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Comments on Proposed Chapter 95 Regulations  
On Total Dissolved Solids  
Aqua Pennsylvania, Inc.

Aqua Pennsylvania, Inc. (Aqua) is a responsible user of the Pennsylvania's water resources and a recognized leader in water treatment and infrastructure. Aqua provides service to almost 430,000 water and wastewater customers in more than 100 systems across Pennsylvania.

Aqua has been a proponent and practitioner of source water protection throughout its 125-year history. Aqua supports efforts by the Department of Environmental Protection (Department) to protect drinking water sources from contamination that could increase risk to public health or increase the cost of treating drinking water.

Aqua recognizes the potential for degradation of water resources from a variety of activities, including drilling, hydrofracturing, and discharge of flow-back water from Marcellus Shale gas exploration and production wells. We have been following developments in this field and recognize the significance of this domestic energy resource for the country and for the Commonwealth of Pennsylvania. We also share some of the Department's concern over potential adverse impacts to the environment, in particular, the potential discharges of high TDS effluent associated with flow-back water.

Aqua applauds the Department's efforts to bring this issue forward and to allow for a public discussion of an appropriate framework for regulations that might address this issue. After carefully reviewing the draft regulation, Aqua believes that the current proposal by the Department to accomplish these protections in part by revising the Chapter 95 regulations based on a secondary drinking water standard for Total Dissolved Solids could be problematic depending on interpretation and implementation.

**Issues associated with applying a TDS standard.**

Water quality standards set for rivers, creeks, and streams generally do not match drinking water standards for water used for consumption. Aqua has debated with dischargers, the Department, and other regulatory agencies for years about this issue for constituents occasionally found in discharges or natural waters (like geosmin, MIB and 2,4,6-trichloroanisole) that have no known health effects at levels where they can impart objectional taste and odor to water. However, water quality standards, as with drinking water standards, need to be based on sound peer reviewed science and developed in a transparent manner. We are concerned that underlying data analysis for this proposal is not sufficient to support a statewide standard and has not been adequately vetted by technical peer review.

TDS is a crude measurement of water quality. It is a surrogate for a variety of constituents (primarily chloride and sulfate) that can impart aesthetic qualities (taste) to water. The secondary standard for drinking water was set by the Public Health Service in 1962 based on the results of taste tests. After many trials, samples that were described as having a salty taste were flagged. A correlation between the subjective taste test results and measurements of TDS led to a proposal for a limit of 500 mg/L for TDS and 250 mg/L of chloride and sulfate (at one time EPA had considered setting a primary MCL for sulfate at 250 mg/L, but subsequently dropped the proposal).

There are many constituents that can contribute to TDS. Some (e.g. heavy metals) can have health effects, some can impart taste (e.g. chloride, sulfate), and some (e.g. calcium, magnesium, carbonate, bicarbonate) have no health or taste or odor effects.

There are many man-made and natural sources of Total Dissolved Solids:

- Road salt runoff
- Acid mine drainage
- Wastewater discharges (containing salt that is ingested in foods and beverages)
- Water softening – both on a home, commercial and industrial scale
- Industrial processes
- Discharges from quarries, particularly in limestone formations
- Natural groundwater discharges from carbonate aquifers
- Natural discharges of groundwater in seeps and springs fed from aquifers containing salt or connate groundwater

Any of these sources could, under certain circumstances and in certain settings, result in water in a stream or aquifer (whether used for water supply or not) that exceeds the TDS level of 500 mg/L without there being any adverse impact on aquatic life or drinking water quality or treatment cost.

#### **Targeted regulatory approach appropriate.**

Although TDS might not be the appropriate singular criteria to apply, the concept proposed by the department to apply new criteria only for new or expanded discharges that exceed a higher threshold (2,000 mg/L TDS) might have some merit.

The targets of the proposed regulation are new one-time activities (drilling, hydrofracturing and flow-back) that are happening, and will happen, at multiple sites that vary over time and geography. The potential impact of each activity at each site will vary considerably depending on the location, the time of year, and the methods employed in the activity. Collateral impacts on other pre-existing activities (including road salt application, quarry operations, wastewater dischargers that are not processing wastewater from gas well drilling and development) should be avoided.

#### **Recommendations for Department consideration.**

The second “tier” of the Department’s proposed regulatory approach involves amendments to Chapter 93. This regulation sets water quality standards for waterways to protect designated uses. It appears that the proposed amendments will focus on chlorides; however, Aqua suggests that a broader review of impacts of drilling waters be considered. This approach would allow discharge standards to be developed on a watershed basis, reflecting the levels of protection needed to avoid impairment of designated uses.

In the interim, the Department could apply a targeted approach using a trigger of 2,000 mg/L or 100,000 pounds per day of TDS as a surrogate for a variety of other potential constituents that might adversely impact water quality and tap water compliance or trigger new treatment by downstream users all without relying on the secondary drinking water standard of 500 mg/L TDS.

Applicants proposing discharges exceeding the proposed triggers could propose an impact analysis specific to the proposed time and location of discharge as an alternative to treatment. The impact analysis would have to be reviewed and approved by potentially affected downstream water suppliers relying on the affected source, by the Department, and by representatives of any downstream state (or the appropriate river basin commission). The impact analysis could include proposed mitigation measures that might include contribution to remediation of acid mine drainage or other existing sources of contamination. It is conceivable that downstream water suppliers, and water resources of the Commonwealth, could receive long-term net benefits in contaminant reduction from such mitigation activities that would otherwise not be funded or undertaken.

It is likely, even with the interim regulatory approach outlined above, gas exploration and development companies and wastewater treatment technology companies (including Aqua) will pave a third path -- Zero Liquid Discharge (ZLD) solutions for handling flow-back water. It is our understanding that the technology and capability is within reach and, as of late 2009, has been successfully demonstrated in the state. The recommendations above would be compatible with evolving ZLD technology and with the environmental protection goals of the Department without the potential consequences of protracted litigation or unintended consequences on activities that are not, and never were, the intended target of the proposed regulations.