



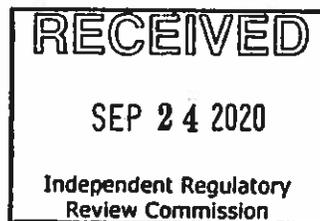
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Environmental Quality Board
P.O. Box 8477
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Submitted by eComment



Re: **Water Quality Standard for Manganese and Implementation (25 Pa. Code Chapters 93 and 96); Notice of Proposed Rulemaking 50 Pa.B. 3724, July 25, 2020**

Rosebud Mining Company ("Rosebud") provides the following comments on the proposed Water Quality Standard for Manganese and Implementation: Notice of Proposed Rulemaking [50 Pa. B. 3724] per the public notice published in the Pennsylvania Bulletin on July 25, 2020.

Act 40 of 2017

Act 40 of 2017 required the Environmental Quality Board ("EQB") to make a simple revision to Pennsylvania's water quality regulations. The revision would provide clarity on the point of compliance for the manganese effluent standard. All the Department of Environmental Protection ("DEP") would need to do to comply is add **ONE** word, manganese, to Chapter 96.3(d). The insertion of manganese into the list of other water quality criteria found in Chapter 96.3(d) would fulfill the intent of Act 40. Below is how the DEP could have proposed the regulation to comply with Act 40.

(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.

Instead of this simple one word fix, the DEP has taken a different approach. The proposed rulemaking that the DEP provided to the EQB relies on outdated science to label manganese as toxic, piles on an overly conservative 3 modifying factor, thereby proposing a 0.3 mg/l health and human criteria standard. In essence, the Department is trying to treat manganese, a nutrient vital for human health, as if it were a toxic metal like cyanide, arsenic or mercury. Further, DEP is proposing two different points of compliance, one that complies with Act 40, and one that ignores Act 40 completely.

Human Health

Manganese is an essential nutrient for humans and animals. In fact, severe health effects can occur from a manganese deficiency. For this reason, manganese supplements can be purchased at the local pharmacy.

Despite essential nature of manganese, the main concern being raised by proposed rulemaking is the danger of manganese consumption from drinking water. DEP claims that drinking water above 0.3 mg/l is toxic; and the proposed regulation is necessary to protect children. Yet there are many beverages that have much higher concentrations of manganese that are consumed regularly by children. For example, pineapple juice has a manganese concentration of 11.8 mg/l, 39 times more than the proposed limit of 0.3 mg/l. Based on this illogical claim that manganese is toxic in concentrations above 0.3 mg/l, other beverages like cranberry juice, tea, grape juice would be more toxic than drinking water. The table below contains manganese concentrations for common beverages.

Beverage	Manganese Concentration	Toxicity Compared to 0.3 mg/l
Pineapple Juice	11.8 mg/l	39 Times
Cranberry Juice	5.0 mg/l	17 Times
Tea	3.9 mg/l	13 Times
Grape Juice	2.6 mg/l	9 Times

The proposed rulemaking as currently written would place manganese as a toxic substance for Human Health Criteria ("HHC") in Chapter 93.8c. Manganese would be listed along other known toxic substances for which there is no recommended daily intake. The table below lists other substances that have HHC but no recommended daily intake.

Chemical Name	Human Health Criteria (µg/l)	Recommended Daily Intake (µg/l)
Antimony	5.6	0
Arsenic	10	0
Mercury	0.05	0
Nickel	610	0
Thallium	0.24	0
Cyanide	140	0

In sum, a threshold point that must be understood when examining this issue is that manganese is an essential nutrient and is not a chemical substance like arsenic or cyanide in Chapter 93.8. Yet, Chapter 93.8 is exactly where DEP is proposing to create a new manganese criterion.

Modifying Factor/Additional Studies

DEP appears to be relying in part on the US EPA's IRIS assessment on manganese for implementation of the 3 modifying factor for manganese in drinking water. The EPA's assessment is based in part on findings from a study by Kondakis et al. (1989). The validity of this study is very concerning considering several issues like population age sampling, study location relative to Pennsylvania, and most concerning that the study indicated that there was an unknown amount of manganese intake from diet and water consumption from drinking water. In fact, the EPA itself determined "Because of the uncertainty in the amount of manganese in the diet and the amount of water consumed, it is impossible to estimate the total oral intake of manganese in this study. These limitations preclude the use of this study to determine a quantitative dose-response relationship for the toxicity of manganese in humans." Why would the DEP or EPA then utilize the report to derive a quantitative dose and modifying factor?

The DEP also references several studies in the rationale statement provided in the public notice for the development of the HHC. However, based on testimony from Lisa A. Bailey, Ph.D. during the PA Senate Environmental Resources and Energy Committee's Informational Hearing on Proposed Rulemaking: Water Quality Standards for Manganese and Implementation (#7-553), these studies are incomplete and do not provide evidence to the necessity of a 3 modifying factor in her professional opinion.

In addition, DEP has not referenced the most recent studies mentioned by Ms. Bailey during her testimony. A number of studies using physiologically-based pharmacokinetic (PBPK) models have been published since the US EPA's (2002) IRIS assessment on Mn. These models are useful tools in understanding the relative importance of Mn exposure via inhalation and diet, as well as age differences in Mn absorption (Schroeter et al., 2011; Yoon et al., 2012).

Recently, Song et al. (2018) developed a human PBPK model to evaluate Mn bioavailability from drinking water and validated the model through simulating published datasets of human consumption of drinking water containing Mn, showing that modeled bioavailability of Mn from food and drinking water in humans is similar. Importantly, the Song et al. (2018) PBPK model assumed normal daily Mn intake of up to 10 mg/d Mn (i.e., the NOAEL identified by PADEP, 2019). For the average adult, this suggests that Mn up to 0.14 mg/kg-d is absorbed into the blood stream similarly, regardless of whether Mn exposure occurred from a food or water source.

Point of Compliance

Not only is DEP wrong on the toxicity of manganese, but they are ignoring Act 40, which directed that the manganese standard only be applied at the potable water supply ("PWS") withdrawal. Instead, the DEP is proposing the new 0.3 mg/l standard be applied to all reaches of the stream to protect human health, especially for children and infants under the very unlikely scenario that children and infants drink directly from a stream. By this logic, all streams should be drinking water quality, which is impracticable and unachievable. This is why Chapter 93 states the definition of a potable water supply is "after conventional treatment".

Placing the point of compliance at the PWS withdrawal is not a novel concept. Other coal mining state utilizes the PWS withdrawal as the point of compliance for certain parameters. Ohio, Kentucky, Illinois, Indiana and West Virginia all base their manganese standard on the concentration at the PWS withdrawal, and there is no evidence that the health of the residents is affected by this point of compliance. The following are examples of regulations from other neighboring states.

In Ohio, designated uses are provided in in Chapter 3745-1-07 of the Ohio Administrative Code. Section (B)(3)(a) designates that "... all surface waters within five hundred yards of an existing public water supply surface water shall be classified as 'Public Water Supply.'" Further, Ohio does not have a PWS standard, an aquatic life standard, or a human health standard for manganese. Rather, it regulates mine discharges consistence with 40 CFR §434.

In Kentucky, all streams, according to 401 Kentucky Administrative Regulations 5:026, are designated for warm water aquatic habitat and primary and secondary contact recreation. "The designation for domestic water supply is applicable only at points of intake." Further, Kentucky does not have a PWS standard, an aquatic life standard, or a human health standard for manganese. Rather, it regulates mine discharges consistence with 40 CFR §434.

In Illinois, per Title 35, §303.202 "...waters of the State shall meet the public and food processing water supply standards ...at any point at which water is withdrawn for treatment and distribution as a potable supply or for food processing."

In Indiana, Title 327, Article 2, "All waters that are used for public or industrial water supply must meet the standards for those uses at the points where the water is withdrawn." Further, Indiana does not have a PWS standard or an aquatic life standard for manganese.

In West Virginia, "The manganese human health criterion shall only apply within the five-mile zone immediately upstream above a known public or private water supply used for human consumption."

Economic Impacts

With respect to the costs of regulatory change, some have suggested that PWS operators would spend \$60 to \$80 million in treatment upgrades if the point of compliance would be moved. These numbers appear questionable since no upgrades would be needed at all, since there will be no change in protection. PWS operators currently have a 1.0 mg/l of manganese protection standard since DEP has placed the point of compliance within the stream. If the point of compliance was moved to the PWS withdrawal, the same 1.0 mg/l standard would apply. Water entering the withdrawal point currently has to be 1.0 mg/l or lower and would stay 1.0 mg/l or lower even if the point of compliance were to be moved. Nothing will change for water suppliers. Also, the majority of the manganese that is in the stream at the PWS withdrawal is solid, and will be removed by already standard filtration techniques.

Unlike the water suppliers, the proposed rulemaking, as written, will impose significant compliance costs not only on the coal mining industry, but potentially on numerous other industries that may not currently be treating for manganese. The precipitation of manganese comes from the breaking of rock and disturbance of soil. This is the case no matter if you are mining coal, limestone or conducting land development projects including public highway road cuts. Many earth disturbance permits do not currently require the treatment of manganese by way of a manganese effluent limit placed on the NPDES permit. However, if manganese is labeled as toxic, a reasonable potential analysis would need to be conducted for currently exempt and future NPDES permits that involve rock or soil disturbance. This has the potential to substantially increase treatment costs or require the construction of a treatment system where one may not exist.

Environmental Impacts

While the financial costs to numerous industries will be significant, the environmental benefits from the proposed rulemaking will be limited. The labeling of manganese as a toxin may have unintended consequences. The increase in costs would likely push already financially strapped mining companies into bankruptcy; thus causing the forfeiture of long term trust fund sites. Operators of post-mining treatment sites that are currently spending private money to treat discharges would likely start to forfeit their treatment trust since it will become too expensive to treat to such low levels of manganese. The sites would then revert to DEP to carry out treatment. DEP already has issues with treating bond forfeiture sites and has not even begun treatment at some. This would provide an extra burden to the tax payers and take funding resources away from treating the important parameters at abandoned mine discharges. In fact, manganese would likely be ignored by the DEP at these abandoned sites, which shows the importance of manganese mitigation as compared to other parameters like pH, iron and aluminum.

Also, the proposed rulemaking could disincentivize mining operators from treating abandoned mine discharges because of the burdensome manganese effluent limits placed on the dischargers NPDES permits. A perfect example of this issue would be the St. Michael Treatment Plant. In 2012, Rosebud Mining Company (Rosebud) constructed a \$20 million dollar AMD (acid mine drainage) plant to treat a 4,000 gallon per minute (gpm) discharge from the abandoned Maryland No. 1 Mine. This discharge was depositing 2.2 million pounds of iron into the Conemaugh River every year. This discharge also contained some manganese at around 5.0 mg/l, but iron and pH were the main pollutant loading impairing the Conemaugh River. The plant was turned on in 2013 and now prevents 98% of that 2.2 million pounds of iron from entering the river every year. If Rosebud had to achieve the 0.3 mg/l manganese level, instead of the current 1.0 mg/l effluent standard, that project would have never occurred.

Even when watershed groups, like the Bureau of Abandoned Mine Reclamation or DEP treat an abandoned mine discharge, manganese is usually not treated, or at the very least no specific concentration of manganese is targeted. PH, iron, aluminum and acidity are usually the parameters that are treated for since they impact the aquatic life the most. Manganese tends to not be treated due to the difficulty in removal using passive treatment systems and the balancing act between iron/aluminum precipitation and manganese precipitation. To remove manganese, the pH must be increased to a level that iron and aluminum begin to dissolve. Thus creating a two phase treatment system. Since iron and aluminum have the most impact on aquatic life and manganese has little impact, treatment for manganese is typically ignored. DEP does not issue NPDES permits for abandoned mine sites, so changing the effluent discharge limit will have not impact the stream quality for abandoned mine sites. Even on bond forfeiture sites where DEP has a legal obligation to treat the water, NPDES limits for manganese are not applied. So basically, the regulated community will have to go from a 2.0 or 1.0 mg/l manganese limit to a 0.3 mg/l, and the adjacent abandoned mine discharge and bond forfeiture sites will continue to spew out high manganese levels with no potential treatment in sight.

The proposed rulemaking may have detrimental impacts to the DEP's subF program. This program incentivizes mine operators to re-mine abandoned surface mines that can improve abandoned mine discharges without having to take 100% ownership of the discharge, while still taking some risk that improvement may not occur. If manganese is labeled as a toxin, an operator would then be unwilling to take the risk and the abandoned surface mine and discharge would go on unmitigated.

Unlimited Manganese Loading Concern

Federal law already prohibits the unfettered discharge of manganese into Pennsylvania waterways. Manganese is already regulated in coal mining NPDES discharges by Chapters 87, 88, 89 and 90 and federally by 40 Code of Federal Regulation 434. All of these regulate manganese to a 2.0 mg/l average and 4.0 mg/l daily max. These levels were determined by BAT (Best Available Technology) treatment standards.

If a concern exists for non-coal mining industries, the DEP should regulate those industries through BAT standards. The PWS are already protected from coal and other industry discharges through the reasonable potential analysis that is conducted by the DEP to ensure the discharge does not exceed the PWS withdrawal standard of 1.0 mg/l.

Conclusions

DEP's proposed rulemaking fails to comply with Act 40 and places an unrealistic limit of 0.3 mg/l for manganese. DEP should simply propose a rule for manganese that involves a ONE word addition, manganese, to 25 PA Code Chapter 96.3(d). By doing so, PWS operators will still be afforded the existing 1.0 mg/l protection standard, PA would be consistent with surrounding state water quality standards, and DEP will have complied with Act 40, as signed by the Governor in 2017.

Sincerely,



John St. Clair
Manager of Permitting
Rosebud Mining Company