift the burden of treatment and control to downstream users, such as public water suppliers and customers.

On November 29, 2018, May 23, 2019 and July 25, 2019, the Department met with the Water Resources Advisory Committee (WRAC) to discuss the scientific literature and information available to support manganese water quality criteria development and other regulatory issues relating to manganese. On July 25, 2019, WRAC voted on a motion to: acknowledge the legislative requirement in Act 40 to propose a regulation moving the point of compliance for manganese to the point of all existing or planned surface potable water supply withdrawals; support proposing a regulation that adds manganese to Table 5 in section 93.8c as a toxic substance for human health at the level of 0.3 mg/L, recognizing that the compliance point for

this standard will be met in all surface waters, as described in section 96.3(c); and recommend that the Board request public comment on this combined approach for consideration in developing a final regulation.

The Department met with the Agricultural Advisory Board on October 25, 2018, June 20, 2019 and August 29, 2019 to present information and seek additional agriculture-related information relating to manganese and this proposed rulemaking. Also, the Department met with the Small Water Systems Technical Assistance Center Advisory Board (TAC) on January 31, 2019 and August 8, 2019 to present information and seek additional water supply treatment information relating to manganese and this proposed rulemaking. TAC voted to concur with WRAC's motion.

## **E. Summary of Regulatory Requirements**

### ***Proposed Amendments to Manganese Criteria in Chapter 93***

The Department periodically reviews its existing criteria to ensure that they are appropriate. If the peer-reviewed scientific information demonstrates that a change is warranted, the criteria will be revised to ensure protection of the most sensitive water use, or population to be protected. For this rulemaking, the Department completed a comprehensive review of the available scientific data for manganese to determine the appropriate water quality criteria to protect all existing and designated water uses and to evaluate the impact of the proposed regulations required by Act 40.

The Department conducted a review of the information received through the ANPR as well as an independent search of the scientific literature available on the toxic effects of manganese to aquatic life, livestock and humans. With respect to aquatic life, the Department reviewed manganese studies on aquatic macroinvertebrates, fish and algae. Current science indicates that elevated manganese is toxic to aquatic organisms. Limited information was available to evaluate the impacts of elevated source water manganese on livestock, but some data suggests elevated levels of manganese in the drinking water for livestock may significantly reduce palatability resulting in lower water consumption. With respect to impacts on humans, the Department reviewed over 60 human health studies relevant to the toxic effects of manganese and included areas of epidemiology, epigenetics, and animal toxicity studies. The Department also reviewed information available through EPA's Integrated Risk Information System (IRIS) database. At levels beyond those necessary to maintain adequate health, manganese has been identified as a nervous system toxin and has been specifically linked to negative impacts on fetal and childhood neurodevelopment.

Based on the science reviewed, the Board is proposing adoption of a numeric water quality criterion for manganese designed to be protective of human health. This criterion would be added to §93.8c Table 5 - Water Quality Criteria for Toxic Substances, and the existing Potable Water Supply criterion of 1 mg/L, found in § 93.7 Table 3 would be deleted. Table 3 generally identifies a specific water use, or uses, to be protected by each criterion. Conversely, Table 5 does not identify specific water uses to be protected by each criterion, but rather the table identifies the organisms to be protected by the criterion (i.e., aquatic life or human health). While Table 3 criteria are specific to the protection of those uses identified, the Table 5 criteria may be

relevant to multiple protected water uses particularly with respect to human health (e.g., water supply, water contact sports, irrigation and fishing may all be relevant). The proposed numeric human health criterion for manganese is more stringent than the existing Potable Water Supply criterion of 1.0 mg/L and includes protection of the Potable Water Supply use; therefore, the Potable Water Supply use would be afforded appropriate protection from elevated levels of manganese when the human health standard is applied in accordance with Department policy and regulations. Since this numeric criterion will be included in Table 5, it should apply in all surface waters of the Commonwealth, consistent with § 93.8a(a) (relating to toxic substances), § 96.3(c) (relating to water quality protection requirements) and the Department's Water Quality Toxics Management Strategy – Statement of Policy (25 Pa. Code Chapter 16). Based upon the Department's scientific review, the adoption and implementation of a human health criterion in all surface waters in accordance with these proposed regulations should also provide adequate protection to aquatic life and livestock from the toxic effects of manganese.

When a chemical or compound, in sufficient quantity or concentration, is harmful to humans the Department must limit the concentrations in waste discharges, as required in § 93.8a(a). In accordance with Chapter 16 and EPA-approved methodologies, human health criteria are developed based on one of two approaches – threshold level or non-threshold level toxic effects (carcinogens). The terms “threshold effect” and “nonthreshold effects” are defined in 25 Pa. Code § 93.1 (relating to definitions). For threshold level toxic effects, there exists a dose below which no adverse response will occur. 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. A non-threshold effect is an adverse impact, including carcinogenic effects, for which no exposure greater than zero assures protection to the exposed individual. Manganese has not been shown to be carcinogenic. Therefore, a criterion was developed following the Department's threshold level toxic effects policy found at §16.32 (relating to threshold levels of toxic effects).

Under §16.32 (relating to threshold levels of toxic effects), the Department will establish criteria for threshold toxics in accordance with the following guidelines: (1) if 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) and the National Recommended Water Quality Criteria (EPA-822-H-04-001, 2004), as amended and updated or Exhibit 3-1 of the Water Quality Standards Handbook, Second Edition, EPA-823-0-94-005A, August 1994, as amended and updated; and (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. In accordance with this policy, the Department reviewed the available information to determine whether or not a criterion could be developed for manganese. EPA has not published a human health criterion recommendation for manganese; however, toxicological data relating to the human health effects of manganese does exist. Therefore, the Department followed the procedures outlined in §16.32(c)(2) to develop a human health criterion for manganese.

In addition to these guidelines for criteria development, Section 16.32(d) identifies the sources the Department uses to obtain relevant risk assessment values for protection from threshold level toxic effects, which includes the following sources: (1) verified reference doses listed in EPA's IRIS database and other EPA approved data sources referred through IRIS; (2) maximum contaminant level goals; (3) the EPA's CWA § 304(a) health criteria as amended and updated and other final criteria published by the EPA and the Great Lakes Initiative Clearinghouse; and (4) Teratology and other data that have been peer-reviewed may provide information for criteria development. In accordance with §16.32(d), the Department will typically use verified reference doses in the IRIS database when available. When appropriate reference dose information is not available in IRIS, the Department must develop a reference dose using one of the other sources of information listed above. A reference dose is an essential component of the EPA equation used to derive ambient water quality criteria for the protection of human health. In other words, a human health criterion cannot be calculated without an appropriate reference dose.

EPA developed an oral reference dose (RfD) for manganese (CASRN 7439-96-5) and published the complete summary in the IRIS database <https://www.epa.gov/iris> in 1995. EPA defines a reference dose as “an estimate (with an uncertainty spanning approximately an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects over a lifetime.” When EPA's 2000 Human Health Methodology was published, the most common approach for deriving a reference dose was to identify the no-observed-adverse-effect level (NOAEL) for the most sensitive known toxicity endpoint, that is, the toxic effect that occurs at the lowest dose. This effect is called the critical effect (EPA-822-B-00-004, October 2000). Many different factors are evaluated when selecting the most appropriate NOAEL from among all available studies. For manganese, EPA identified central nervous system effects as the critical effect.

The 1995 IRIS reference dose is for the total daily oral intake of manganese, which includes drinking water and dietary sources. However, the NOAEL was based solely on dietary studies; therefore, EPA recommends that an assessment of drinking water exposure should include a modifying factor (MF) of 3. EPA provided four reasons for this recommendation. First, fasting individuals have been shown to absorb more manganese from drinking water than non-fasting individuals. Second, there were concerns about possible adverse health effects associated with a lifetime consumption of drinking water containing approximately 2 mg/L of manganese. Third, formula-fed infants have been found to have a much higher concentration of manganese in hair samples versus breast fed infants. Not only does infant formula contain higher amounts of manganese than breast milk, but the valence form of the manganese in formula appears to increase the absorption rate. Studies have shown that the levels of manganese in learning-disabled children were significantly increased in comparison with that of non-disabled children. Although no causal relationship has been determined, further research is needed. Fourth, there is evidence that the neonate (infant less than 28 days old) digestive tract absorbs more manganese than an adult's and that neonates are less able to excrete it. Furthermore, it has been shown that manganese will more readily cross the blood-brain barrier in neonates, suggested by studies to be at a rate 4-times higher in infants than in adults. Caution is warranted when establishing safe levels of manganese in water since any adverse neurological effects acquired during this critical

period of development are likely to be irreversible and may not manifest for years after the exposure.

The Board's proposed criterion relies upon EPA's existing IRIS RfD for manganese with the recommended MF of 3. EPA recommends applying an MF of 3 in order to assess manganese exposure from water consumption.

$$\text{RfD} = (0.14 \text{ mg/kg-day} \div 3) = 0.05 \text{ mg/kg-day}$$

In accordance with the guidelines in § 16.32(c) (relating to threshold level toxic effects), the Department follows the EPA Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000) <https://www.epa.gov/wqc/methodology-deriving-ambient-water-quality-criteria-protection-human-health-2000-documents> in establishing criteria for threshold toxics. The Department used the updated exposure input values as given in the 2015 EPA Updated Ambient Water Quality Criteria for the Protection of Human Health <https://www.epa.gov/wqc/2015-epa-updated-ambient-water-quality-criteria-protection-human-health>. In accordance with § 93.8a (relating to toxic substances), the Department derived the following human health criterion for manganese. Manganese is not known to significantly bioaccumulate in freshwater fish; therefore, a bioaccumulation factor of 1 has been assumed.

AWQC<sub>Mn</sub> = Ambient Water Quality Criterion for Manganese

$$\text{AWQC}_{\text{Mn}} = \text{RfD} \times \text{RSC} \times (\text{BW} \div [\text{DWI} + (\text{FI} \times \text{BAF})])$$

Where:

$$\text{RfD} = 0.05 \text{ mg/kg-day}$$

$$\text{Relative Source Contribution (RSC)} = 0.2$$

$$\text{Body Weight (BW)} = 80 \text{ kg}$$

$$\text{Drinking Water Intake (DWI)} = 2.4 \text{ L}$$

$$\text{Fish Intake (FI)} = 0.022 \text{ kg/day}$$

$$\text{Bioaccumulation factor (BAF)} = 1$$

$$\text{AWQC}_{\text{Mn}} = 0.05 \text{ mg/kg-day} \times 0.2 \times (80 \div [2.4 + (0.022 \text{ kg/day} \times 1)])$$

$$\text{AWQC}_{\text{Mn}} = \mathbf{0.3 \text{ mg/L}}$$

This proposed criterion of 0.3 mg/L is expected to protect human health from the threshold level toxic effects of manganese (i.e., developmental neurotoxicological effects) consistent with Chapters 16 and 93.

In response to the ANPR, the Department received comments noting that both the State and Federal regulations include technology-based limits for mining wastewater effluent discharges of manganese to 2.0 mg/L as a 30-day average, 4.0 mg/L as a daily maximum and 5.0 mg/L as an instantaneous maximum. It has been suggested that these limitations would prevent the discharge of toxic levels of manganese to Pennsylvania surface waters. However, these effluent limits are

based on the performance of wastewater treatment and control technologies, not water quality protection. The National Pollutant Discharge Elimination System (NPDES) regulations require permit limits to be based on “any requirements *in addition to or more stringent than* promulgated effluent limitations guidelines or standards under sections 301 (relating to effluent limitations), 304 (relating to information and guidelines), 306 (relating to national standards of performance), 307 (relating to toxic and pretreatment effluent limits), 318 (relating to aquaculture) and 405 (relating to disposal of sewage sludge) of the CWA *necessary to (1) achieve water quality standards established under section 303 of the CWA...*” (emphasis added) 40 CFR § 122.44(d)(1) incorporated by reference into 25 Pa. Code § 92a.44 (relating to establishing limitations, standards, and other permit conditions); and 33 U.S.C.A. § 302(a) (relating to water quality related effluent limitations).

It must be noted that the technology-based effluent limitations mentioned above are specific to the mining industry and do not apply to other dischargers of manganese. The Department conducted a review of NPDES permits and identified several non-mining, NPDES-permitted sectors (e.g., landfills, wastewater treatment plants and power plants) that currently have water quality-based effluent limits for manganese, based on the existing manganese water quality criterion, but which do not have State or Federal technology-based limits similar to the mining program which would limit their discharge of manganese at the point of discharge. In contrast to the applicability of technology-based limitations, water quality criteria are not narrowly focused or developed for specific permitted discharge activities or categories of discharge. They are developed to protect designated uses and specific populations (i.e., aquatic life or human health), and they apply to all permitted discharges regardless of the type of discharge activity. All NPDES discharge permits must be written to comply with all applicable water quality standards as set forth by the Board for the protection of water uses and users. Therefore, the Department cannot limit its review to industry specific standards when determining the water quality criteria necessary to ensure adequate aquatic life, plant, animal and human health protection.

With respect to the mining industry, EPA evaluated the Federal effluent limitation guidelines (ELGs) for manganese in 2008 at the request of mining industries and state agencies. EPA determined that the ELGs were valid and should remain in place. EPA noted that the toxic effects of manganese on aquatic species are typically chronic rather than acute in nature, and headwater streams are especially sensitive to manganese. Additionally, EPA determined that for active surface and underground mining areas and postmining areas with underground acid mine drainage discharges, manganese treatment is available, economically achievable, and compliance rates with permit limits derived from the management effluent guidelines are high (73 FR 53218; Notice of Final 2008 Effluent Guideline Program Plan).

Adoption of a new human health toxics criterion for manganese may require new and existing NPDES discharges to be evaluated when permit applications undergo Department review. This evaluation could potentially result in increased treatment and operational costs for permitted dischargers with manganese effluent limits, depending on the point of compliance for the criterion.

## *Proposed Amendments to Chapter 96 – Point of Compliance Alternatives*

Annex A includes language which supports two alternative points of compliance for the proposed manganese criterion. The first alternative, consistent with Act 40, is to move the point of compliance to the point of all existing or planned surface potable water supply withdrawals. The second alternative is to maintain the existing point of compliance in all surface waters (i.e., at the point of discharge). The Board is seeking public comment on both alternatives.

### First Alternative Point of Compliance

In accordance with Act 40, the first alternative is a proposed regulation that changes the point of compliance for manganese in Chapter 96 from “be[ing] achieved in all surface waters” (§ 96.3(c)) to being met “at the point of all existing or planned surface potable water supply withdrawals” (§ 96.3(d)). Language in the Annex A that reflects this alternative is as follows:

(d) As an exception to subsection (c), the water quality criteria for total dissolved solids, nitrite-nitrate nitrogen, phenolics, chloride, sulfate and fluoride established for the protection of potable water supply **and the water quality criterion for manganese** shall be met at least 99% of the time at the point of all existing or planned surface potable water supply withdrawals unless otherwise specified in this title.

Under this alternative, if no potable water supply exists or is planned then no water quality-based effluent limits will apply; however, Federal ELGs would apply to the mining discharges. For all other point source discharges of manganese there would be no water quality criteria or Federal ELGs to limit the amount of manganese discharged into the surface water. Under this scenario, dischargers would have no water quality-based effluent limit applied to their discharge of wastewater containing manganese. If a potable water supply withdrawal does exist downstream of a manganese discharge, the proposed water quality criterion for manganese will only apply at the potable water supply intake, leaving the surface water users between the discharge and the potable water supply intake devoid of any kind of protection from the effects of manganese.

This scenario, which would establish the point of compliance for the proposed manganese criterion at the point of potable water supply intake, would grant some financial relief to any permitted discharger of manganese due to reduced wastewater treatment costs. Under this alternative the proposed human health criterion for manganese will not apply unless a potable water supply withdrawal is located on the surface water. If a potable water supply is located on the stream, a discharger’s point of compliance with the proposed manganese criterion will be modelled from the upstream point of discharge to the point of potable water supply withdrawal, allowing for attenuation of the effluent as it travels downstream. The discharger’s effluent limitation would be determined based on achieving the proposed manganese criterion of 0.3 mg/L at the point of potable water supply intake.

Although moving the point of compliance may be beneficial to some facilities that have permitted discharges of manganese in their wastewater, it could be an added burden to some

potable water supply facilities. It could also burden facilities with surface water intakes that require a certain level of water quality for use in food and beverage production or preparation, paper and textile manufacturing, aquaculture, and irrigation. Moving the point of compliance for the manganese water quality criterion from the point of discharge to the point of withdrawal will likely require additional monitoring by all of these facilities to determine the effects of increased source water manganese levels on their operations. As the levels of manganese change in the surface water, all potable water supply facilities using surface waters as their source water will need to monitor and may require facility upgrades or additional chemical usage to continue achieving the secondary maximum contaminant level (SMCL) for manganese of 0.05 mg/L in the finished water, which is required under the Pennsylvania Safe Drinking Water Act (35 P.S. §§ 721.3 and 721.5) and regulations at 25 Pa. Code § 109.202(b) (relating to state MCLs, MRDLs and treatment technique requirements). The SMCL for manganese in Pennsylvania is based on the Federal standard found at 40 CFR § 143.3.

Additional burdens to water suppliers may apply based on other drinking water requirements. EPA developed one-day, 10-day and lifetime Health Advisory Limits (HALs) for manganese, pursuant to the Federal Safe Drinking Water Act (42 U.S.C.A. §§ 300f-300j-26). The lifetime HAL of 0.3 mg/L protects against concerns of potential neurological effects. The one-day and 10-day HALs of 1 mg/L are for acute exposure and it is advised that for infants younger than 6 months, the lifetime HAL of 0.3 mg/L be used even for an acute exposure of 10 days, because of the concerns for differences in manganese content in human milk and formula and the possibility of higher absorption and lower excretion in young infants. Because EPA developed HALs for manganese, public water suppliers may be subject to additional monitoring and public notification requirements if the HALs are exceeded in the finished water. In accordance with the current regulations found at Chapter 93, the Potable Water Supply water quality criterion ensures that public water systems receive raw water at their intake structures that can achieve compliance with 25 Pa. Code Chapter 109 Safe Drinking Water (SDW) standards utilizing only conventional treatment. If a water supplier or the Department indicates a contaminant is present in the potable water supply and may cause a potential health hazard, additional monitoring may be required under 25 Pa. Code § 109.302(b) (relating to special monitoring), which may then trigger additional treatment requirements pursuant to § 109.4 (relating to general requirements). If source water for public water supply operations is received at or above 0.3 mg/L, sequestration of manganese is no longer an option and modifications to operations and/or additional treatment technologies for removal of manganese would be required. Sequestration does not remove the manganese so it is still present and still bioavailable and as such it can act as a neurotoxin. Finally, under § 109.407(a)(9) (relating to general public notification requirements) and § 109.408(a)(11) (relating to Tier 1 public notice—categories, timing and delivery of notice), Tier 1 public notice requirements may be triggered if exceedance of the HALs has the “potential to have serious adverse effects on human health as a result of short-term exposure.”

Industries that rely on surface waters for industrial water supplies may be faced with similar modifications and costs to achieve compliance with their respective industry standards and regulations. If a facility’s monitoring reveals an increase of manganese in the surface water source, modifications to their existing operations and/or additional technologies may be required to remove the additional manganese load. An example of a potential facility modification would be the addition of an oxidation process or increased chemical usage, but the type and degree of

modifications will be based on both the manganese concentration and the effect of manganese on other water quality parameters of the source water.

The Department reviewed information submitted by several drinking water facilities in response to the ANPR. Comments received on the ANPR from Pennsylvania American Water, PUC, Philadelphia Water Department, SUEZ FCGA, and the City of Lancaster's Department of Public Works indicated that moving the compliance point for the manganese criterion to the location of an existing or planned surface water potable water supply withdrawal will shift the burden of treatment from the resource extraction industry to the public water suppliers. The City of Lancaster's Department of Public Works and Pennsylvania American Water both indicated that the costs associated with this proposed change will be in the tens of millions of dollars.

The ANPR requested information be submitted describing the costs that would be incurred if the numeric limit of the manganese criterion remained at 1.0 mg/L and the point of compliance was moved to the surface water potable water supply intake. The evaluation of the manganese criterion, resulting in a proposal of a 0.3 mg/L limit, was not completed prior to the ANPR. If the recommended limit of 0.3 mg/L is applied only at the point of potable water supply withdrawal, the treatment cost concerns raised by the drinking water facilities still apply and such costs will likely be passed on to their customers.

#### Second Alternative Point of Compliance

Manganese is a human health concern through its action as a neurotoxin when levels necessary to maintain adequate health are exceeded. To be consistent with all other toxics criteria in Table 5, the second alternative is a proposed regulation that maintains the current point of compliance for manganese, in all surface waters (i.e., at the point of discharge), as stated in § 96.3(c). Language in the Annex A that reflects this alternative is as follows:

- (c) To protect existing and designated surface water uses, the water quality criteria described in Chapter 93 (relating to water quality standards), including the criteria in § § 93.7 and 93.8a(b) (relating to specific water quality criteria; and toxic substances) shall be achieved in all surface waters at least 99% of the time, unless otherwise specified in this title. The general water quality criteria in § 93.6 (relating to general water quality criteria) shall be achieved in surface waters at all times at design conditions.

Under this alternative, the manganese criterion for the protection of human health would be applicable in all surface waters to protect all relevant water uses in accordance with § 96.3(c). As stated in EPA's 2000 Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (EPA-822-B-00-004), "water quality criteria are derived to establish ambient concentrations of pollutants which if not exceeded, will protect the general population from adverse health impacts from those pollutants due to consumption of aquatic organisms and water, including incidental water consumption related to recreational activities ... EPA considers that its target protection goal is satisfied if the population as a whole will be adequately protected by the human health criteria when criteria are met in ambient water." EPA further states that "in consideration of the Agency's goals of pollution prevention, ambient waters should not be contaminated to a level where the burden of achieving health objectives is shifted away from

those responsible for pollutant discharges and placed on downstream users to bear the costs of upgraded or supplemental water treatment.”

In accordance with Chapters 16, 93 and 96, the criteria for all human health toxic pollutants contained in § 93.8c Table 5 are met in all surface waters, consistent with § 96.3(c) (i.e., met at the point of discharge). In comparison, the exceptions contained in § 96.3(d) list parameters which are only required to be met at the point of any existing or planned potable water supply withdrawal. To date, exceptions to subsection (c) have only been made for limited, specific Potable Water Supply criteria that have not been identified as toxic pollutants. For example, the existing Potable Water Supply criterion for Phenolics in Table 3 is listed as an exception to subsection (c) in § 96.3. However, it should be noted that § 93.7 Table 3 specifically excludes those phenolic compounds that have been identified as Priority Pollutants (toxics) by EPA. Criteria for those specific toxic pollutants are presently located in § 93.8c Table 5 and must be met in all surface waters for the protection of human health.

The second alternative would afford aquatic life an appropriate level of protection from the deleterious effects of manganese. It is widely known that high levels of manganese are toxic to aquatic life. Comments were received in response to the ANPR which provided discussion regarding how movement of the point of compliance will affect other uses including aquatic life. FBC commented that manganese is one of several heavy metals associated with acid mine discharges that act on aquatic organisms as metabolic poisons. Depending on the water chemistry, manganese will often settle on stream beds as a black, sticky coating that interferes with the colonization, abundance, and diversity of stream dwelling aquatic insects which are very important in the aquatic ecosystem. FBC also provided information on the impacts of this proposed regulatory change on FBC and cooperative fish hatcheries that rely on withdrawals from streams for their raw source water. If manganese concentrations in the source water are greater than 1.0 mg/L there would be a new need for pre-treatment to reduce the level of manganese to an acceptable level for fish culture. FBC also noted that, although it was developed for Potable Water Supply use protection, the current manganese standard which is applicable in all surface waters provides protection for other protected uses including Boating, Fishing, Water Contact Sports, and Esthetics.

In addition to FBC’s comments, the Department reviewed EPA’s ECOTOX database for information on the toxicity of manganese to aquatic life. This database contains over 150 studies relevant to the toxicity of manganese to aquatic organisms. ECOTOX (<https://cfpub.epa.gov/ecotox/index.cfm>) is a comprehensive, publicly available knowledgebase which provides single chemical environmental toxicity data derived predominantly from peer-reviewed literature on aquatic life, terrestrial plants and wildlife.

The threshold at which manganese needs to be maintained in the surface water to avoid toxicity to humans is lower than the level necessary to afford appropriate protection for aquatic life. The current science indicates that the human health criteria proposed in this rulemaking will afford adequate protection for aquatic life if it is applied in all surface waters. Aquatic life would not be granted adequate protection under the first alternative, where the standard would only be met in at the point of potable water supply withdrawal.

Under this alternative, additional protections will be provided to the Potable Water Supply use and other protected water supply uses (e.g., Irrigation, Livestock Water Supply and Wildlife Water Supply). Furthermore, cost savings may be realized by public water systems, as manganese levels in source waters will be lower, and less treatment will be necessary to meet drinking water regulations.

## **F. Benefits, Costs and Compliance**

### ***Benefits***

Overall, the 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; recreational opportunities such as fishing (also for consumption), water contact sports, and boating; and aquatic life protection. It is important to realize these benefits and to ensure opportunities and activities continue in a manner that is environmentally, socially and economically sound. Maintenance of water quality ensures its future availability for all uses. All users of surface water will benefit from the development of a human health criterion for manganese.

If the proposed criterion is adopted and the first point of compliance alternative is adopted, those entities holding or seeking permits to discharge manganese into the surface waters of Pennsylvania will benefit. If the proposed criterion is adopted and the second point of compliance alternative is adopted, all users of surface waters will benefit.

### ***Compliance costs***

Based on the proposed water quality criterion for manganese and the first alternative point of compliance, additional compliance costs may be imposed on the regulated drinking water community due to potential increases in source water levels of manganese, while reducing compliance costs for the mining industry.

Under the first alternative point of compliance, persons with an existing or planned potable water supply surface water withdrawal could be adversely affected financially if there is a need to provide a higher level of raw water treatment to continue meeting the existing SMCL for manganese, 0.05 mg/L, in the finished (i.e., potable) water. For example, increased costs may take the form of increased source water sampling and monitoring, facility upgrades, treatment modifications or additional operation and maintenance costs for treatment chemicals and waste disposal. Treatment modifications and associated costs are site-specific and will depend upon the specific treatment processes employed by a facility, the quality of the source water 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 higher treatment costs for public water supply facilities located downstream of permitted manganese discharges, which would likely result in water fee increases for the water supply rate payers. A review of statewide potable water supply withdrawals and permitted manganese discharges suggests a significant overlap exists between

the two regulated communities, which means treatment may be necessary in areas with mining discharges.

Based on the second alternative point of compliance and the proposed criterion for manganese, compliance and treatment costs for the regulated wastewater community, including the mining industry, may increase. The expenditures necessary to meet new effluent limitations may exceed that which is required under existing regulations.

The proposed amendments will be implemented through the Department's permit and approval actions. Persons with an existing discharge or proposing to add a new discharge point to a stream could be adversely affected upon permit renewal or permit issuance if they need to provide a higher level of treatment to meet any new 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. Monitoring and treatment costs 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 higher treatment costs for permitted discharges to streams to meet the new water quality standards requirements. The initial costs resulting from the installation of technologically advanced wastewater treatment processes may be offset by potential savings from and increased value of improved water quality through more cost-effective and efficient treatment over time.

### ***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. All surface waters in this Commonwealth are afforded a minimum level of protection through compliance with the 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 water uses of the stream, and the water quality criteria developed to maintain those uses. These effluent limits are established to assure water quality is protected and maintained.

### ***Paperwork requirements***

This proposed rulemaking should not have new direct paperwork impact on the Commonwealth, local governments, political subdivisions, or the private sector. This proposed rulemaking will be implemented in accordance with existing Department regulations.

## **G. Pollution Prevention**

The Federal Pollution Prevention Act of 1990 (42 U.S.C.A. §§ 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 limits. Water quality-based limits are determined by the designated use of the receiving stream and the water quality criteria necessary to achieve the designated and existing uses.

#### **H. Sunset Review**

The Board is not proposing to establish a sunset date for these regulations because they are needed for the Department to carry out its statutory authority. The Department will continue to closely monitor these regulations for their effectiveness and recommend updates to the Board as necessary.

#### **I. Regulatory Review**

Under section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on **DATE**, the Department submitted a copy of this proposed rulemaking and a copy of a 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 **DATE**.

Comments may be submitted to the Board online, by e-mail, by mail or express mail as follows below.

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 the 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. Comments submitted by facsimile will not be accepted.

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 \_\_\_\_ public hearings for the purpose of accepting comments on this proposed rulemaking. The hearings will be held at \_\_\_\_ p.m. on the following dates:

\_\_\_\_\_ (blank) \_\_\_\_\_

\_\_\_\_\_ (blank) \_\_\_\_\_

\_\_\_\_\_ (blank) \_\_\_\_\_

Persons wishing to present testimony at a hearing are requested to contact the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477, (717) 787-4526 at least 1 week in advance of the hearing to reserve a time to present testimony. Oral testimony is limited to 5 minutes for each witness. Witnesses are requested to submit three written copies of their oral testimony to the hearing chairperson at the hearing. Organizations are limited to designating one witness to present testimony on their behalf at each hearing.

Persons in need of accommodations as provided for in the Americans with Disabilities Act of 1990 should contact the Board at (717) 787-4526 or through the Pennsylvania AT&T Relay Service at (800) 654-5984 (TDD) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

PATRICK McDONNELL,  
Chairperson