



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION



Bureau of Clean Water

Water Quality Standards for Manganese

Development of Proposed Rulemaking

Agricultural Advisory Board

August 29, 2019

Tom Wolf, Governor

Patrick McDonnell, Secretary

Act 40 of 2017

Section 6. Section 1920-A of the act is amended by adding a subsection to read:
Section 1920-A. Environmental Quality Board.--* * *

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

Manganese : Criteria Development

CHAPTER 93. WATER QUALITY STANDARDS

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WATER QUALITY CRITERIA

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TABLE 3

Parameter	Symbol	Criteria	Critical Use*
* * * * *			
Iron	Fe ₁	30-day average 1.5 mg/l as total recoverable.	CWF, WWF, TSF, MF
	Fe ₂	Maximum 0.3 mg/l as dissolved.	PWS
Manganese	Mn	Maximum 1.0 mg/l, as total recoverable.	PWS
Nitrite plus Nitrate	N	Maximum 10 mg/l as nitrogen.	PWS
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CHAPTER 96. WATER QUALITY STANDARDS

IMPLEMENTATION

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§ 96.3. Water quality protection requirements.

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

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Manganese : Criteria Development

Outreach	
Act 40	30 Oct 2017
Advanced Notice of Proposed Rulemaking	27 Jan 2018
Agricultural Advisory Board	25 Oct 2018
Water Resources Advisory Committee	29 Nov 2018
Small Water Systems Technical Assistance Center Advisory Board	31 Jan 2019
Water Resources Advisory Committee	23 May 2019
Agricultural Advisory Board	20 Jun 2019
Water Resources Advisory Committee	25 Jul 2019
Small Water Systems Technical Assistance Center Advisory Board	09 Aug 2019

Manganese : Criteria Development

Since there are known toxic effects of manganese on human health, DEP must develop water quality criteria for human health protection.

Manganese : Criteria Development

Development of Water Quality Criteria for Human Health Protection for Toxic Substances

Chapter 93. Water Quality Standards

- § 93.6. *General water quality criteria.*
- § 93.8a. *Toxic substances.*
- § 93.8c. *Human health and aquatic life criteria for toxic substances*

Chapter 16. Water Quality Toxics Management Strategy – Statement of Policy

- Threshold vs. Non-Threshold toxic effects
- § 16.32. *Threshold level toxic effects*

Manganese : Criteria Development

Development of Water Quality Criteria for Human Health Protection for Toxic Substances

Literature review included:

- animal toxicity studies (rats, mice, non-human primates)
- epidemiological studies
- epigenetic studies (human and animal)
- information on human dietary needs, exposure routes and sources, etc.

Many of the reference studies evaluated manganese exposure as it relates to developmental neurotoxicity. The studies and data generally support the continued need for an IRIS reference dose.

Manganese : Criteria Development

$$AWQC_{Mn} = RfD_W \times RSC \times (BW \div [DWI + (FI \times BAF)])$$

RfD_W	Reference Dose, Water	0.05	mg/kg-day
RSC	Relative Source Contribution	0.2	---
BW	Body Weight	80	kg
DWI	Drinking Water Intake	2.4	L
FI	Fish Intake	0.022	kg/day
BAF	Bioaccumulation Factor	1	---
AWQC_{Mn}	Ambient Water Quality Criteria for Mn

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

$$AWQC_{Mn} = 0.3 \text{ mg/L} = 300 \text{ } \mu\text{g/L}$$

Manganese : Criteria Development

On July 25, 2019, WRAC voted to approve the following motion.

1. 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; AND
2. To support proposing a regulation either through the Annex or by discussion in the Preamble (whichever is the most legally appropriate) 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. The compliance point for this standard will be met in all surface waters, as described in section 96.3(c); AND
3. To recommend that the EQB request public comment on this combined approach for consideration in developing a final regulation.

TAC voted to approve this same motion on August 8, 2019.

Manganese : Criteria Development

The proposed rule will include recommendations to:

- (1) move the point of compliance for the existing 1.0 mg/L PWS Mn criterion to the point of PWS withdrawal as required by Act 40 of 2017; and
- (2) adopt a new human health toxic criterion for Mn of 0.3 mg/L, applicable to all surface waters.



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Questions?

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