



# COMMONWEALTH of VIRGINIA

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## MEMORANDUM

**TO:** State Water Control Board Members

**FROM:** Melanie D. Davenport, Water Division Director *John M. Kennedy for MDD*

**SUBJECT:** Request to Proceed to Public Hearing and Comment on Proposed Amendments to the Water Quality Standards – Triennial Review

**DATE:** February 25, 2014

### EXECUTIVE SUMMARY

Staff intends to ask the Board for approval to go to public hearing and comment on amendments to the Water Quality Standards regulation (*State Water Control Board, 9 VAC 25-260 Virginia Water Quality Standards, Triennial Review Proposed Amendments*; attached). The Board has a legal mandate for a review of the Water Quality Standards under the Code of Virginia (§62.1-44.15(3a)) and federal regulation at 40 CFR 131, at least once every three years. During this review the Board must adopt, modify or cancel standards as appropriate. This rulemaking is needed because new scientific information is available to update the water quality standards and changes are needed to improve permitting, monitoring and assessment programs. The goal is to provide the citizens of the Commonwealth with a technical regulation that is protective of water quality in surface waters, reflects recent scientific information, reflects agency procedures and is reasonable and practical. An ad hoc Regulatory Advisory Panel advised staff on the amendments. The most important changes are updates to the numeric criteria for several toxic chemicals, new criteria for ammonia, some reclassifications of public water supply designations, new swampwater classifications and special standards to reflect site specific conditions.

### BACKGROUND

A Notice of Intended Regulatory Action was published August 12, 2013. A public comment period was held between August 12 and October 11, 2013, and a public meeting held in Richmond on September 10, 2013. Comments were received from several organizations and individuals (*Summary of Comment from the Notice of Intended Regulatory Action*; attached). An ad hoc Regulatory Advisory Panel consisting of 15 members was formed and held three

meetings (November 18, December 13, 2013 and January 16, 2014). The meeting summaries may be seen online at:

[http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/RulemakingInfo.aspx#Triennial\\_Review](http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/WaterQualityStandards/RulemakingInfo.aspx#Triennial_Review)

## IMPORTANT ISSUES

**The following paragraphs summarize the key sections of the regulation proposed for amendment:**

### **1. Table of Parameters (Toxics) § 9 VAC 25-260-140:**

The Table of Parameters contains a list of toxic chemicals and the water quality criteria designed to protect human health and aquatic life. The criteria are expressed as concentrations in parts per billion (micrograms/liter). Triennial Review is the appropriate time to update the Table based on new technical information available on the toxicity of these parameters to human health and aquatic life.

- a) **Criteria to Protect Human Health; 8 Revised Parameters** - The Table of Parameters has been updated and 8 of the human health parameters' criteria have been recalculated using updated recommendations provided by the U.S. Environmental Protection Agency (EPA) regarding the toxicity of these chemicals. The new criteria concentrations for carbon tetrachloride, Methylene chloride, nitrobenzene and tetrachloroethylene increased between 88 and 1779%. The new criteria for cyanide, Hexachloroethane, pentachlorophenol, and trichloroethylene decreased between 64 and 97% compared to the current criteria. These changes could have an economic impact on permittees if these particular pollutant parameters are present in their effluent.
- b) **Criteria to Protect Aquatic Life; Added New Criteria for Acrolein** – EPA has issued new criteria recommendations for Acrolein (a biocide) of 3.0 micrograms/liter for the protection of aquatic life. Virginia has an existing criterion of 9.3 microgram per liter for the protection of human health. These changes could have an economic impact on permittees if acrolein is present in their effluent.
- c) **Criteria to Protect Aquatic Life; Added Carbaryl** - Carbaryl is a widely used pesticide (the active ingredient in the pesticide Sevin) and it is toxic to aquatic life. EPA's new criteria recommendation is for 2.1 microgram/liter in freshwater and 1.6 microgram per liter in saltwater. These changes could have an economic impact on permittees if this pesticide is present in their effluent.
- d) **Criteria to Protect Aquatic Life; Revised Cadmium** - Staff is recommending a revision to the existing aquatic life criteria for cadmium based on more recent EPA guidance issued in 2001 and updated with additional revisions included in a report published by the U.S Geological Survey in 2010. The proposed cadmium criteria are more stringent by about 50% than the existing Virginia criteria, but less stringent than

EPA's 2001 recommendations. These changes could have an economic impact on permittees if cadmium is present in their effluent.

- e) **Criteria to Protect Aquatic Life; Copper** - EPA has developed new, national recommended criteria for copper in freshwater that is in the form of a computer program called a Biotic Ligand Model (BLM), which is a metal bioavailability model that uses receiving water body chemical and physical characteristics to develop site-specific water quality criteria for copper. EPA considers the BLM as a more accurate means of calculating copper criteria for freshwater. The use of the BLM requires additional data from the local receiving waterbody concerning ten parameters of water quality characteristics; temperature, pH, dissolved organic carbon, calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. EPA expects the application of the BLM will result in more appropriate criteria and eliminate the need for costly and time-consuming site-specific modifications using the water effect ratio. DEQ is proposing adding the BLM as an optional, alternate copper criteria for freshwater. If an individual permittee wants to use the BLM to calculate criteria for copper applicable to the receiving stream, the permittee will be responsible for generating the needed data for the ten water parameters needed to run the BLM model. Without the needed data for these ten parameters, the current hardness-based criteria for copper will continue to be applicable.
- f) **Criteria to Protect Aquatic Life; Lead, Total Recoverable Measurements Converted to Dissolved Measurements**; - EPA requires that a conversion factor be included in the criteria for metals to allow them to be expressed as dissolved concentrations instead of total recoverable measurements. All current Virginia criteria for metals include a conversion factor except for lead. Staff recommends applying a conversion factor recommended by EPA as being applicable to the Virginia criteria for lead. This will make the criteria more stringent by approximately 5%-22%.

## **2. Manganese Criterion in Public Water Supplies:**

Virginia currently has a water quality criterion for manganese of 50 parts per billion that applies to public water supplies. This manganese criterion is based on a federal recommended secondary Maximum Contaminant Level (MCL) that is intended to be applied to treated drinking water as supplied to the consumers to prevent laundry staining. Secondary MCLs do not address human health concerns, are not regulatory and not required by federal law. Secondary MCLs are recommended guidelines to address aesthetic concerns with treated drinking water such as taste, odor or laundry staining. By applying this manganese criterion to natural river water, we are in essence trying to maintain untreated river water at a level of purity such that the public can use it to wash their clothes without any staining from suspended soil. Manganese is a common element in the soils of Virginia and when soil is suspended in river water it is likely for manganese concentrations to exceed 50 parts per billion. One half of all the water samples in DEQ's historical water monitoring database analyzed for manganese contained values higher than the 50 micrograms/liter criterion. This sets up a situation where many waterbodies could be considered impaired, when in fact they are only impaired if we intend for the public to use natural, untreated river water for washing their laundry which is not the case. When public drinking water plants treat natural river water, the initial step is to remove the suspended soil

particles, which include the suspended manganese, so this should not be an issue for the typical drinking water plant treating surface water. This is not a health issue. Manganese is an essential nutrient and the recommended daily intake of manganese ranges from 2,000 to 10,000 micrograms per day. DEQ staff has concluded that this manganese criterion has been inappropriately applied to Virginia's natural waters and it is not needed. Staff recommends deleting this criterion.

### **3. Ammonia Surface Water Quality Criteria § 9 VAC 25-260-155:**

EPA completed a reassessment of their recommended national criteria for ammonia in freshwaters in August 2012. The new criteria are approximately one half of the current Virginia ammonia criteria. These changes could have an economic impact on permittees if these particular pollutant parameters are present in their effluent. Most municipal sewage treatment plants can be expected to have ammonia in their effluent.

The new criteria are more restrictive primarily because new toxicity data show that freshwater mussels and snails (including endangered species) are very sensitive to ammonia and the current ammonia criteria do not provide sufficient protection for these species. Consultation with the Virginia Department of Game and Inland Fisheries and U.S. Fish and Wildlife Service indicated that freshwater mussels should be considered ubiquitous and present in all Virginia perennial streams. DEQ staff recommend proposing these new EPA criteria for ammonia. Some headwater streams or intermittent streams may not be able to support populations of freshwater mussels due to inadequate habitat, or intermittent flows. On a site-specific basis, a permittee will have the option to demonstrate that a receiving stream does not contain a population of freshwater mussels, and alternate, less restrictive criteria for ammonia could apply to these streams.

### **4. Bacteria for Recreational Waters § 9 VAC 25-260-170:**

EPA published new, final recommended bacteria water quality criteria for the protection of recreational uses (swimming and other water contact recreation) in November 2012. The new EPA criteria recommendations include three components:

1. A number of culturable colony forming units (CFU) of either the bacteria E.coli or Enterococci,
2. a duration of 30 days as an averaging period for a geometric mean, and
3. an allowable excursion rate of no more than 10% of samples allowed to be greater than a statistical threshold value (STV).

The STV is higher than the geometric mean and is set at the 90<sup>th</sup> percentile of all values observed in the dataset that supports the criteria. For example; for E.coli the geometric mean value is 126 CFU per liter (CFU/L) and a STV of 410 CFU/L. This is because in the data set of bacteria samples and the epidemiological studies used to establish the criteria, the geometric mean was calculated to be 126 and 90% of the bacteria counts were at or below 410 CFU/L. The STV is intended to avoid incorrectly classifying a water body as posing an excessive risk to swimmers, when in fact it is likely just demonstrating the same level of variability in bacteria values that would be consistent with a geometric mean of 126 CFU/L. That is, given the normal variability of bacteria counts in surface waters, we expect about one half of the samples to be above the

mean value, but as long as the higher counts are below the 90% STV, this is deemed to be acceptable.

EPA's recommendations also offer two options for intended level of acceptable risk; 36 theoretical illnesses per 1,000 exposed swimmers or the slightly more protective 32 theoretical illnesses per 1,000 exposed. Virginia's current criteria is a geometric mean value of 126 CFU/L for E. coli in freshwater and 35 Enterococci for saltwater, which are the same as EPA's recommendations at the 36/1,000 illness rate. However, Virginia's criteria states that a minimum of 4 samples within a one month period are needed to calculate a reliable geometric mean value, and Virginia also has a higher value that should not be exceeded more than 10% of the time during the assessment period. EPA's new criteria states that a minimum number of samples is not an approvable part of water quality standards and that any samples within a 30 day period should be used to calculate the mean. This is causing DEQ's monitoring and assessment staff significant concerns. Current monitoring efforts typically sample most inland water bodies once a month at the most. Under EPA recommendations that single sample would have to be considered the equivalent of a geometric mean value. In a normally distributed data set, we expect about one half of the counts will be above the mean, therefore even if the real geometric mean value is at or below the criteria's mean value ( i.e., the criterion is met) we nevertheless expect that about one half of the samples will exceed the criterion's mean value. If these individual values are treated as a "true mean", this will result in assessing a single value as though it is a valid mean value and will result in incorrectly classifying the waterbody as impaired, when in fact it is not. Additional resources to increase monitoring to four or more times within a 30 day period are not available in most cases for waterbodies that are not a high use public swimming beach.

DEQ has asked for clarification from EPA that when assessing limited data sets with only one or two data points within a 30 day period, the geometric mean need not be assessed but rather the limited data be compared to the STV. EPA has indicated that although they recognize that more data increases the confidence in the mean value, any and all data (including a single value) within a 30 day period should be used to assess against the criteria's geometric mean and STV values. DEQ is concerned that this will result in significantly higher incorrect assessments of impaired waters due solely to evaluating limited data sets in an inappropriate manner.

To complicate the matter further, EPA has been sued by at least one citizen environmental organization because in their view the new recommended bacteria criteria aren't protective enough.

In light of all the forgoing issues and concerns, staff will recommend that our water quality standards not be amended to include EPA's new bacteria criteria as part of this Triennial Review. It is possible this issue may be addressed as a separate rulemaking in the future if an understanding can be reached on the issues of assessment against the standard and use of the Geometric Mean.

## **5. Special Standards - § 9 VAC 25-260-310:**

- a) **Chickahominy River:** Special Standard "m" provides for effluent limits for dischargers to

the Chickahominy River above Walker’s Dam. An examination of the record indicates that the intent of this special standard was to protect the Chickahominy River from excessive nutrients inputs and to protect Chickahominy Lake from eutrophication. The effluent limits focus on nutrient related organic pollution and address biochemical oxygen demand, ammonia nitrogen, total phosphorus, as well as settleable and suspended solids. These effluent limits were based on limits achievable with a well managed domestic wastewater treatment plant designed to treat organic waste. DEQ staff believes that for discharges of nonorganic waste, the effluent limits required by the Virginia Industrial Discharge General Permit are more appropriate. Staff recommends modifying special standard “m” by adding the underlined text;

m. The following effluent limitations apply to wastewater treatment facilities treating an organic nutrient source in the entire Chickahominy watershed above Walker's Dam (this excludes discharges consisting solely of stormwater).

- b) **Winter-only stocked trout waters:** The Department of Game and Inland Fisheries (DGIF) stocks trout during the winter in some warm water rivers and streams in order to provide additional fishing opportunities to the public. The stocked trout can survive in these waterbodies during the cold winter season, but are not expected to survive the following summer. Special standard “hh” addresses this issue by stating that these winter-only stocked waters revert back to the original temperature criterion of the underlying classification of mountainous zone waters with a maximum temperature of 31 degrees centigrade. US Fish and Wildlife Service (USFWS) had raised concerns about the maximum allowable temperature for Tinker Creek and a section of the Roanoke River because of the presence of an endangered species of fish, the Roanoke logperch. Consultations with USFWS and DGIF resulted in a recommended maximum temperature of 26°C for Tinker Creek and 28°C for the Roanoke River. DEQ staff recommends proposing special standards “ee” and “ff” for these two waterbodies respectively.

#### **6. Other Trout Water Updates § 9 VAC 25-260-390 through 540:**

Triennial Review provides an opportunity to add, modify or delete trout water designations within the river basin sections as appropriate. This is done in collaboration with the Department of Game and Inland Fisheries and several designation boundary clarifications have been identified.

#### **7. Reclassification of Waters to Class VII (Swamp Waters) § 9 VAC 25-260-390 through 540:**

Approximately 20 waters are proposed to be changed from Class III (non-tidal waters) to Class VII (swampwaters). This is being proposed to recognize the unique aquatic ecosystems that are characterized by low velocity stream flow, abundant swamp vegetation and frequently exhibit low dissolved oxygen concentrations and acidic pH that are attributable to natural conditions.

#### **8. Public Water Supplies § 9 VAC 25-260-390 through 540:**

**James Basin**

Delete the reference to an old intake for the American Tobacco Company's raw water intake in the James River above City Point (Hopewell). The American Tobacco Company's raw water intake has not been in operation for some time. The Virginia Health Department (VDH) reported that there may have been a raw water intake there in early days of the tobacco processing plant. The intake was most likely for industrial (process) water. No known intake has been there for domestic water in the past 35 years. VDH could not find any records about a domestic water intake at that location in years prior to 1978. This issue has been discussed with EPA and it is likely they will agree that the "existing use" as a potable water supply has never really been present at this location, thus allowing for the removal of this designation.

## **ISSUES REQUIRING FURTHER CONSIDERATION**

Several other issues were discussed with the advisory committee but staff does not believe revisions to the regulation are warranted at this time. Most notable among these was the issue of water quality criteria and standards for selenium.

### **Criteria to Protect Aquatic Life; Selenium § 9 VAC 25-260-140**

During the ad hoc meetings, DEQ was presented with new scientific information from a group of coal mining interests and their consultant that suggested the existing water quality criteria for selenium are in need of revisions. It was recommended that Virginia propose new selenium criteria similar to recently adopted criteria in Kentucky. The toxicity of selenium and how it adversely affects aquatic life is very complex and proper ways of revising the criteria for selenium is controversial. There is a high level of interest in this issue by several public groups. EPA is currently revising their criteria for selenium and expects to release for peer review new revised criteria for selenium in 2014. Due to the fact that EPA is reviewing these issues on a national level, we recommend not proposing any new, revised criteria for selenium at this time. Technical issues would be best worked out in a separate advisory committee and incorporated as a separate rulemaking at a later date after additional guidance is received from EPA. It is also likely that DEQ will be requested, under a joint resolution now being considered by the General Assembly, to study the issue of selenium toxicity and provide a report by November 2014.

## **ATTORNEY GENERAL CERTIFICATION**

These amendments have been forwarded to the Office of the Attorney General for agency statutory authority, but authority has not yet been granted. The amendments will be proposed "contingent upon Attorney General Office statutory authority" if not received by the March Board meeting.

## **ATTACHMENTS**

Attachments to this memo to aid in your review of these regulatory amendments are as follows:

- State Water Control Board, 9 VAC 25-260 Virginia Water Quality Standards, Triennial Review Proposed Amendments, 2014
- Summary of Comment from the Notice of Intended Regulatory Action,
- Ad Hoc Advisory Committee Members, 2014.
- Summary Table Triennial Review Water Quality Standards Amendments, January 2014