Regulatory Analysis Form

(Completed by Promulgating Agency)

(All Comments submitted on this regulation will appear on IRRC's website)

INDEPENDENT REGULATORY REVIEW COMMISSION

(1) Agency

Environmental Protection

(2) Agency Number: 7

Identification Number: 553

IRRC Number**:** **3260**

(3) PA Code Cite:

25 Pa. Code Chapters 93 and 96

(4) Short Title:

Water Quality Standards – Manganese and Implementation

(5) Agency Contacts (List Telephone Number and Email Address):

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(6) Type of Rulemaking (check applicable box):

- ☐ Proposed Regulation
- ☒ Final Regulation
- ☐ Final Omitted Regulation
- ☐ Emergency Certification Regulation;
- ☐ Certification by the Governor
- ☐ Certification by the Attorney General

(7) Briefly explain the regulation in clear and nontechnical language. (100 words or less)

Section 303(c)(1) of the Federal Clean Water Act (CWA) requires that states periodically, but at least once every three years, review and revise as necessary, their water quality standards to reflect current scientific knowledge and recommendations. Further, states are required to protect existing uses of their waters. This final regulation is undertaken as part of the Department of Environmental Protection's (Department) ongoing review of Pennsylvania's Water Quality Standards (WQSs).

In the proposed rulemaking, the Environmental Quality Board (Board) proposed 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 proposed to delete the existing manganese numeric 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 and 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 when exposure to levels necessary to maintain adequate health are exceeded. Additionally, the amendments proposed two alternative points of compliance for the proposed manganese criterion. The first alternative point of compliance proposed to amend § 96.3(d) to move the point of compliance to the point of all existing or planned surface potable water supply withdrawals. The second alternative point of compliance maintained the existing point of compliance in all surface waters (i.e., at or near the point of discharge). The proposed regulations, set forth in Annex A, presented both alternatives for consideration.

For this final-form rulemaking, the Board is amending 25 Pa. Code Chapter 93. The amendments delete the existing manganese criterion of 1.0 mg/L from Table 3 at § 93.7, which was established for the protection of

the Potable Water Supply use, and add a manganese criterion of 0.3 mg/L to Table 5 at § 93.8c designed to protect human health from the neurotoxicological effects of manganese when exposure to levels necessary to maintain adequate health are exceeded. The point of compliance for the manganese criterion is in all surface waters (i.e., at or near the point of discharge) consistent with § 96.3(c) (relating to water quality protection requirements) and § 96.3(d) is not amended.

(8) State the statutory authority for the regulation. Include <u>specific</u> statutory citation.

This final-form rulemaking is being made under the authority of sections 5(b)(1) and 402 of The Clean Streams Law (35 P.S. §§ 691.5(b)(1) and 691.402), which authorize the Board to develop and adopt rules and regulations to implement The Clean Streams Law (35 P.S. §§ 691.1—691.1001). Additional authority for this final-form 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 shall be met, consistent with the exception in 25 Pa. Code § 96.3(d) (relating to water quality protection requirements)." In addition, 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 the State 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)).

(9) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.

Act 40 of 2017 added subsection (j) to Section 1920-A of The Administrative Code of 1929, 71 P.S. § 510-20(j), which requires the following: "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 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."

Under sections 4, 5, and 402 of The Clean Streams Law (CSL), the Department has the duty to formulate regulations that prevent and eliminate water pollution. "Pollution" is defined by the law 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. §§ 691.4, 691.5, and 691.402) 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 (71 P.S. § 510-20(b)). 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.

In addition, it is the duty of the Department, pursuant to Section 5 of the CSL, to consider water quality management, pollution control in the watershed as a whole, as well as the present and possible future uses of waters in adopting regulations.

Section 303(c) of the Federal CWA and 40 CFR Part 131 require states to develop WQSs 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)).

(10) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

Change in Water Quality Criteria

Because the manganese water quality criterion designed to be protective of the Potable Water Supply use has been in place, without comprehensive reevaluation, since it was adopted as a statewide standard in 1979, the Department reviewed current scientific and current toxicological information to comprehensively evaluate the manganese standard as it relates to the water uses identified in § 93.3 (related to protected water uses) and, in particular, to determine the need to develop manganese toxics criteria related to human health and aquatic life exposure. Because Act 40 of 2017 involved proposing a regulation that moved the point of compliance for manganese, it was necessary to consider the appropriate criterion to protect human health, the Potable Water Supply use and the other protected water uses in Chapter 93.

The purpose of developing WQSs is to protect the uses and users of Pennsylvania's surface waters. Pennsylvania's surface waters, through the WQSs program, are protected for a variety of uses including: drinking water supplies for humans, livestock, and wildlife; industrial water supplies; irrigation for crops; aquatic life uses; and recreation and fish consumption. All of the residents and visitors of this Commonwealth will benefit from updating the Chapter 93 WQSs to include a water quality criterion for manganese of 0.3 mg/L because it provides the appropriate level of water quality protection for all water uses and users of the surface waters. Current scientific data demonstrates that manganese is a neurotoxin when levels to maintain adequate health are exceeded, and that early life stages, including the developing fetus, infants and children, are particularly susceptible to the negative neurodevelopmental effects of manganese. It also is widely known that high levels of manganese are toxic to aquatic life.

Change in Point of Compliance

The need to propose a change to the point of compliance for the manganese criterion was driven by Act 40 of 2017. See the response to question #9.

Under the first alternative point of compliance, movement of the point of compliance away from discharges and to the point of all downstream existing or planned surface potable water supply withdrawals would be beneficial to facilities that have National Pollutant Discharge Elimination System (NPDES) permits to discharge manganese in their wastewater. It would reduce monitoring and treatment costs for these discharging facilities, which includes mining industry discharges.

Under the second alternative point of compliance, which would maintain the point of compliance in all surface waters (i.e., at or near the point of discharge), the manganese criterion would provide protection of human health and would be applicable in all surface waters. Application of the criterion in all surface waters

will protect all other water uses, including potable water supplies and aquatic life. It is widely known that high levels of manganese are toxic to aquatic life. By protecting the water uses, and the quality of the water necessary to maintain the uses, benefits may be gained in a variety of ways by all residents and visitors of the Commonwealth. For example, clean surface water used as source water for drinking water supplies benefits consumers by lowering drinking water treatment costs and reducing medical costs associated with drinking water-related illnesses. Additionally, by maintaining water quality standards, clean surface water is available for irrigation of crops and livestock and for use in industrial processes. Clean surface waters also benefit the Commonwealth by providing for increased tourism and recreational use of the waters. Clean water provides for increased wildlife habitat and more productive fisheries.

Final-Form Rulemaking Update to the Point of Compliance

The Department received numerous comments on two alternative points of compliance for the manganese criterion during the proposed rulemaking public comment period.

Under the first alternative in the proposed rulemaking, the point of compliance would have been moved away from discharges and to the point of all downstream existing or planned surface potable water supply withdrawals. This amendment would have benefited facilities that have NPDES permits to discharge manganese in their wastewater by reducing the monitoring and treatment costs for these discharging facilities, which include mining industry discharges. The Department received comments on the proposed rulemaking from 28 commentators in support of moving the point of compliance to the point of downstream potable water supply withdrawals. One commentator estimated that the mining industry would save upwards of one million dollars per year on treatment chemicals if the proposed first alternative point of compliance were implemented.

Under the second alternative in the proposed rulemaking, the manganese criterion would provide protection of human health and would be applicable in all surface waters. Application of the criterion in all surface waters protects all water uses, including potable water supplies and aquatic life. This amendment would benefit all residents of and visitors to this Commonwealth. Agricultural operations, various industries, wildlife and aquatic organisms would also benefit from the reduction of manganese in surface waters of the Commonwealth. The Department received comments on the proposed rulemaking from approximately 804 commentators in support of maintaining the point of compliance in all surface waters.

Based on the overwhelming public support for the second alternative point of compliance in the proposed rulemaking and on the Department's comprehensive review of the manganese water quality criterion in accordance with all applicable laws and statutes, this final-form rulemaking leaves the manganese criterion applicable in all surface waters in accordance with § 96.3(c).

By protecting the water uses, and the quality of the water necessary to maintain the uses, benefits may be gained in a variety of ways by all residents of and visitors to this Commonwealth. For example, clean surface water used as source water for drinking water supplies benefits consumers by lowering drinking water treatment costs and reducing medical costs associated with drinking water-related illnesses. Additionally, by maintaining WQSs, clean surface water is available for irrigation of crops and livestock and for use in industrial processes. Clean surface waters also benefit the Commonwealth by providing for increased tourism and recreational use of this Commonwealth's waters. Clean water provides for increased wildlife habitat and more productive fisheries. See the response to question # 17 for more detailed information on the benefits of the final regulation.

(11) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

The United States Environmental Protection Agency (EPA) has a national water quality criterion recommendation for manganese of 0.05 mg/L for water + organism and 0.1 mg/L for organism only based on consumption of marine mollusks. EPA's recommendation of 0.05 mg/L is based on aesthetic effects and is not related to human health or toxicity. The ambient water quality criterion for manganese in this final-form rulemaking of 0.3 mg/L is not more stringent than these federal standards. The Federal CWA section 303(c)(2)(A) requires that Pennsylvania develop water quality criteria that are protective of existing and designated uses if such protection is deemed necessary for Pennsylvania's surface waters. The ambient water quality criterion for manganese for the protection of human health at 25 Pa. Code § 93.8c, Table 5 in this final-form rulemaking is necessary since manganese is discharged through wastewater from industrial facilities and is a pollutant found in many Pennsylvania streams. Current scientific literature identifies manganese as a neurotoxin when the level necessary to maintain adequate health is exceeded. This final-form rulemaking was developed to provide the appropriate protection for human health, including infants and children, from manganese exposure associated with surface waters.

(12) How does this regulation compare with those of the other states? How will this affect Pennsylvania's ability to compete with other states?

Other states are also required to evaluate, adopt and maintain WQSs to protect surface waters from pollution, based on the federal mandate in section 303(c) of the Federal CWA and 40 CFR Part 131. As stated in the response to question #11, manganese is present in permitted discharges to waters of this Commonwealth, and the CWA requires states to develop WQSs for the purpose of establishing effluent limitations in wastewater discharges. Not every state has industries (e.g., the mining industry) that actively discharge manganese to surface waters. Likewise, other states may have adopted WQSs for pollutants that are not present in wastewater effluents discharged into Pennsylvania surface waters. Thus, while every state must follow the requirements of the Federal CWA and evaluate discharges of wastewater for WQSs development, individual states evaluate and adopt water quality criteria specific to their protected water uses and the characteristics of their wastewater discharges. In addition, the timeline on which individual states evaluate and adopt or revise their WQSs, including any evaluation of specific water quality criteria, can vary significantly from state to state.

The amendments in this proposed rulemaking are not expected to put Pennsylvania at a competitive disadvantage to other states since other states with similar geology, resource extraction activities or industries to Pennsylvania also have similar obligations under the federal CWA and a need for such protections.

See "Table 1. Ambient surface water quality criteria for manganese in other states" on the following page.

Final-Form Rulemaking Update

The Board received comments from several commentators regarding other states' water quality standards, which are summarized in the table below. The Department conducted a review of other states' manganese criteria and worked with the Association of Clean Water Administrators (ACWA) to gather information from other participating states nationwide. As noted in Table 1 below, ten states plus the District of Columbia have adopted water quality criteria for manganese, and nearly all of the states with criteria completed their evaluation of manganese and adopted their criteria many years ago.

New York has a Potable Water Supply use criterion for manganese of 0.3 mg/L, the same as the human health criterion in this final-form rulemaking. Five states – Alaska, Colorado, Nebraska, New Hampshire and Wyoming – have human health or Potable Water Supply use criteria for manganese of 0.05 mg/L, lower than the human health criterion in this final-form rulemaking. Presently, only three states – Arizona, West Virginia and Illinois – have human health or Potable Water Supply use criteria similar to Pennsylvania's current Potable Water Supply use criterion of 1.0 mg/L.

West Virginia adopted its current manganese criterion of 1.0 mg/L in 1980 to be consistent with Pennsylvania. At that time, the criterion applied to specific streams by name and not by protected water use categories. A much broader protection of waters, which included all waters designated as "Water Supply Public", occurred in 1986. Movement of the compliance point for the criterion from the point of discharge to the 5-mile zone immediately upstream of a known water supply was added to West Virginia's WQSs in 2001, but the change in compliance point was initially disapproved by EPA. It was subsequently approved by EPA in 2005.

In 2011-2012, Illinois adopted aquatic life use criteria for manganese and increased their Potable Water Supply use criterion from 0.15 mg/L to 1.0 mg/L. It is important to note that Illinois stated in their support documents for their rulemaking that manganese levels averaging around 1.0 mg/L are common in southern Illinois streams and appear to be due to natural conditions based on total maximum daily load (TMDL) evaluations that were completed in that region of the state. Thus, the 1.0 mg/L levels of manganese encountered in Illinois are natural and not due to discharges of manganese, unlike in Pennsylvania.

The Department is not aware of any states, including those listed in Table 1, that have evaluated the current toxicological data on manganese with respect to the development of a water quality standard for manganese.

Table 1. Ambient surface water quality criteria for manganese in other states.

State	Protected Use(s)					
	Human Health		Aquatic Life		Agriculture	Potable Water Supply
	Water + Fish	Fish Consumption	Acute	Chronic		
New York	-	-	-	-	-	0.3 mg/L
West Virginia	1.0 mg/L[1]	-	5.0 mg/L[2]	-	-	-
Washington, D.C.	-	0.1 mg/L[3]	-	-	-	-
Alaska	0.05 mg/L	0.1 mg/L	-	-	0.2 mg/L[4]	-
Arizona	0.98 mg/L	-	-	-	10.0 mg/L[4]	-
Colorado	-	-	2.986 mg/L[5]	1.650 mg/L[5]	0.2 mg/L	0.05 mg/L
Illinois	-	-	0.004181 mg/L[6]	1.778 mg/L[6]	-	1.0 mg/L
Maine	-	0.1 mg/L	-	-	-	-
Nebraska	-	-	-	1.0 mg/L	-	0.05 mg/L
New Hampshire	0.05 mg/L	0.1 mg/L	-	-	-	-
Wyoming	-	-	3.110 mg/L[6]	1.462 mg/L[6]	-	0.05 mg/L

[1] Applies within 5-mile zone immediately upstream above a known water supply
[2] Site-specific acute criteria for manganese applies to Fly Ash Run of Daugherty Run.
[3] Class D Human Health Criteria for Metals based on Total Recoverable Metals: Noncarcinogen; 30-day average.
[4] Standard is for irrigation and does not include livestock water supply.
[5] Hardness dependent equation – Value is based on a $CaCO_3$ of 100 mg/L.
[6] Hardness dependent equation – Value is based on a $CaCO_3$ of 100 mg/L – Value is based on the dissolved amount.

(13) Will the regulation affect any other regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

With respect to whether the proposed regulation may affect any other regulation, the first alternative point of compliance may affect the ability of drinking water suppliers to immediately comply with existing state and federal safe drinking water regulations. Under this alternative, the point of compliance for the manganese criterion will be at the point of any planned or existing potable water supply withdrawal. Water suppliers will likely need to conduct additional source water monitoring at their 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 water supply facilities using surface waters as their source water will need to monitor the raw water manganese levels to ensure adequate manganese removal will be achieved through their treatment processes 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 Chapter 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 the standards in 25 Pa. Code Chapter 109 (relating to safe drinking water) 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 with manganese concentrations 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."

<u>Final-Form Rulemaking Update</u>

The final-form regulation maintains the point of compliance for the manganese criterion in all surface waters consistent with the second alternative point of compliance. Since the compliance point is not being moved to the point of potable water supply withdrawal, no other regulations are affected by this final-form regulation.

(14) Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. ("Small business" is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)

Within 90 days of the effective date of Act 40 of 2017, the Department published an advance notice of proposed rulemaking (ANPR) in the *Pennsylvania Bulletin* on January 27, 2018 (48 Pa. B. 605) soliciting information necessary to prepare the rulemaking documents required by Commonwealth and Federal law to support the Board's adoption of the required proposed regulations. In response to the ANPR, the Department received comments from 15 organizations or individuals, including EPA, Pennsylvania Anthracite Council, American Rivers, PA American Water, Rosebud Mining Company, Pennsylvania Fish and Boat Commission (PFBC), Pennsylvania Coal Alliance, Counsel to the Manganese Interest Group, PennFuture, Pennsylvania Public Utility Commission (PUC), CONSOL Energy, Corsa Coal Corporation, City of Lancaster Public Works, Philadelphia Water Department, and SUEZ-FCGA.

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 of 2017 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 the proposed rulemaking. 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 the proposed rulemaking. TAC voted to concur with WRAC's motion.

<u>Final-Form Rulemaking Update</u>

The proposed rulemaking was published on July 25, 2020, and included a 60-day public comment period. During this 60-day public comment period, the Board held three virtual public hearings for the purposes of accepting comments on the proposed rulemaking on September 8, 9, and 10, 2020. The Board received public comments from 957 commentators, including testimony from 13 witnesses at the public hearings and comments from IRRC.

IRRC submitted comments on the proposed rulemaking requesting the Board seek additional input from the Mining and Reclamation Advisory Board (MRAB) and the Aggregate Advisory Board. The Department met with the MRAB on January 21, 2021, and the Aggregate Advisory Board on May 5, 2021, to present an overview of the proposed rulemaking and receive additional comments and information on the impacts of the proposed regulation. The Department received no additional comments or information from these advisory boards in response to these meetings.

The Department discussed the final-form rulemaking with WRAC on November 18, 2021. At that meeting, WRAC approved a motion that endorsed a manganese criterion of 0.3 mg/L and point of compliance at the

point of discharge, as presented in Annex A. Additionally, the Department discussed the rulemaking with the MRAB on January 20, 2022, the Aggregate Advisory Board on February 2, 2022, and TAC on February 8, 2022. MRAB passed a motion to recommend that the Board not proceed with the final-form rulemaking. TAC voted to support advancing the final-form rulemaking to EQB for consideration. The Department also presented a regulatory review to the Agricultural Advisory Board on December 9, 2021, that included the draft final water quality standard for manganese.

The Department met with members and representatives of the Pennsylvania Coal Alliance, including Rosebud Mining Company, and their legal counsel on January 17, 2020 to gather additional information from the coal mining industry on the challenges associated with manganese removal from wastewater and the different types of manganese removal treatment technologies. The Pennsylvania Coal Alliance provided copies of six NPDES permits for mining facilities, a map depicting the land availability limitations for a typical coal mining operation, and copies of two manganese toxicity studies (Yoon et al., 2019 and Song et al., 2018). In the fall of 2021, representatives of Rosebud Mining Company offered to provide a tour of their St. Michaels treatment facility to Department staff. On October 22, 2021, Department staff visited the St. Michaels treatment facility and discussed manganese removal treatment.

In addition to these efforts, the Department collaborated with several organizations and entities to gather additional data and information on manganese removal treatment technologies and the potential economic impacts of the final-form regulation. Also see the response to question #17.

(15) Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?

All persons, groups, or entities with proposed or existing point source discharges of manganese into surface waters of this Commonwealth must comply with the regulation. There are approximately 1,322 NPDES permits, including 616 non-mining permits and 706 mining permits, that currently contain manganese monitoring and report requirements or manganese effluent limits. These permits are associated with mining operations, industrial and sewage treatment facilities, food processing facilities, landfills and water supply facilities. Of the 1,322 NPDES permits, most of the 706 mining sector permits likely meet the definition of small businesses as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012. The majority of NPDES permits, approximately 923 out of 1,322 permits, are for mining-related discharges and discharges of filter backwash water from public water systems.

Under the second alternative point of compliance in the proposed rulemaking, persons with an existing NPDES permitted discharge or proposing to add a new discharge to a stream could be adversely affected upon permit renewal or issuance of a new permit if they need to provide a higher level of treatment to meet any new standard established by the 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 or the number of entities that will be affected by the regulation. Economic impacts would primarily involve the potential for higher monitoring and 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.

Under the first alternative point of compliance in the proposed rulemaking, the Department's Bureau of Safe Drinking Water estimated that approximately 280 of the 340 public water supply systems with an existing or planned potable water supply surface water withdrawal may see increased costs 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 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 or the number of entities that could be affected by the regulation. Under the first point of compliance from the proposed rulemaking, economic impacts would primarily involve the potential for higher monitoring and 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 additional treatment by public water suppliers may be necessary in areas with mining discharges if the first alternative point of compliance from the proposed rulemaking were implemented.

A review of the U.S. Small Business Size Regulations under 13 CFR Part 121 provides a standard for determining what constitutes a small business for the NAICS category relating to public water systems. A public water system falls within NAICS category 221310, Water Supply and Irrigation Systems, which comprises establishments primarily engaged in operating water treatment plants and/or operating water supply systems. The small size standard for this NAICS category is annual receipts of not more than $27.5 million.

For the 340 public water supply systems with an existing or planned potable water supply surface water withdrawal, the Department has no way to estimate annual receipts. Therefore, the Department used the federal definition of a small water system in 40 CFR 141.2, which states that a small water system is "a water system that serves 3,300 persons or fewer". For purposes of this regulatory package, a public water system owned by a private individual or investor serving less than or equal to 3,300 persons was considered to be a small business. Using this definition, there are less than 25 public water supply systems in this Commonwealth with existing or planned potable water supply surface water withdrawals that are considered small businesses.

Under the first alternative point of compliance in the proposed rulemaking, facilities with water supply intakes for use in food and beverage production or preparation, paper and textile manufacturing, aquaculture, and irrigation may also see increased costs if there is a need to provide a higher level of raw water treatment to continue meeting their industry specific standards and the need for a certain level of raw water quality. Under that alternative point of compliance, economic impacts would primarily involve the potential for higher monitoring and treatment costs for facilities located downstream of permitted manganese discharges, which would likely result in the increased costs for the goods or services provided by these facilities being passed on to consumers.

Also relevant to the first alternative point of compliance in the proposed rulemaking, in comments received on the ANPR, PFBC indicated that if source water concentrations of manganese are greater than 1.0 mg/L, there would be a need to pretreat the source water used in PFBC's fish hatchery facilities to reduce the level of manganese to an acceptable level for fish culture. There are 14 PFBC State hatcheries, 166 cooperative fish hatcheries, and several private hatcheries across Pennsylvania.

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The final-form rulemaking maintains the point of compliance in all surface waters (that is, at the point of discharge). Persons with an existing NPDES permitted discharge or proposing to add a new discharge to a stream could be adversely affected upon permit renewal or issuance of a new permit if they need to provide a higher level of treatment to meet the new manganese standard established by this final-form 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 facility- and site-specific and depend upon the size of the discharge in relation to the size of the stream plus many other factors. In fact, the Pennsylvania Coal Alliance noted similar challenges in estimating the economic impact of the proposed rulemaking on the mining industry stating "the wide range [$44-$88 million] is due to generalizations and more refined estimates would require better understanding of flow, chemistry and treatment at each NPDES permit location". For these reasons and given that there are currently over 1,300 NPDES permits containing manganese requirements, the Department can only estimate the economic impact of this final-form regulation on the regulated community.

During the public comment period for the proposed rulemaking, the Board received information from several mining companies and organizations on the estimated economic impacts that could result from the new criterion being applied at the point of discharge. See the responses to questions #17 and #19 for more detailed information on how facilities may be affected financially.

Generally speaking, the Department expects that the financial impacts would primarily involve the potential for higher monitoring and treatment costs for permitted discharges to streams to comply with the new water quality criterion for manganese. It is important to recognize that 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.

(16) List the persons, groups or entities, including small businesses, that will be required to comply with the regulation. Approximate the number that will be required to comply.

All persons, groups, or entities with proposed or existing point source discharges of manganese into surface waters of the Commonwealth must comply with the regulation. There are approximately 1,322 NPDES permits that currently contain either manganese monitor and report requirements or numeric manganese effluent limitations. These permits are generally associated with mining operations, industrial and sewage treatment facilities, food processing facilities, landfills, and water supply facilities. Of the 1,322 NPDES permits, most of the 706 mining sector permits likely meet the definition of small businesses as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012. Note, while the new manganese criterion will be implemented uniformly, it will not result in a uniform effluent limitation for all discharges. This regulation will not result in a water quality-based effluent limitation of 0.3 mg/L for all discharges when considering mixing and receiving water characteristics.

(17) Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.

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. Improving, maintaining, and restoring water quality also protects aquatic life and provides recreational opportunities such as fishing (including fish consumption), water contact sports, and boating.

All of the Commonwealth's residents and visitors will benefit by having a manganese criterion that is protective of aquatic life. It is widely known that high levels of manganese are toxic to aquatic life. PFBC provided information indicating 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. 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 wastewater dischargers.

All of the Commonwealth's residents and visitors, both present and future, will benefit from having clean water that is protected and maintained. Any reduction in the total toxic load in the Commonwealth's waterbodies 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 water.

By implementing a human health water quality criterion for manganese in all surface waters of this Commonwealth, users downstream will not have to bear the costs associated with remediating discharge from upstream users before the water can be used. For example, lower levels of manganese in surface waters may reduce the costs incurred by downstream surface water users who have to pre-treat water for industrial or commercial use (such as, food processing and manufacturing facilities) and public water systems who have to treat water that is high in manganese at their intakes to meet Federal and Pennsylvania Safe Drinking Water Act standards. In addition, other protected water uses such as Irrigation, Livestock Water Supply, and Fishing will be protected by limiting the amount of manganese that may be discharged into surface waters of this Commonwealth.

Reduced toxics in Pennsylvania's waterways will likely increase recreational fishing and tourism to swimming and fishing locations throughout the state. Additionally, cleaner rivers and fish may lead to increased birding and wildlife viewing opportunities, as the benefits of cleaner water and less contaminated fish work themselves up the food chain, resulting in substantial economic benefits. Persons who recreate on the waters and who fish, both for sport and consumption, will benefit from better water quality protection.

A reduction in toxics found in Pennsylvania's waterways may also lead to increased property values for properties located near rivers or lakes. The study, *The Effect of Water Quality on Rural Nonfarm Residential Property Values* (Epp and Al-Ani, American Journal of Agricultural Economics, Vol 61, No. 3 (Aug. 1979)), used real estate prices to determine value of improvements in water quality in small rivers and streams in Pennsylvania. Water quality, whether measured in pH or by the owner's perception, has a significant effect on the price of adjacent property. Their analysis 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 affects the price paid for a residential property.

A 2006 study from the Great Lakes region ("*Economic Benefits of Sediment Remediation,"* www.nemw.org/Econ) 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 (approx. 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 multi-family homes as a result of toxic sediments. The same study estimated that a portion of the Sheboygan River (approx. 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 is easily transferable to Pennsylvania. A reduction in toxic pollution in Pennsylvania's waters has a substantial economic benefit to property values in close proximity to waterways.

There are economic benefits to be gained by maintaining clean water for potable and other water supply uses. Water suppliers, and their customers, may benefit from lower pretreatment costs if water is withdrawn that meets surface water quality standards. Assuring the availability of clean water will cut down on the costs to consumers for purchasing household pretreatment/water filtration systems and bottled water (*see* "*The Real Cost of Bottled Water*," San Francisco Chronicle, Feb. 18th, 2007, which estimates the cost of bottled water to be anywhere between 240 and 10,000 times more expensive than tap water). An additional benefit to greater reliance on tap water is the reduction of containers that need to be recycled or disposed of in landfills. Persons may incur a cost benefit by reducing their dependence on bottled waters and household water filtration systems based on their confidence in source water quality.

There are also economic benefits to be gained by having clearly defined remediation standards for surface waters. Under Pennsylvania's Land Recycling and Environmental Remediation Standards Act, 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. An article in the Duquesne University Law Review discusses the importance of liability limitation as "vital to the participation in the remediation process" ("*COMMENT: Pennsylvania's Land Recycling Program: Solving the Brownfields Problem with Remediation Standards and Limited Liability*," Creenan, James W. and Lewis, John Q., Duquesne University Law Review, 34 *Duq. L. Rev*. 661 (Spring 1996)). The article recognizes that "liability protection provides the missing ingredient—financial incentive—for undertaking the cleanup of an industrial site." 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.

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Outdoor recreation within the Commonwealth generates billions of dollars in annual revenues through wages and salaries, taxes, and travel-related expenses. The Commonwealth and persons who recreate on the waters and who fish, both for sport and consumption, will benefit from better water quality protection. Recreational uses are statewide protected water uses in Pennsylvania and include fishing, boating, water contact sports, and aesthetics.

In addition, maintenance of water quality eliminates the need to spend taxpayer dollars to meet additional regulatory obligations such as federally-mandated TMDLs. If a waterbody becomes impaired and is not meeting its protected water uses, the Commonwealth will be obligated to develop TMDLs and impose more stringent water quality standards. By maintaining the appropriate water quality to protect the uses, expensive remediation costs can be avoided.

All persons, groups, or entities with proposed or existing point source discharges of manganese into surface waters of the Commonwealth may be impacted financially by the final-form regulation. The financial impacts would primarily involve the potential for higher monitoring and treatment costs for some permitted discharges to streams to comply with the new water quality criterion for manganese. See the response to question #15 for more discussion on how the regulated community may be affected.

The Pennsylvania Coal Alliance submitted public comments on the proposed rulemaking, which included a treatment technology report completed by Tetra Tech. The Tetra Tech analysis concluded that annual treatment cost increases for the coal mining sector would range between $44 and $88 million and capital spent on treatment improvement projects would exceed $200 million due to pH control and other changes in treatment needed to address conflicting effluent limits for manganese and aluminum. These cost estimates were generated using the Office of Surface Mining Reclamation and Enforcement's (OSMRE) AMDTreat software.

To gather additional information on economic impacts, the Department collaborated with the Pennsylvania State University (PSU) to better understand different manganese removal treatment options and the challenges and costs associated with removing manganese from coal mine drainage.

PSU conducted a comprehensive evaluation of available manganese removal treatment options, including the potential costs associated with removing manganese from coal mine drainage, and provided a summary report of the findings to the Department.

While the PSU report (Burgos, 2021) does generally corroborate the cost estimates found in the Tetra Tech report received through public comment on the proposed rulemaking, the PSU report also highlights several limitations of the Tetra Tech evaluation and provides a more robust analysis. The Tetra Tech evaluation assumed that every NPDES discharge permit for mining operations (that is, approx. 700 permits) would require installation of treatment systems and that the treatment system utilized by every facility would be chemical precipitation water softening, which is generally the most expensive treatment option. Data from permitted mining discharges have been analyzed by the Department and by Brady and Cravotta (2015) and demonstrate that not all 706 mining permits will be affected by the regulation, either due to low levels of manganese in the influent wastewater to be treated or due to manganese levels of the treated wastewater effluent already being at or below 0.3 mg/L. Brady and Cravotta (2015) analyzed discharge data from 42 permitted facilities, which included 48 different coal mine drainage discharges. Of those 48 discharges, 14 treated discharges had manganese levels below 0.3 mg/L and an additional 11 treated discharges had manganese levels below 1.0 mg/L.

The PSU analysis takes a more balanced and comprehensive approach to the evaluation of costs based on different percentages of permits potentially affected (for example, 50% and 75% versus 100%) as well as consideration of the most cost-effective treatment options for different sizes of mining operations based on flow and other water quality characteristics. PSU noted that chemical precipitation water softening was never the most cost-effective treatment option for any category of discharge. It is also important to recognize that chemical precipitation water softening is not currently utilized by all mining facilities, and there is no reason to assume that all facilities would utilize this treatment option if this final-form regulation is promulgated.

The PSU analysis indicates that total costs to the mining industry if 75% of permits are affected are in the range of $137-$143 million in capital costs and $33-$46 million in annual operating costs. The ranges decrease to $91-$95 million in capital costs and $22-$31 million in annual operating costs if only 50% of permits are affected. These costs estimates were generated by PSU using OSMRE's AMDTreat software,

which is the same software used by Tetra Tech and the mining industry to estimate treatment costs. The different treatment systems evaluated by PSU included limestone manganese removal beds, oxidative precipitation using chemicals followed by either a limestone removal bed or sand filter, coprecipitation and sorption, and chemical precipitation water softening. The PSU report also noted that actual costs may be substantially lower than these refined costs estimates (i.e., below the low range of these costs estimates) if sites are able to utilize existing treatment infrastructure or if the relatively few deep mines with larger flows are able to remove dissolved manganese using the coprecipitation and sorption option.

Furthermore, the PSU analysis indicates that, on an equal flow basis, capital costs for both the drinking water industry and the coal industry would be similar and, on an equal manganese (II) load basis, annual operating costs for both industries would be similar.

(18) Explain how the benefits of the regulation outweigh any cost and adverse effects.

Section 4 of the CSL (Declaration of Policy) clearly states "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).

Under the first alternative point of compliance, adverse effects may occur at an existing or planned potable water supply. A surface water supplier may see increased costs 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. Facilities with water supply intakes for use in food and beverage production or preparation, paper and textile manufacturing, aquaculture, and irrigation may also see increased costs if there is a need to provide a higher level of raw water treatment.

Under the second alternative point of compliance, adverse effects associated with the adoption of new criteria may take the form of additional wastewater treatment requirements. Sometimes these requirements require costly upgrades. If new criteria apply to a facility and if treatment requirements require significant and costly changes operationally, there are regulatory mechanisms in place, through the NPDES permitting program, to manage an appropriate schedule for meeting the new standards.

Health and welfare benefits to all residents of and visitors to this Commonwealth accrue from protecting the surface waters of the Commonwealth at the appropriate level. The benefits from substantial revenue and jobs associated with clean drinking water, recreational fisheries, and other industries that rely on clean water, outweigh the cost and adverse effects associated with selective effluent treatment technology for those who discharge pollutants to the surface waters.

Protection of water quality, up front, reduces the need for costly remedial measures that are often difficult to retrofit. In addition, maintenance of water quality eliminates the need for spending taxpayer dollars to meet additional regulatory obligations such as federally mandated TMDLs. If a waterbody becomes impaired and is not meeting its protected water uses, the Commonwealth will be obligated to develop TMDLs and impose more stringent WQSs. By maintaining the appropriate water quality to protect the uses, expensive remediation costs can be avoided.

By maintaining the point of compliance at the point of discharge, adverse effects associated with the adoption of new criteria may take the form of additional wastewater treatment requirements for some individuals with NPDES permits. In some cases, these additional treatment requirements may necessitate costly upgrades. However, there are regulatory mechanisms in place through the NPDES permitting program

to manage an appropriate schedule for meeting the new WQSs if new water quality criteria apply to a facility and if treatment requirements require significant and costly changes operationally.

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The final-form regulation maintains the point of compliance at the point of discharge.

Also, see the responses to questions #15 and #17.

(19) Provide a specific estimate of the costs and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

For both alternative points of compliance, specific estimates of treatment costs and savings cannot be determined at this time because each activity affected by this regulation must be reviewed based on site-specific considerations.

Under the first alternative point of compliance, regulated wastewater dischargers may experience cost savings through reduced monitoring and treatment costs associated with removing manganese from their permitted discharges. However, regulated public water suppliers with an existing or planned potable water supply surface water withdrawals may see increased costs since there will be a need to conduct additional source water monitoring, and some facilities may 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.

Under the second alternative point of compliance, the compliance and treatment costs for regulated wastewater dischargers may increase based on site-specific considerations. These site-specific considerations include, but are not limited to, the size, flow volume, and the chemical, biological, and physical properties of both the receiving water and the effluent discharge. These unique parameters result in a site-specific analysis. Conversely, this alternative may result in cost savings to the drinking water suppliers as manganese levels in source waters will be lower and less treatment will be necessary to meet drinking water regulations.

The Department is required to establish monitoring requirements and/or water quality-based effluent limitations for the discharge of pollutants in an NPDES permit. There are factors that may be considered by the Department that may result in the modification of effluent limitations or the deadline by which compliance with limitations must be achieved. Cost and/or savings may be affected by the remedial measures leading to compliance with the effluent limitations. Based on site-specific evaluations, effluent limitations developed based on new water quality criteria may be modified, or more time for compliance may be granted under applicable regulations.

Information on the analytical laboratory costs, based on the analytical method used, can be obtained from the National Environmental Methods Index (NEMI) website. This website can be used to access most EPA approved analytical methods (www.nemi.gov). Based upon current information in NEMI, analytical costs for manganese water samples can be expected to range between $50-$400 and vary based upon the analytical method used.

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The final-form rulemaking maintains the point of compliance for the manganese criterion at the point of discharge. The Department is required to establish wastewater discharge effluent limitations for pollutants in NPDES permits. Such limitations will be the more stringent of either technology-based or water quality-based effluent limitations, as appropriate. With respect to this regulation, the compliance and treatment costs for NPDES-permitted wastewater dischargers may increase based on discharge- and site-specific considerations. These considerations include, but are not limited to, the size, flow, chemical, biological, and other physical properties of both the receiving water and the effluent discharge. Additionally, some dischargers must comply with technology-based effluent limitations or other best available technology limits developed for their industry. As such, specific estimates of treatment costs and savings for every one of the more than 1,300 potentially affected dischargers of manganese are not feasible to determine at this time because each activity affected by this regulation must be reviewed based on site-specific considerations. In comments submitted on the proposed rulemaking, the Pennsylvania Coal Alliance noted similar challenges in estimating the economic impact on the mining industry stating "the wide range [$44-$88 million] is due to generalizations and more refined estimates would require better understanding of flow, chemistry and treatment at each NPDES permit location".

It is also important to note there are additional factors that may be considered by the Department and which may result in the modification of effluent limitations or the deadline by which compliance with the limitations must be achieved. Cost and/or savings may be affected by the remedial measures leading to compliance with the effluent limitations.

The Department received limited information from the mining industry on the potential economic impacts during the public comment period of the proposed rulemaking. Pennsylvania Coal Alliance, based on an evaluation completed by Tetra Tech, indicated the overall costs to achieve compliance with the 0.3 mg/L criterion could range between $44-$88 million in annual costs (that is, for active treatment systems using chemical addition for manganese removal) and upwards of $200 million in capital costs. Of that total amount, increased alkaline chemical costs were projected to be between $15 and $40 million annually depending upon the chemical used (that is, lime versus sodium hydroxide). Increased sludge handling fees would be $5 to $10 million annually, and increased one-time capital costs for tanks and chemical feed systems would be $20 to $40 million. If aluminum is also present in the wastewater discharge, additional costs could be incurred.

The Department also received economic information from several NPDES-permitted dischargers. The New Enterprise Stone & Lime Company stated that six of their 51 NPDES permits would require additional treatment to comply with a water quality standard of 0.3 mg/L. Anticipated combined costs for all six permits were estimated at $320,000 for capital investments (that is, expansion of existing treatment tanks and new treatment equipment) and $450,000 in annual operating costs. This commentator also noted that additional staff may be necessary, and land availability issues could limit expansion of treatment systems.

Shenango, LLC holds seven NPDES permits for postmining discharges and indicated that two of the seven NPDES permits must comply with manganese effluent limitations based on the 1.0 mg/L manganese criterion. If a human health criterion of 0.3 mg/L is adopted and implemented at the point of discharge, they expect all seven permits will require treatment to remove manganese. This commentator stated that the addition of manganese effluent limitations to the remaining five permits would necessitate the installation of additional treatment systems at a cost of approximately $650,000, which is generally equivalent to the present-day capital cost for all seven systems. Shenango, LLC operates passive treatment systems and

expressed concern over the lack of land area to install larger, or additional, treatment ponds at some discharge locations.

Talon Energy Supply, LLC owns and operates the Rushton acid mine discharge (AMD) treatment plant, which treats pumped water from a flooded underground deep mine complex. If new effluent limitations are imposed at this facility based on a water quality criterion of 0.3 mg/L, the commentator anticipates needing to replace the existing clarifier system at an overall capital cost of $30 million, including more than $9 million for new clarifiers and more than $20 million for microfiltration. Estimated annual operating costs would be expected to exceed $2 million.

By maintaining the point of compliance at the point of discharge, this final-form rulemaking may result in cost savings to drinking water suppliers as manganese levels in source waters will be lower and less treatment will be necessary to meet drinking water regulations.

Projects that are proposed to ensure compliance with effluent limits in an NPDES permit may need to implement a treatment works project. These proposals may be for treatment and discharge of sewage or industrial wastewater. Generally, the implementation of these types of projects are eligible for funding under the Federal State Revolving Fund program which is implemented by the Pennsylvania Infrastructure Investment Authority (PENNVEST) and DEP. Funding consideration is based on project eligibility, project ranking, and recommendation to the PENNVEST Board for funding. Private Sector funding is typically limited to low interest loans while public entities may be eligible for principal forgiveness.

See the response to question #17 for additional information on potential economic impacts and costs to the regulated community.

(20) Provide a specific estimate of the costs and/or savings to the local governments associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

No costs will be imposed directly upon local governments by this regulation. This proposed rulemaking is based on and will be implemented through existing Department programs, procedures, and policies. Certain municipally-owned water suppliers that treat surface water or municipally-owned wastewater treatment plants that discharge manganese to surface waters may be affected by this regulation as described in the response to question #15. The costs associated with permits and performance or design requirements will be site-specific and depend upon the alternative point of compliance for the proposed criterion.

Under the first alternative point of compliance in the proposed rulemaking, municipally-owned water suppliers may realize increased treatment costs if the level of manganese increases at their point of surface water withdrawal. Based on information provided by the Pennsylvania PUC, the Local Government Association estimates that for a small water treatment plant: "…a municipal water authority operating a 1 MGD (million gallons/day) water treatment plant, estimated an additional annual cost of $20,000 just for chemical usage (Potassium Permanganate) to treat manganese". Regarding the first alternative point of compliance in the proposed rulemaking, the Local Government Association further states that, "diligent monitoring and sampling would be required by operators to ensure removal to prevent unpleasant taste and odor, discoloration and staining, and potential health impacts from high Manganese levels."

Under the second alternative point of compliance in the proposed rulemaking, the compliance and treatment costs for municipally-owned wastewater treatment plants may increase if manganese is present in the discharge, but each facility will require an evaluation based on site-specific considerations. No additional

costs are expected for local governments that own public water supplies under this alternative because manganese in wastewater discharges would be treated to achieve compliance with the proposed criterion at the point of discharge.

In addition to cost savings, under the second alternative point of compliance, a municipality may derive additional revenue and employment from the outdoor recreation and tourism industries when waters are protected by the proposed manganese criterion.

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This final-form regulation is based on, and will be implemented through, existing Department programs, procedures, and policies. Certain municipally-owned water suppliers or municipally-owned wastewater treatment plants that discharge manganese to surface waters may be affected by this regulation as described in the response to question #15. The costs associated with permits and performance or design requirements will be site-specific as described in the responses to questions #15 and #19.

The final-form rulemaking maintains the point of compliance at the point of discharge (i.e., the second alternative point of compliance in the proposed rulemaking). Under this point of compliance, the compliance and treatment costs for municipally-owned wastewater treatment plants may increase if manganese is present in their discharges, but each facility will require an evaluation based on site-specific considerations as detailed in the responses to questions #15 and #19. The Department did not receive any specific cost estimates or data from municipally-owned wastewater treatment plants during the public comment period for the proposed rulemaking.

No additional costs are expected for local governments that own and operate public water supplies under this final-form rulemaking because manganese in wastewater discharges would be treated to achieve compliance with the criterion at the point of discharge, which is expected to result in either no change to or a decrease in levels of manganese in surface water sources. Public water systems that have NPDES permits to discharge filter backwash water are also not expected to be widely affected based on the application of a Department-derived best available technology (BAT) limit that is specific to public water systems. The Department recognizes that some public water systems could be affected if an effluent limitation more stringent than the BAT limit would be needed to comply with the manganese water quality criterion. However, several public water systems indicated in their public comments that it would be cheaper to address manganese removal in their wastewater effluent than in the source water used to supply potable water.

Projects that are proposed to ensure compliance with effluent limits in an NPDES permit may need to implement a treatment works project. These proposals may be for treatment and discharge of sewage or industrial wastewater. Generally, the implementation of these types of projects are eligible for funding under the Federal State Revolving Fund (SRF) program which is implemented in Pennsylvania by the Pennsylvania Infrastructure Investment Authority (PENNVEST) and the Department. SRF funding consideration is based on project eligibility, project ranking, and recommendation to the PENNVEST Board. SRF funding to private-sector entities is typically limited to low interest loans while public entities may be eligible for principal forgiveness.

Regarding savings to local governments, the final-form regulation may result in cost savings for municipalities that utilize surface waters of the Commonwealth as a source of drinking water since manganese levels in surface water sources are expected to decrease as a result of the regulation, which could translate to less treatment being required to meet safe drinking water regulations. Furthermore, a municipality may derive additional revenue and employment from the outdoor recreation and tourism

industries when water uses are protected by water quality criteria for toxic substances, including the human health manganese criterion.

(21) Provide a specific estimate of the costs and/or savings to the <u>state government</u> associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

No costs will be imposed directly upon state government by this regulation. The proposed rulemaking is based on and will be implemented through existing Department programs, procedures, and policies. However, certain state agencies that operate regulated drinking water supplies or wastewater treatment plants that discharge manganese to surface waters may be affected by this regulation as described in the response to question #15. The costs associated with permits and performance or design requirements will be site-specific.

Under the first alternative point of compliance, state-owned wastewater treatment plants will benefit from the proposed regulation through reduced monitoring and treatment costs associated with removing manganese from their permitted discharges. In addition, bond forfeiture sites for mining activities where the Commonwealth is responsible for mine drainage treatment would potentially have a reduction in treatment costs. However, state agencies that provide drinking water may realize increased treatment costs if the level of manganese increases at their point of surface water withdrawal.

Under the second alternative point of compliance, the compliance and treatment costs for the state-operated wastewater plants may increase. However, this alternative should also result in cost savings for the state agencies that provide drinking water since manganese levels in source waters will be lower and less treatment will be necessary to meet drinking water regulations.

In addition to cost savings, under the second alternative point of compliance, the state may derive additional revenue and employment from the outdoor recreation and tourism industries when waters are protected by the proposed manganese criterion.

Also, see responses to questions #17 and #20.

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This final-form rulemaking is based on, and will be implemented through, existing Department programs, procedures, and policies. State agencies that operate regulated drinking water supplies or wastewater treatment plants that discharge manganese to surface waters may be affected by this regulation as described in the response to question #15. The costs associated with permits and performance or design requirements will be site-specific as described in the responses to questions #15 and #19.

The final-form regulation maintains the point of compliance at the point of discharge (i.e., the second point of compliance from the proposed rulemaking). Under this point of compliance, the compliance and treatment costs for the state-operated wastewater plants may increase if manganese is present in the discharge, but each facility will require an evaluation based on site-specific considerations as detailed in the responses to questions #15 and #19. However, this point of compliance will also result in cost savings for the state agencies that provide drinking water since manganese levels in source waters will be lower and less treatment will be necessary to meet drinking water regulations. The Department did not receive any specific cost estimates or data from state-owned wastewater treatment plants.

No additional costs are expected for state government entities that own public water supplies under this final-form rulemaking because manganese in wastewater discharges would be treated to achieve compliance with the proposed criterion at the point of discharge. Public water systems that have NPDES permits to discharge filter backwash water are also not expected to be widely affected based on the application of a Department-derived BAT limit that is specific to public water systems. The Department recognizes that some public water systems could be affected if an effluent limitation more stringent than the BAT limit would be needed to comply with the manganese water quality criterion. However, several public water systems indicated in their public comments that it would be cheaper to address manganese removal in their wastewater effluent than in the potable water supply.

Regarding savings to state government, the final-form regulation should result in cost savings for the state agencies that provide drinking water since manganese levels in source waters will be lower and less treatment will be necessary to meet drinking water regulations. Also, additional state government revenue may be derived from the outdoor recreation and tourism industries when waters are protected by the human health manganese criterion.

Also, see the responses to questions #17 and #20.

(22) For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

As detailed in the responses to questions #15 and #19, each activity that will result in a discharge of pollutants to waters of this Commonwealth requires a review that is based on site-specific considerations, including the specific levels of manganese expected or known to be in the discharge to waters of this Commonwealth, as well as the physical and chemical properties of the receiving water. Existing Department procedures will be used to implement this regulation.

Persons with existing, or proposing new or expanded, activities or projects which result in discharge of manganese to waters of the Commonwealth will be required to implement treatment of effluent and the appropriate protections to meet the WQSs established by this regulation. These requirements are generally implemented upon renewal or amendment of existing NPDES permits.

(22a) Are forms required for implementation of the regulation?

No additional forms are required as a result of this regulation.

(22b) If forms are required for implementation of the regulation, attach copies of the forms here. If your agency uses electronic forms, provide links to each form or a detailed description of the information required to be reported. Failure to attach forms, provide links, or provide a detailed description of the information to be reported will constitute a faulty delivery of the regulation.

N/A

(23) In the table below, provide an estimate of the fiscal savings and costs associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

	Current FY (2020-21)	**FY +1** (2021-22)	**FY +2** (2022-23)	**FY +3** (2023-24)	**FY +4** (2024-25)	**FY +5** (2025-26)
SAVINGS:	**$**	**$**	**$**	**$**	**$**	**$**
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Savings	"	"	"	"	"	"
COSTS:						
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Costs	"	"	"	"	"	"
REVENUE LOSSES:						
Regulated Community	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable	Not Measurable
Local Government	"	"	"	"	"	"
State Government	"	"	"	"	"	"
Total Revenue Losses	"	"	"	"	"	"

(23a) Provide the past three-year expenditure history for programs affected by the regulation.

Program	**FY -3** (2018-19)	**FY -2** (2019-20)	**FY -1** (2020-21)	**Current FY** (2021-22)
160-10381 Enviro Protection Operations	$93,190,000	$84,023,000	$94,202,000	$98,036,000
161-10382 Enviro Program Management	$30,932,000	$27,920,000	$32,041,000	$34,160,000

(24) For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following:

(a) An identification and estimate of the number of small businesses subject to the regulation.

Persons with proposed or existing discharges into surface waters of the Commonwealth must comply with the regulation. Also, see the response to question #15.

(b) The projected reporting, recordkeeping, and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.

As detailed in the responses to questions #15 and #19, each activity that will result in a discharge of pollutants to waters of this Commonwealth requires a review that is based on site-specific considerations. NPDES permits and other approvals will be required for discharges to surface waters, using the water quality criteria and standards identified in the regulations. Existing Department procedures will be used to implement this final-form regulation.

(c) A statement of probable effect on impacted small businesses.

As detailed in the responses to questions #15 and #19, each activity that will result in a discharge of pollutants to waters of this Commonwealth requires a review that is based on site-specific considerations. NPDES permits and other approvals will be required for discharges to surface waters, using the water quality criteria and standards identified in the regulation. Existing Department procedures will be used to implement this final-form regulation.

(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

There were no non-regulatory alternatives or less intrusive methods available to consider in order to achieve the purpose of this regulation.

In addition to the flexibility afforded by the regulatory mechanisms in the NPDES permitting program, the water quality standards regulations include a provision that allows for the development of site-specific water quality criteria, in lieu of the statewide criteria, under certain circumstances. In particular, in accordance with § 93.8d(a), if site-specific biological or chemical conditions of the receiving waters differ from the conditions upon which the statewide criteria are based, or there exists a need for a site-specific criterion for a substance not listed in § 93.8c, Table 5, the Department will consider a request for site-specific criteria. A discharger has the opportunity to weigh the costs of developing a site-specific standard against the usage of an existing statewide standard.

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Since manganese is a toxic substance being added to § 93.8c, Table 5, for the protection of human health, there will not be a need to develop a site-specific criterion under § 93.8d(a). There is flexibility afforded by the regulatory mechanisms in the NPDES permitting program. Additional factors may be considered by the Department which may result in the modification of effluent limitations or the deadline by which compliance with the limitations must be achieved. Cost and/or savings may be affected by the remedial

measures leading to compliance with the effluent limitations. Based on site-specific evaluations, effluent limitations developed based on new water quality criteria may be modified, or more time for compliance may be granted under applicable regulations.

(25) List any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, the elderly, small businesses, and farmers.

There are no such provisions in this rulemaking.

(26) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

Two alternative regulatory schemes were proposed for consideration in achieving the correct level of protection for the waters of the Commonwealth. The amendments proposed 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 (First Alternative Point of Compliance); or all surface waters, near the point of discharge (Second Alternative Point of Compliance). The first alternative complies with Act 40 of 2017 and the second alternative is consistent with the CSL and Pennsylvania's existing water quality program as it relates to toxic pollutants, since manganese is a neurotoxin at exposure levels beyond those necessary to maintain adequate health.

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Based on the Department's comprehensive review of the manganese water quality criterion in accordance with all applicable laws and statutes, the final-form rulemaking maintains the point of compliance for the human health manganese criterion in all surface waters in accordance with § 96.3(c). This point of compliance represents the least burdensome option for public water systems and other downstream water users, who are not responsible for the pollution caused by manganese but who are responsible for treating the source water to meet stringent regulatory limits for the safe delivery of drinking water to consumers or other such standards required for agricultural, industrial, or other protected water supply uses.

(27) In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including:

(a) The establishment of less stringent compliance or reporting requirements for small businesses.

This rulemaking does not establish or revise compliance or reporting requirements for small businesses. There was no less stringent compliance or reporting requirements to consider in this case. Any water quality criteria that are less stringent than those recommended by the Department and accepted by the Board in the rulemaking would not be protective enough for the waters of the Commonwealth and would negate the benefits listed in the response to question #17. The rulemaking reflects the results of a scientific evaluation of regulatory criteria.

(b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses.

There were no non-regulatory alternatives available to consider in this case. Schedules of compliance and reporting requirements to meet the standards of this rulemaking may be considered when permit or approval

actions are taken, in accordance with 25 Pa. Code Chapter 92a, but they are not considered as part of this scientific evaluation of the water quality criteria needed to protect surface waters.

(c) The consolidation or simplification of compliance or reporting requirements for small businesses.

Schedules of compliance and reporting requirements to meet the standards of this rulemaking may be considered when permit or approval actions are taken, but they are not part of this scientific evaluation and establishment of the water quality criteria needed to protect surface waters.

(d) The establishment of performing standards for small businesses to replace design or operational standards required in the regulation.

The regulation represents performance standards. It identifies the in-stream goals for water quality protection and does not identify the design or operational standards that must be used to meet the goals.

(e) The exemption of small businesses from all or any part of the requirements contained in the regulation.

There were no such exemptions of small businesses to consider in this case.

(28) If data is the basis for this regulation, please provide a description of the data, explain <u>in detail</u> how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.

Please see the attached rationale document for criteria development and specific literature reviews and citations.

The Department assessed the peer-reviewed technical documentation and scientific literature used in the development of the water quality criterion for manganese and found it was scientifically sound.

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The Department also reviewed several physiologically-based pharmacokinetic (PBPK) model papers that were submitted by the mining industry. While the Department recognizes that PBPK models generally add to the overall knowledge base for a toxic substance, the Department's review identified a number of concerns and potential limitations, which are discussed in detail in the comment and response document. Additionally, the World Health Organization and Health Canada recently developed health-based recommendations for manganese using much of the same literature as the Department and reviewed these PBPK studies. Both organizations acknowledged that the PBPK models for manganese have not been sufficiently validated and indicated the results should be treated with caution.

(29) Include a schedule for review of the regulation including:

A. The length of the public comment period:	45 days
B. The date or dates on which any public meetings or hearings will be held:	Sept. 8, 9 & 10, 2020
C. The expected date of delivery of the final-form regulation:	Quarter 3, 2022
D. The expected effective date of the final-form regulation:	Upon publication in the *Pennsylvania Bulletin* as final-form rulemaking for CSL permit and approval actions, or as approved by EPA for purposes of implementing the CWA.
E. The expected date by which compliance with the final-form regulation will be required:	Upon issuance or renewal of NPDES permits or other approvals of the Department subsequent to publication in the final-form rulemaking in the *Pennsylvania Bulletin.*
F. The expected date by which required permits, licenses or other approvals must be obtained:	When permits or approvals are issued or renewed subsequent to publication of the final-form rulemaking in the *Pennsylvania Bulletin*.

(30) Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.

The Board is not proposing to establish a sunset date for this final-form regulation because it is needed for the Department to carry out its statutory authority. The Department will continue to closely monitor this final-form regulation for its effectiveness and recommend updates to the Board as necessary.

Also, since the CWA requires review and revision of water quality standards as necessary, but at least once every three years, a schedule for review is inherently established.