



# Manganese

Overview of the scientific literature  
and information

Water Resources Advisory Committee

May 23, 2019

# Manganese : Scientific Overview

Act 40 of 2017 requires the Environmental Quality Board to propose a regulation that moves the point of compliance for the Mn criterion from the point of discharge to the point of all existing or planned surface potable water supply withdrawals, as an exception in 25 Pa. Code Section 96.3(d).

Exceptions in Section 96.3(d) are for specific PWS criteria.

Existing Ch. 93 Mn criterion of 1.0 mg/L is for protection of the PWS use.

# Manganese : Scientific Overview

Current Ch. 93 Mn criterion of 1.0 mg/L was developed and adopted in the 1960s.

The Department has an obligation to review and update water quality standards to reflect current scientific knowledge and understanding (i.e. updated national recommendations, published scientific literature, etc.).

# Manganese : Scientific Overview

Advanced notice of proposed rulemaking (ANPR) -  
January 27, 2018, to solicit data and information on Mn.

Approximately 60 human health related scientific studies and/or scientific references were provided by the following commenters:

- EPA (7)
- PennFuture (40)
- Manganese Interest Group (MIG) (12)

# Manganese : Scientific Overview

Concurrent with the ANPR, the Department:

- Conducted an independent literature search and review.
- Reviewed scientific references as they were received through the ANPR.
- Evaluated existing EPA health advisories, risk assessment information and national recommendations for Mn.

# Manganese : Scientific Overview

## 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 : Scientific Overview

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

### § 16.32. *Threshold level toxic effects*

§ 16.32(d) The sources the Department uses to obtain relevant risk assessment values for protection for threshold level toxic effects to human health are as follows:

- (1) Verified references doses, listed in the EPA agency-wide supported data system known as IRIS and other EPA approved data sources referred through IRIS.
- (2) Maximum contaminant level goals.
- (3) The EPA's CWA 304(a) health criteria under 40 CFR 131.56.
- (4) Teratology and other data that have been peer-reviewed.

# Manganese : Scientific Overview

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

### Summary of EPA IRIS human health assessment information

- Oral reference dose information is available.
- It was last revised in 1995.
- The critical effect identified = Central Nervous System (CNS) effects.
- NOAEL (No Observed Adverse Effect Level) is based on dietary studies.
- Modifying factor of 3 recommended for exposures from water or soil.



# Manganese : Scientific Overview

## 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 : Scientific Overview

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

Review of the literature - Additional studies or science?

# Manganese : Scientific Overview

## Mn Rulemaking Timeline:

- Must go through our Regulatory Process
- Presentation of draft Annex at July 25<sup>th</sup> WRAC meeting
- Presentation to Ag Advisory Board at August 29<sup>th</sup> meeting



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DEPARTMENT OF ENVIRONMENTAL  
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# Questions?

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