

Risk-Based Remedies

RBR Consulting, Inc.

650 Shady Drive
Beaver Falls, PA 15010

October 12, 2012

Via U.S. Mail and email to Kevin.R.Coyne@wv.gov

West Virginia Department of Environmental Protection
Division of Water and Waste Management
Water Quality Standards Program
Attention: Kevin Coyne
601 57th Street, SE
Charleston, West Virginia 25304

REGARDING: COMMENTS ON POTENTIAL REVISIONS TO SPECIFIC ASPECTS OF THE WEST VIRGINIA WATER QUALITY STANDARDS

Dear Mr. Coyne:

We appreciate the opportunity to provide comments that will be considered for potential revisions of the West Virginia Water Quality Standards as part of the 2014 Triennial Review Process. The standards of interest are specifically addressed in 47CSR2 Appendix E, Table 1, Category C, Section 8.23. Organics, Human Health Designation. The points raised herein specifically apply to the potentially carcinogenic polycyclic aromatic hydrocarbons (cPAH): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3,-cd)pyrene (misspelled ideno in the regulation), all of which have a standard of 0.018 micrograms per liter (ug/l) in the regulation.

It is relevant to recognize that the 0.018 ug/l standard applied to the cPAH is based on multiple factors that physically cannot occur in some of the waters in which the standard is applied. Specifically, it should be noted that the 0.018 ug/l standard is derived from equations that incorporate (1) factors for the ingestion of fishes by humans and (2) the bioaccumulation of cPAH in the edible tissues of fishes.

We ask the West Virginia Department of Environmental Protection to consider the following two points for revision of specific aspects of the existing water quality standards.

Point 1: The Water Quality Standards for Potentially Carcinogenic PAHs Are Applied to Waters in Which the Technical Basis of the Standards Cannot Physically Occur

Waters that are specifically associated with drainage from urban and suburban roadways, as well as general municipal sources, typically contain traces of cPAH originating from the placement of asphalt on the road as a road surface, automobile exhaust, and tire wear (ATSDR, 1995). These waters (such as intermittent drainage channels) cannot support the presence of any fish, due to the fact that they are too shallow and sometimes ephemeral, regardless of the size of the fishes or the ability of a person to ingest the edible portions. We request that these standards be reconsidered and recalculated or more accurately applied so that they are excluded from application in waters in which the presence of fish of edible size and with edible tissues is impossible. Specifically, Category C standards are based on

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fishing and boating, which cannot occur in the waters under discussion here. Factors and equations addressing standards for the fish ingestion exposure pathway for humans should be excluded from application in waters in which fish (never mind edible size fish) cannot exist due to the size of the waterway or other natural dynamics.

Point 2: The Water Quality Standards are Based on a Phenomenon that has been Shown Scientifically to Occur to a Much Lesser Extent than Assumed by the Standards or Not to Occur at All

Equally as relevant as the application of standards for fish ingestion in waters that cannot support the existence of fish is the development of standards incorporating a phenomenon that does not actually occur. Considerable research has been conducted on the phenomenon of bioaccumulation of PAH in fish tissues. Because these substances are hydrophobic (low solubility in water, high octanol-water partitioning coefficient), fishes would be expected to bioaccumulate PAH. To the contrary, however, research has indicated that this bioaccumulation does not occur. The primary reason that this does not occur is a high depuration rate of PAH in fish tissues due to the presence of enzymes capable of rapidly biodegrading these substances. A review describing this phenomenon and summarizing multiple research papers related to the subject is presented by Van der Oost et al. (2003). Page 78 of this document specifically addresses this issue. This work is supported by numerous later studies, such as Oloade and Lajide (2010). Based on consideration of this research, we believe the derivation of the West Virginia Water Quality Standards incorporates factors that include the bioaccumulation of cPAH in fish tissue despite the fact that considerable research indicates that this phenomenon does not occur.

We ask that the water quality standards for cPAH be reconsidered and recalculated to exclude factors that assume the bioaccumulation of cPAH in the tissues of fishes, given a plethora of scientific data that demonstrate that bioaccumulation of cPAH does not occur in fish tissue.

Once again, we appreciate the opportunity to provide these comments. We reserve the right to present additional comments at future public hearings on this subject. Please do not hesitate to contact me at 724-846-4096 if you have any questions or would like additional information on this subject.

Sincerely,

Bruce E. Fishman, Ph.D. DABT
Chief Toxicologist

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References

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United States Department of Health and Human Services (1995) Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for Polycyclic Aromatic Hydrocarbons*. August.

Van der Oost, R., Beyer, J. and Vermeulen, N. (2003) Fish bioaccumulation and biomarkers in environmental risk assessment: A review. *Environmental Toxicology and Pharmacology* 13: 57-149.