



Manganese in Surface Water: UPDATE - Proposed Change to Water Quality Standards

Water Resources Advisory Committee

November 29, 2018

Manganese

- Manganese (Mn) is the 12th most abundant element in the earth's crust
- Manganese is an essential micronutrient, however excessive intake can cause neurological damage to humans
- Pennsylvania (PA) Department of Environmental Protection (DEP) currently limits the discharge of manganese to commonwealth waters to a maximum of 1.0 part per million (1ppm), for taste and odor and to prevent laundry staining



Legislation Adopted

On October 30, 2017, the Governor signed PA legislation requiring the Environmental Quality Board (EQB) to promulgate proposed rulemaking to move the point of compliance for the Mn criteria established under 25 *Pennsylvania Code (Pa. Code)* Ch. 93 from the point of wastewater discharge to the point of Potable Water Supply (PWS) withdrawal; consistent with the special exception in 25 *Pa. Code* Section 96.3(d).

Must Protect For All Uses

Comprehensive Review of Water Quality Standards (WQS) for Mn.

DEP develops WQS that protect all water uses by establishing water quality criteria to protect those uses – “*Critical Use.*”

Protected Water Uses include:

- Aquatic Life & Human Health
- Water Supply Uses:
 - ❖ PWS = Potable Water Supply
 - ❖ IWS = Industrial Water Supply
 - ❖ LWS = Livestock Water Supply
 - ❖ IRS = Irrigation

What Other States Are Doing

Researching available WQS for other states

Question asked through Association of Clean Water Administrators (ACWA):

- States replied with Examples of WQ Criteria for:
 - Human Health
 - Aquatic Life
 - Water Supply Uses:
 - Drinking Water
 - Agriculture
 - Aesthetics

▶ Advance Notice Proposed Rulemaking

On January 27, 2018, DEP announced an advanced notice of proposed rulemaking (ANPR), seeking public input necessary to prepare this proposed rule for Mn (48 Pa.Bulletin 605).

DEP sought scientific and economic information to support development of proposed regulations consistent with duties under The Clean Streams Law, the Federal Clean Water Act, and requirements under Commonwealth law regarding the rulemaking process, including the Administrative Code of 1929 and the Regulatory Review Act.

Information was received from 13 commenters in response to this ANPR.

➤ Research from Penn State Extension

“Experience in Pennsylvania has shown that aesthetic pollutants like iron, manganese and hydrogen sulfide, are the most common water-related causes of problems with dairy herds. These pollutants cause tastes or odors that result in reduced water intake and milk production.”

<https://extension.psu.edu/interpreting-drinking-water-tests-for-dairy-cows>

Ag Advisory Board

DEP met with the Agricultural Advisory Board (AAB) on October 25, 2018, seeking input on the potential impact on agricultural uses, or agriculture-related businesses or operations; and estimates of the direct and indirect costs to these uses, businesses, or operations.

Requested information by November 29, 2018.

Drinking Water Supplies

DEP received comments raising concerns about possible impacts of shifting additional treatment burden to water treatment facilities:

- Requiring modifications to existing treatment or addition of new treatment technologies
- Increasing operation and maintenance costs
- Increasing treatment costs

Small Water Systems TAC

DEP will provide an update to members of the Small Water Systems Technical Assistance Center (TAC) Advisory Committee in early 2019.

DEP is interested in knowing:

- if the new regulation will have an impact on water supply uses, the users, or the providers;
- estimates of the direct and indirect costs on treatment, performance, or costs to the water suppliers or users.

Aquatic Life Criteria

- The U.S. Environmental Protection Agency currently has no national recommendation on Aquatic Life criteria for Mn.
- DEP reviewed criteria for Aquatic Life of Colorado, Illinois, and Michigan.
 - All three have equation-based criteria that rely on hardness.
- DEP believes considerably more research and investigation is needed to determine how useful these states' criteria would be for Pennsylvania.

Human Health Effects

Current science shows manganese is harmful to human health as a possible nervous system toxin with implications to early childhood development at levels that are less than the threshold levels that impact aquatic life.

Human health criteria are needed, and may become the “*Critical Use*” that provides protection to the other less sensitive uses, at least until such time that a more complete, comprehensive suite of WQ criteria can be developed for the other uses.

▶ Other Water Supply Use Protection

- PA Safe Drinking Water maintains secondary maximum contaminant level (SMCL) for Mn
 - SMCLs are enforceable in PA Drinking Water
- Concerns with Irrigation/Livestock Water Supply uses
- Is there a concern for water supplies for fish hatcheries and water quality for Mn?
- Will Industrial Water Supply users encounter special WQ requirements or pre-treatment needs?



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Bureau of Clean Water

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