WEST VIRGINIA
SECRETARY OF STATE
NATALIE E. TENNANT
ADMINISTRATIVE LAW DIVISION

Form #3

Do Not Mark In This Box

2013 APR 30 PM 4:48

NOTICE OF AGENCY APPROVAL OF A PROPOSED RULE
AND
FILING WITH THE LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

AGENCY: DEP - Division of Water and Waste Management TITLE NUMBER: 47

CITE AUTHORITY: W. Va. Code § 22-11-4(a)(16); § 22-11-7b

AMENDMENT TO AN EXISTING RULE: YES X NO ____

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 2

TITLE OF RULE BEING AMENDED: Requirements Governing Water Quality Standards

IF NO, SERIES NUMBER OF RULE BEING PROPOSED: ____

TITLE OF RULE BEING PROPOSED: ____

THE ABOVE PROPOSED LEGISLATIVE RULE HAVING GONE TO A PUBLIC HEARING OR A PUBLIC COMMENT PERIOD IS HEREBY APPROVED BY THE PROMULGATING AGENCY FOR FILING WITH THE SECRETARY OF STATE AND THE LEGISLATIVE RULE-MAKING REVIEW COMMITTEE FOR THEIR REVIEW.

Authorized Signature

QUESTIONNAIRE

(Please include a copy of this form with each filing of your rule: Notice of Public Hearing or Comment Period; Proposed Rule, and if needed, Emergency and Modified Rule.)

DATE: April 30, 2013

TO: LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

FROM:(*Agency Name, Address & Phone No.*) DEP - Division of Water and Waste Management

601 57th Street SE Charleston, WV 25304

(304) 926-0440

LEGISLATIVE RULE TITLE: Requirements Governing Water Quality Standards

1. Authorizing statute(s) citation W. Va. Code § 22-11-4(a)(16); § 22-11-7b

2. a. Date filed in State Register with Notice of Hearing or Public Comment Period:

February 8, 2013

b. What other notice, including advertising, did you give of the hearing?

WVDEP website
WVDEP e-mailing list

c. Date of Public Hearing(s) ***or*** Public Comment Period ended:

March 27, 2013

d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments.

Attached X No comments received _____

e. Date you filed in State Register the agency approved proposed Legislative Rule following public hearing: (be exact)

April 30, 2013

f. **Name, title, address and <u>phone/fax/e-mail numbers</u>** of agency person(s) to receive all *written correspondence* regarding this rule: (Please type)

Kevin R. Coyne, Assistant Director

DEP - Division of Water and Waste Management

601 57th Street, SE Charleston, WV 25304

(304) 926-0495 Kevin.R.Coyne@wv.gov

g. **<u>IF DIFFERENT</u> FROM ITEM 'f'**, please give **Name, title, address and phone number(s)** of agency person(s) who wrote and/or has responsibility for the contents of this rule: (Please type)

3. If the statute under which you promulgated the submitted rules requires certain findings and determinations to be made as a condition precedent to their promulgation:

a. Give the date upon which you filed in the State Register a notice of the time and place of a hearing for the taking of evidence and a general description of the issues to be decided.

b. Date of hearing or comment period:

_____

c. On what date did you file in the State Register the findings and determinations required together with the reasons therefor?

_____

d. Attach findings and determinations and reasons:

Attached _____

APPENDIX B

FISCAL NOTE FOR PROPOSED RULES

Rule Title: Requirements Governing Water Quality Standards, 47CSR2

Type of Rule: [X] Legislative [ ] Interpretive [ ] Procedural

Agency: DEP - Division of Water and Waste Management

Address: 601 57th Street, SE

Charleston, WV 25304

Phone Number: (304) 926-0495 Email: Kevin.R.Coyne@wv.gov

Fiscal Note Summary

Summarize in a clear and concise manner what impact this measure will have on costs and revenues of state government.

There will be a cost saving to the state through the implementation of this water quality standard change. Between now and the summer of 2014 the Total Maximum Daily Load (TMDL) program will be creating TMDL's that will be based on the existing water quality standard. By making the change to the water quality standard now the costs that would be incurred by the TMDL program can be avoided.

Fiscal Note Detail

Show over-all effect in Item 1 and 2 and, in Item 3, give an explanation of Breakdown by fiscal year, including long-range effect.

FISCAL YEAR			
Effect of Proposal	Current Increase/Decrease (use "-")	Next Increase/Decrease (use "-")	Fiscal Year (Upon Full Implementation)
1. Estimated Total Cost	0.00	0.00	0.00
Personal Services	0.00	0.00	0.00
Current Expenses	0.00	87,095.00	0.00
Repairs & Alterations	0.00	0.00	0.00
Assets	0.00	0.00	0.00
Other	0.00	0.00	0.00
2. Estimated Total Revenues	0.00	0.00	0.00

Rule Title: Requirements Governing Water Quality Standards, 47CSR2

Rule Title: Requirements Governing Water Quality Standards, 47CSR2

3. Explanation of above estimates (including long-range effect):
Please include any increase or decrease in fees in your estimated total revenues.

The review of Tygart watershed pre-Total Maximum Daily Loads (pre-TMDL) monitoring has identified 37 streams with at least one exceedance of the existing criterion. Of these 37, only 5 streams exhibit exceedances based on the new proposed criteria and would require a TMDL. Assuming that 37 streams would be impaired pursuant to the existing criterion, and 5 of those would remain impaired if revised, then the TMDL avoidance cost would be 32 x our average per pollutant TMDL development cost over the last 11 project years = 32 * $2,722 = $87,095.

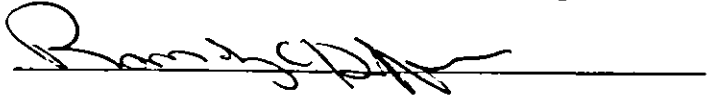
MEMORANDUM

Please identify any areas of vagueness, technical defects, reasons the proposed rule **would not** have a fiscal impact, and/or any special issues **not** captured elsewhere on this form.

The proposed rule will revise the dissolved aluminum criteria and the human health Category A beryllium criterion. The agency's costs to implement these water quality standards will remain unchanged after the triennial review in 2014.

Date: April 30, 2013

Signature of Agency Head or Authorized Representative



DEPARTMENT OF ENVIRONMENTAL PROTECTION

PROPOSED RULE BRIEFING DOCUMENT

Rule Title:

"Requirements Governing Water Quality Standards", 47CSR2

A. AUTHORITY:

W.Va. Code §22-11-4(a)(16); 22-11-7b

B. SUMMARY OF RULE:

This rule establishes requirements governing surface water quality standards for the waters of the State and establishes standards of purity and quality consistent with public health and the enjoyment thereof, the protection of animal, aquatic and plant life and the expansion of employment opportunities, agricultural expansion and a foundation for healthy industrial development.

C. STATEMENT OF CIRCUMSTANCES WHICH REQUIRE RULE:

The DEP is proposing this rule to revise the dissolved aluminum criteria and human health category A beryllium criterion in 47CSR2.

Current scientific studies show a direct relationship between the hardness concentration and the toxicity of dissolved aluminum in waters with a pH value of 6.5 to 9.0. This evidence provides an equation using stream hardness concentration that will accurately calculate the dissolved aluminum criteria necessary to protect the uses of warm and trout waters of WV.

The current human health Category A beryllium criterion is being updated to reflect EPA's maximum contaminant level goal (MCLG) of 0.004 mg/l. The MCLG represents the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety.

Unnecessary treatment costs for a portion of the regulated community and the inclusion of many waters on the DEP's 303(d) list that are not impaired will occur without this revised dissolved aluminum and beryllium criteria. This rule is therefore justified as necessary to prevent substantial harm to the public interest.

See attached "Emergency Rule Justification" for further discussion of emergency circumstances.

EMERGENCY RULE JUSTIFICATION

The West Virginia Department of Environmental Protection ("DEP"), Division of Water and Waste Management is proposing an emergency rule to address the aquatic life category B dissolved aluminum criteria and human health category A beryllium criterion in the state water quality standards rule "Requirements Governing Water Quality Standards", 47CSR2. This proposed emergency rule is necessary to prevent substantial harm to the public's interest in economical and meaningful expenditure of resources in environmental regulation. The current water quality standards for these two criteria are in some circumstances overprotective while underprotective in others. Due to this situation the regulated community is subject to DEP permit limits that cause them to incur unnecessary treatment costs and subject some of the State's waters to inclusion on EPA's list of impaired waters when such waters are not actually degraded. Registering waters on the impaired waters list initiates a regulatory process for the DEP that results in the significant expenditure of agency resources in cases where it is unwarranted. This diverts resources from other programs where protection of water quality is, in fact, essential and vital. Also, it has been found in low hardness environments, the current dissolved aluminum criteria have been found to be underprotective in the safeguarding of the aquatic life uses.

Therefore, based on the scientific justification outlined below, DEP's Division of Water and Waste Management (DWWM) proposes to amend the acute and chronic dissolved aluminum standards from their current limits of 750 µg/l in Category B1 waters (warm water aquatic life) and 750 µg/l acute or 87 µg/l chronic in Category B2 waters (trout streams) to limits based on calculations established by using the equations explained below. DWWM further proposes to amend the current beryllium standard from 0.0077 µg/l to 4 µg/l.[1]

SCIENTIFIC JUSTIFICATION

Dissolved Aluminum. Dissolved aluminum toxicity, like other metals, has a direct relationship to hardness, and numerous scientific studies have validated the impact of hardness as it relates to toxicity to the aquatic community. These studies were recently utilized to update and justify new hardness based approaches to dissolved aluminum criteria in Colorado and New Mexico, and subsequently these approaches have been approved by both the respective EPA regions and EPA headquarters. These same studies can be used to validate a relationship between the hardness concentration of West Virginia's waters and the toxicity of dissolved aluminum in waters within a pH range of greater-than or equal to 6.5 to less-than or equal to 9.0. This evidence provides an equation using stream hardness concentrations that calculates the dissolved aluminum criteria necessary to protect the designated uses of West Virginia's waters. The equation includes lower and upper boundaries for hardness levels (26 to 220 mg/L respectively) that will be applied in the calculation and are based upon the hardness levels utilized in the scientific studies that resulted

[1] These standards are found in sections 8.1 and 8.6 of the Rule and in Appendix E, Table 1 on page 34.

in the development of the equation. Based on the scientific research presented, DEP proposes to amend the dissolved aluminum criteria to standards that reflect the impact that hardness has on dissolved aluminum toxicity in West Virginia's waters.

Beryllium. EPA has not proposed a national recommended water quality criterion for beryllium, but it does have a maximum contaminant level goal (MCLG) of 4 µg/L. For a pollutant for which EPA has not published a recommended water quality criterion for "water and organisms" and for which EPA has promulgated a MCLG, EPA generally recommends the MCLG for non-carcinogenic pollutants. The MCLG represents the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur and that allows an adequate margin of safety. The MCLG is derived in a three-step process that includes the calculation of a reference dose (RfD). The RfD is an estimate of the amount of a chemical that a person can be exposed to on a daily basis that is not anticipated to cause adverse systemic health effects over the person's lifetime. The proposed beryllium criterion of 4 µg/L provides for the protection of the human health use of surface water.

As presented in this justification, by amending both the dissolved aluminum and the beryllium standards, West Virginia can avoid substantial harm to both the regulated community and the agency while maintaining the level of protection necessary for its aquatic life and human health. These proposed amendments will also be included in the 2014 Triennial Review for both Legislative and EPA approval.

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 2
REQUIREMENTS GOVERNING WATER QUALITY STANDARDS

§47-2-1. General.

1.1. Scope. -- These rules establish requirements governing the discharge or deposit of sewage, industrial wastes and other wastes into the waters of the state and establish water quality standards for the waters of the State standing or flowing over the surface of the State. It is declared to be the public policy of the State of West Virginia to maintain reasonable standards of purity and quality of the water of the State consistent with (1) public health and public enjoyment thereof; (2) the propagation and protection of animal, bird, fish, and other aquatic and plant life; and (3) the expansion of employment opportunities, maintenance and expansion of agriculture and the provision of a permanent foundation for healthy industrial development. (See W. Va. Code §22-11-2.)

1.2. Authority. -- W. Va. Code §§22-11-4(a)(16); 22-11-7b.

1.3. Filing Date. --

1.4. Effective Date. --

§47-2-2. Definitions.

The following definitions in addition to those set forth in W. Va. Code §22-11-3, shall apply to these rules unless otherwise specified herein, or unless the context in which used clearly requires a different meaning:

2.1. "Conventional treatment" is the treatment of water as approved by the West Virginia Bureau for Public Health to assure that the water is safe for human consumption.

2.2. "Cool water lakes" are lakes managed by the West Virginia Division of Natural Resources for cool water fisheries, with summer residence times greater than 14 days.

2.3. "Cumulative" means a pollutant which increases in concentration in an organism by successive additions at different times or in different ways (bio-accumulation).

2.4. "Designated uses" are those uses specified in water quality standards for each water or segment whether or not they are being attained. (See sections 6.2 - 6.6, herein)

2.5. "Dissolved metal" is operationally defined as that portion of metal which passes through a 0.45 micron filter.

2.6. "Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included in the water quality standards.

2.7. The "Federal Act" means the Clean Water Act (also known as the Federal Water Pollution Control Act) 33 U.S.C. §1251 - 1387.

2.8. "High quality waters" are those waters whose quality is equal to or better than the minimum levels necessary to achieve the national water quality goal uses.

2.9. "Intermittent streams" are streams which have no flow during sustained periods of no precipitation and which do not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six (6) months.

2.10. "Outstanding national resource waters" are those waters whose unique character, ecological or recreational value or

pristine nature constitutes a valuable national or State resource.

2.11. "Natural" or "naturally occurring" values or "natural temperature" shall mean for all of the waters of the state:

2.11.a. Those water quality values which exist unaffected by -- or unaffected as a consequence of -- any water use by any person; and

2.11.b. Those water quality values which exist unaffected by the discharge, or direct or indirect deposit of, any solid, liquid or gaseous substance from any point source or non-point source.

2.12. "Non-point source" shall mean any source other than a point source from which pollutants may reach the waters of the state.

2.13. "Persistent" shall mean a pollutant and its transformation products which under natural conditions degrade slowly in an aquatic environment.

2.14. "Point source" shall mean any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

2.15. "Representative important species of aquatic life" shall mean those species of aquatic life whose protection and propagation will assure the sustained presence of a balanced aquatic community. Such species are representative in the sense that maintenance of water quality criteria will assure both the natural completion of the species' life cycles and the overall protection and sustained propagation of the balanced aquatic community.

2.16. "Secretary" shall mean the Secretary of the Department of Environmental Protection or such other person to whom the Secretary has delegated authority or duties pursuant to W. Va. Code §§22-1-6 or 22-1-8.

2.17. The "State Act" or "State Law" shall mean the West Virginia Water Pollution Control Act, W. Va. Code §22-11-1 et seq.

2.18. "Total recoverable" refers to the digestion procedure for certain heavy metals as referenced in 40 CFR 136, as amended June 15, 1990 and March 26, 2007, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act.

2.19. "Trout waters" are waters which sustain year-round trout populations. Excluded are those waters which receive annual stockings of trout but which do not support year-round trout populations.

2.20. "Water quality criteria" shall mean levels of parameters or stream conditions that are required to be maintained by these regulations. Criteria may be expressed as a constituent concentration, levels, or narrative statement, representing a quality of water that supports a designated use or uses.

2.21. "Water quality standards" means the combination of water uses to be protected and the water quality criteria to be maintained by these rules.

2.22. "Wetlands" are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

2.23. "Wet weather streams" are streams that flow only in direct response to precipitation or whose channels are at all times above the water table.

§47-2-3. Conditions Not Allowable In State Waters.

3.1. Certain characteristics of sewage, industrial wastes and other wastes cause

pollution and are objectionable in all waters of the state. Therefore, the Secretary does hereby proclaim that the following general conditions are not to be allowed in any of the waters of the state.

3.2. No sewage, industrial wastes or other wastes present in any of the waters of the state shall cause therein or materially contribute to any of the following conditions thereof:

3.2.a. Distinctly visible floating or settleable solids, suspended solids, scum, foam or oily slicks;

3.2.b. Deposits or sludge banks on the bottom;

3.2.c. Odors in the vicinity of the waters;

3.2.d. Taste or odor that would adversely affect the designated uses of the affected waters;

3.2.e. Materials in concentrations which are harmful, hazardous or toxic to man, animal or aquatic life;

3.2.f. Distinctly visible color;

3.2.g. Algae blooms or concentrations of bacteria which may impair or interfere with the designated uses of the affected waters;

3.2.h. Requiring an unreasonable degree of treatment for the production of potable water by modern water treatment processes as commonly employed; and

3.2.i. Any other condition, including radiological exposure, which adversely alters the integrity of the waters of the State including wetlands; no significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems shall be allowed.

§47-2-4. Antidegradation Policy.

4.1. It is the policy of the State of West Virginia that the waters of the state shall be maintained and protected as follows:

4.1.a. Tier 1 Protection. Existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Existing uses are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.

4.1.b. Tier 2 Protection. The existing high quality waters of the state must be maintained at their existing high quality unless it is determined after satisfaction of the intergovernmental coordination of the state's continuing planning process and opportunity for public comment and hearing that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. If limited degradation is allowed, it shall not result in injury or interference with existing stream water uses or in violation of state or federal water quality criteria that describe the base levels necessary to sustain the national water quality goal uses of protection and propagation of fish, shellfish and wildlife and recreating in and on the water.

In addition, the Secretary shall assure that all new and existing point sources shall achieve the highest established statutory and regulatory requirements applicable to them and shall assure the achievement of cost-effective and reasonable best management practices (BMPs) for non-point source control. If BMPs are demonstrated to be inadequate to reduce or minimize water quality impacts, the Secretary may require that more appropriate BMPs be developed and applied.

4.1.b.1. High quality waters are those waters meeting the definition at section 2.8 herein.

4.1.b.2. High quality waters may include but are not limited to the following:

4.1.b.2.A. Streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code §22-13-5; and

4.1.b.2.B. Streams listed in West Virginia High Quality Streams, Fifth Edition, prepared by the Wildlife Resources Division, Department of Natural Resources (1986).

4.1.b.2.C. Streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.

4.1.c. Tier 3 Protection. In all cases, waters which constitute an outstanding national resource shall be maintained and protected and improved where necessary. Outstanding national resource waters include, but are not limited to, all streams and rivers within the boundaries of Wilderness Areas designated by The Wilderness Act (16 U.S.C. §1131 et seq.) within the State, all Federally designated rivers under the "Wild and Scenic Rivers Act", 16 U.S.C. §1271 et seq.; all streams and other bodies of water in state parks which are high quality waters or naturally reproducing trout streams; waters in national parks and forests which are high quality waters or naturally reproducing trout streams; waters designated under the "National Parks and Recreation Act of 1978", as amended; and pursuant to subsection 7.1 of 60CSR5, those waters whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource.

Additional waters may be nominated for inclusion in that category by any interested party or by the Secretary on his or her own initiative. To designate a nominated water as an outstanding national resource water, the Secretary shall follow the public notice and hearing provisions as provided in 46 C.S.R. 6.

4.1.d. All applicable requirements of section 316(a) of the Federal Act shall apply to modifications of the temperature water quality criteria provided for in these rules.

§47-2-5. Mixing Zones.

5.1. In the permit review and planning process or upon the request of a permit applicant or permittee, the Secretary may establish on a case-by-case basis an appropriate mixing zone.

5.2. The following guidelines and conditions are applicable to all mixing zones:

5.2.a. The Secretary will assign, on a case-by-case basis, definable geometric limits for mixing zones for a discharge or a pollutant or pollutants within a discharge. Applicable limits shall include, but may not be limited to, the linear distances from the point of discharge, surface area involvement, volume of receiving water, and shall take into account other nearby mixing zones. Mixing zones shall take into account the mixing conditions in the receiving stream (i.e: whether complete or incomplete mixing conditions exist). Mixing zones will not be allowed until applicable limits are assigned by the Secretary in accordance with this section.

5.2.b. Concentrations of pollutants which exceed the acute criteria for protection of aquatic life set forth in Appendix E, Table 1 shall not exist at any point within an assigned mixing zone or in the discharge itself unless a zone of initial dilution is assigned. A zone of initial dilution may be assigned on a case-by-case basis at the discretion of the Secretary. The zone of initial dilution is the area within the mixing zone where initial dilution of the effluent with the receiving water occurs, and where the concentration of the effluent will be its greatest in the water column. Where a zone of initial dilution is assigned by the Secretary, the size of the zone shall be determined using one of the four alternatives outlined in section 4.3.3 of US EPA's Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001 PB91-127415, March 1991). Concentrations of pollutants shall not exceed the acute criteria at the edge of the assigned zone of initial dilution. Chronic criteria for the protection of aquatic life may be exceeded within the mixing zone but shall be met at the edge of the assigned mixing zone.

5.2.c. Concentrations of pollutants which exceed the criteria for the protection of human health set forth in Appendix E, Table 1 shall not be allowed at any point unless a mixing zone has been assigned by the Secretary after consultation with the Commissioner of the West Virginia Bureau for Public Health. Human health criteria may be exceeded within an assigned mixing zone, but shall be met at the edge of the assigned mixing zone. Mixing zones for human health criteria shall be sized to prevent significant human health risks and shall be developed using reasonable assumptions about exposure pathways. In assessing the potential human health risks of establishing a mixing zone upstream from a drinking water intake, the Secretary shall consider the cumulative effects of multiple discharges and mixing zones on the drinking water intake. No mixing zone for human health criteria shall be established on a stream which has a seven (7) day, ten (10) year return frequency of 5 cfs or less.

5.2.d. Mixing zones, including zones of initial dilution, shall not interfere with fish spawning or nursery areas or fish migration routes; shall not overlap public water supply intakes or bathing areas; cause lethality to or preclude the free passage of fish or other aquatic life; nor harm any threatened or endangered species, as listed in the Federal Endangered Species Act, 15 U.S.C. §1531 et seq.

5.2.e. The mixing zone shall not exceed one-third (1/3) of the width of the receiving stream, and in no case shall the mixing zone exceed one-half (1/2) of the cross-sectional area of the receiving stream.

5.2.f. In lakes and other surface impoundments, the volume of a mixing zone shall not affect in excess of ten (10) percent of the volume of that portion of the receiving waters available for mixing.

5.2.g. A mixing zone shall be limited to an area or volume which will not adversely alter the existing or designated uses of the receiving water, nor be so large as to adversely affect the integrity of the water.

5.2.h. Mixing zones shall not:

5.2.h.1. Be used for, or considered as, a substitute for technology-based requirements of the Act and other applicable state and federal laws.

5.2.h.2. Extend downstream at any time a distance more than five times the width of the receiving watercourse at the point of discharge.

5.2.h.3. Cause or contribute to any of the conditions prohibited in section 3, herein.

5.2.h.4. Be granted where instream waste concentration of a discharge is greater than 80%.

5.2.h.5. Overlap one another.

5.2.h.6. Overlap any 1/2 mile zone described in section 7.2.a.2 herein.

5.2.i. In the case of thermal discharges, a successful demonstration conducted under section 316(a) of the Act shall constitute compliance with all provisions of this section.

5.2.j. The Secretary may waive the requirements of subsections 5.2.e and 5.2.h.2 above if a discharger provides an acceptable demonstration of:

5.2.j.1. Information defining the actual boundaries of the mixing zone in question; and

5.2.j.2. Information and data proving no violation of subsections 5.2.d and 5.2.g above by the mixing zone in question.

5.2.k. Upon implementation of a mixing zone in a permit, the permittee shall provide documentation that demonstrates to the satisfaction of the Secretary that the mixing zone is in compliance with the provisions outlined in subsections 5.2.b, 5.2.c, 5.2.e, and 5.2.h.2, herein.

5.2.l. In order to facilitate a determination or assessment of a mixing zone

pursuant to this section, the Secretary may require a permit applicant or permittee to submit such information as deemed necessary.

§47-2-6. Water Use Categories.

6.1. These rules establish general Water Use Categories and Water Quality Standards for the waters of the State. Unless otherwise designated by these rules, at a minimum all waters of the State are designated for the Propagation and Maintenance of Fish and Other Aquatic Life (Category B) and for Water Contact Recreation (Category C) consistent with Federal Act goals. Incidental utilization for whatever purpose may or may not constitute a justification for assignment of a water use category to a particular stream segment.

6.1.a. Waste assimilation and transport are not recognized as designated uses. The classification of the waters must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation.

Subcategories of a use may be adopted and appropriate criteria set to reflect varying needs of such subcategories of uses, for example to differentiate between trout water and other waters.

6.1.b. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under section 301(b) and section 306 of the Federal Act and use of cost-effective and reasonable best management practices for non-point source control. Seasonal uses may be adopted as an alternative to reclassifying a water or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria will be adjusted to reflect the seasonal uses; however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season. A designated use which is not an existing use may be removed, or subcategories of a use may be established if it can be demonstrated that attaining the designated use is not feasible because:

6.1.b.1. Application of effluent limitations for existing sources more stringent than those required pursuant to section 301 (b) and section 306 of the Federal Act in order to attain the existing designated use would result in substantial and widespread adverse economic and social impact; or

6.1.b.2. Naturally-occurring pollutant concentrations prevent the attainment of the use; or

6.1.b.3. Natural, ephemeral, intermittent or low flow conditions of water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges to enable uses to be met; or

6.1.b.4. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

6.1.b.5. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water to its original condition or to operate such modification in a way that would result in the attainment of the use; or

6.1.b.6. Physical conditions related to the natural features of the water, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses.

6.1.c. The State shall take into consideration the quality of downstream waters and shall assure that its water quality standards provide for the attainment of the water quality standards of downstream waters.

6.1.d. In establishing a less restrictive use or uses, or subcategory of use or uses, and the water quality criteria based upon such uses, the Secretary shall follow the requirements for

revision of water quality standards as required by W. Va. Code §22-11-7b and section 303 of the Federal Act and the regulations thereunder. Any revision of water quality standards shall be made with the concurrence of EPA. The Secretary's administrative procedural regulations for applying for less restrictive uses or criteria shall be followed.

6.2. Category A -- Water Supply, Public. -- This category is used to describe waters which, after conventional treatment, are used for human consumption. This category includes streams on which the following are located:

6.2.a. All community domestic water supply systems;

6.2.b. All non-community domestic water supply systems, (i.e. hospitals, schools, etc.);

6.2.c. All private domestic water systems;

6.2.d. All other surface water intakes where the water is used for human consumption. (See Appendix B for partial listing of Category A waters; see section 7.2.a.2, herein for additional requirements for Category A waters.) 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.

6.3. Category B -- Propagation and maintenance of fish and other aquatic life. --

This category includes:

6.3.a. Category B1 -- Warm water fishery streams. -- Streams or stream segments which contain populations composed of all warm water aquatic life.

6.3.b. Category B2 -- Trout Waters. -- As defined in section 2.19, herein (See Appendix A for a representative list.)

6.3.c. Category B4 -- Wetlands. -- As defined in section 2.22, herein; certain numeric stream criteria may not be appropriate for application to wetlands (see Appendix E, Table 1).

6.4. Category C -- Water contact recreation. -- This category includes swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats. (See Appendix D for a representative list of category C waters.)

6.5. Category D. -- Agriculture and wildlife uses.

6.5.a. Category D1 -- Irrigation. -- This category includes all stream segments used for irrigation.

6.5.b. Category D2 -- Livestock watering. -- This category includes all stream segments used for livestock watering.

6.5.c. Category D3 -- Wildlife. -- This category includes all stream segments and wetlands used by wildlife.

6.6. Category E -- Water supply industrial, water transport, cooling and power. -- This category includes cooling water, industrial water supply, power production, commercial and pleasure vessel activity, except those small craft included in Category C.

6.6.a. Category E1 -- Water Transport. -- This category includes all stream segments modified for water transport and having permanently maintained navigation aides.

6.6.b. Category E2 -- Cooling Water. -- This category includes all stream segments having one (1) or more users for industrial cooling.

6.6.c. Category E3 -- Power production. -- This category includes all stream segments extending from a point 500 feet upstream from the intake to a point one half (1/2) mile below the wastewater discharge point. (See Appendix C for representative list.)

6.6.d. Category E4 -- Industrial. -- This category is used to describe all stream segments with one (1) or more industrial users. It does not include water for cooling.

§47-2-7. West Virginia Waters.

7.1. Major River Basins and their Alphanumeric System. All streams and their tributaries in West Virginia shall be individually identified using an alphanumeric system as identified in the "Key to West Virginia Stream Systems and Major Tributaries" (1956) as published by the Conservation Commission of West Virginia and revised by the West Virginia Department of Natural Resources, Division of Wildlife (1985).

7.1.a. J - James River Basin. All tributaries to the West Virginia - Virginia State line.

7.1.b. P - Potomac River Basin. All tributaries of the main stem of the Potomac River to the West Virginia - Maryland - Virginia State line to the confluence of the North Branch and the South Branch of the Potomac River and all tributaries arising in West Virginia excluding the major tributaries hereinafter designated:

7.1.b.1. S - Shenandoah River and all its tributaries arising in West Virginia to the West Virginia - Virginia State line.

7.1.b.2. PC - Cacapon River and all its tributaries.

7.1.b.3. PSB - South Branch and all its tributaries.

7.1.b.4. PNB - North Branch and all tributaries to the North Branch arising in West Virginia.

7.1.c. M - Monongahela River Basin. The Monongahela River Basin main stem and all its tributaries excluding the following major tributaries which are designated as follows:

7.1.c.1. MC - Cheat River and all its tributaries except those listed below:

7.1.c.1.A. MCB - Blackwater River and all its tributaries.

7.1.c.2. MW - West Fork River and all its tributaries.

7.1.c.3. MT - Tygart River and all its tributaries except those listed below:

7.1.c.3.A. MTB - Buckhannon River and all its tributaries.

7.1.c.3.B. MTM - Middle Fork River and all its tributaries.

7.1.c.4. MY - Youghigheny River and all its tributaries to the West Virginia - Maryland State line.

7.1.d. O Zone 1 - Ohio River - Main Stem. The main stem of the Ohio River from the Ohio - Pennsylvania - West Virginia state line to the Ohio - Kentucky - West Virginia State line.

7.1.e. O Zone 2 - Ohio River - Tributaries. All tributaries of the Ohio River excluding the following major tributaries:

7.1.e.1. LK - Little Kanawha River. The Little Kanawha River and all its tributaries excluding the following major tributary which is designated as follows:

7.1.e.1.A. LKH - Hughes River and all its tributaries.

7.1.e.2. K - Kanawha River Zone 1. The main stem of the Kanawha River from mile point 0, at its confluence with the Ohio River, to mile point 72 near Diamond, West Virginia.

7.1.e.3. K - Kanawha River Zone 2. The main stem of the Kanawha River from mile point 72 near Diamond, West Virginia and all its tributaries from mile point 0 to the headwaters excluding the following major tributaries which are designated as follows:

7.1.e.3.A. KP - Pocatalico River and all its tributaries.

7.1.e.3.B. KC - Coal River and all its tributaries.

7.1.e.3.C. KE - Elk River and all its tributaries.

7.1.e.3.D. KG - Gauley River. The Gauley River and all its tributaries excluding the following major tributaries which are designated as follows:

7.1.e.3.D.1. KG-19 - Meadow River and all its tributaries.

7.1.e.3.D.2. KG-34 - Cherry River and all its tributaries.

7.1.e.3.D.3. KGC - Cranberry River and all its tributaries.

7.1.e.3.D.4. KGW - Williams River and all its tributaries.

7.1.e.3.E. KN - New River. The New River from its confluence with the Gauley River to the Virginia - West Virginia State line and all tributaries excluding the following major tributaries which are designated as follows:

7.1.e.3.E.1. KNG - Greenbrier River and all its tributaries.

7.1.e.3.E.2. KNB - Bluestone River and all its tributaries.

7.1.e.3.E.3. KN-60 - East River and all its tributaries.

7.1.e.3.E.4. K(L)-81-(1) - Bluestone Lake.

7.1.e.4. OG - Guyandotte River. The Guyandotte River and all its tributaries excluding the following major tributary which is designated as follows:

7.1.e.4.1. OGM - Mud River and all its tributaries.

7.1.e.5. BS - Big Sandy River. The Big Sandy River to the Kentucky - Virginia - West Virginia State lines and all its tributaries arising in West Virginia excluding the following major tributary which is designated as follows:

7.1.e.5.1 BST - Tug Fork and all its tributaries.

7.2. Applicability of Water Quality Standards. The following shall apply at all times unless a specific exception is granted in this section:

7.2.a. Water Use Categories as described in section 6, herein.

7.2.a.1. Based on meeting those Section 6 definitions, tributaries or stream segments may be classified for one or more Water Use Categories. When more than one use exists, they shall be protected by criteria for the use category requiring the most stringent protection.

7.2.a.2. Each segment extending upstream from the intake of a water supply public (Water Use Category A), for a distance of one half (1/2) mile or to the headwater, must be protected by prohibiting the discharge of any pollutants in excess of the concentrations designated for this Water Use Category in section 8, herein. In addition, within that one half (1/2) mile zone, the Secretary may establish for any discharge, effluent limitations for the protection of human health that require additional removal of pollutants than would otherwise be provided by this rule. (If a watershed is not significantly larger than this zone above the intake, the water supply section may include the entire upstream watershed to its headwaters.) The one-half (1/2) mile zone described in this section shall not apply to the Ohio River main channel (between Brown's Island and the left descending bank) between river mile points 61.0 and 63.5 and mile points 70 and 71. All mixing zone regulations found in section 5 of this rule will apply except 47 CSR 2 §5.2.h.6. Whether a mixing zone is appropriate, and the proper size of such zone, would need to be considered on a site-specific basis in accordance with the EPA approved West

Virginia mixing zone regulations in 47 CSR 2 §5.

7.2.b. In the absence of any special application or contrary provision, water quality standards shall apply at all times when flows are equal to or greater than the minimum mean seven (7) consecutive day drought flow with a ten (10) year return frequency (7Q10). NOTE: With the exception of section 7.2.c.5 listed herein exceptions do not apply to trout waters nor to the requirements of section 3, herein.

7.2.c. Exceptions: Numeric water quality standards shall not apply: (See section 7.2.d, herein, for site-specific revisions)

7.2.c.1. When the flow is less than 7Q10;

7.2.c.2. In wet weather streams (or intermittent streams, when they are dry or have no measurable flow): Provided, that the existing and designated uses of downstream waters are not adversely affected;

7.2.c.3. In any assigned zone of initial dilution of any mixing zone where a zone of initial dilution is required by section 5.2.b herein, or in any assigned mixing zone for human health criteria or aquatic life criteria for which a zone of initial dilution is not assigned; In zones of initial dilution and certain mixing zones: Provided, That all requirements described in section 5 herein shall apply to all zones of initial dilution and all mixing zones;

7.2.c.4. Where, on the basis of natural conditions, the Secretary has established a site-specific aquatic life water quality criterion that modifies a water quality criterion set out in Appendix E, Table 1 of this rule. Where a natural condition of a water is demonstrated to be of lower quality than a water quality criterion for the use classes and subclasses in section 6 of this rule, the Secretary, in his or her discretion, may establish a site-specific water quality criterion for aquatic life. This alternate criterion may only serve as the chronic criterion established for that parameter. This alternate criterion must be met at end of pipe. Where the Secretary decides to establish a site-specific water quality criterion for aquatic life, the natural condition constitutes the applicable water quality criterion. A site-specific criterion for natural conditions may only be established through the legislative rulemaking process in accordance with W. Va. Code §29A-3-1 et seq. and must satisfy the public participation requirements set forth at 40 C.F.R. 131.20 and 40 C.F.R. Part 25. Site-specific criteria for natural conditions may be established only for aquatic life criteria. A public notice, hearing and comment period is required before site-specific criteria for natural conditions are established.

Upon application or on its own initiative, the Secretary will determine whether a natural condition of a water should be approved as a site-specific water quality criterion. Before he or she approves a site-specific water quality criterion for a natural condition, the Secretary must find that the natural condition will fully protect existing and designated uses and ensure the protection of aquatic life. If a natural condition of a water varies with time, the natural condition will be determined to be the actual natural condition of the water measured prior to or concurrent with discharge or operation. The Secretary will, in his or her discretion, determine a natural condition for one or more seasonal or shorter periods to reflect variable ambient conditions; and require additional or continuing monitoring of natural conditions.

An application for a site-specific criterion to be established on the basis of natural conditions shall be filed with the Secretary and shall include the following information:

7.2.c.4.A. A U.S.G.S. 7.5 minute map showing the stream segment affected and showing all existing discharge points and proposed discharge point;

7.2.c.4.B. The alphanumeric code of the affected stream, if known;

7.2.c.4.C. Water quality data for the stream or stream segment. Where adequate data are unavailable, additional studies may be required by the Secretary;

7.2.c.4.D. General land uses (e.g. mining, agricultural, recreation, residential, commercial, industrial, etc.) as well as specific land uses adjacent to the waters for the affected segment or stream;

7.2.c.4.E. The existing and designated uses of the receiving waters into which the segment in question discharges and the location where those downstream uses begin to occur;

7.2.c.4.F. General physical characteristics of the stream segment, including, but not limited to width, depth, bottom composition and slope;

7.2.c.4.G. Conclusive information and data of the source of the natural condition that causes the stream to exceed the water quality standard for the criterion at issue.

7.2.c.4.H. The average flow rate in the segment and the amount of flow at a designated control point and a statement regarding whether the flow of the stream is ephemeral, intermittent or perennial;

7.2.c.4.I. An assessment of aquatic life in the stream or stream segment in question and in the adjacent upstream and downstream segments; and

7.2.c.4.J. Any additional information or data that the Secretary deems necessary to make a decision on the application.

7.2.c.5. For the upper Blackwater River from the mouth of Yellow Creek to a point 5.1 miles upstream, when flow is less than 7Q10. Naturally occurring values for Dissolved Oxygen as established by data collected by the dischargers within this reach and reviewed by the Secretary shall be the applicable criteria.

7.2.d. Site-specific applicability of water use categories and water quality criteria - State-wide water quality standards shall apply except where site-specific numeric criteria, variances or use removals have been approved following application and hearing, as provided in 46 C.S.R. 6. (See section 8.4 and section 8.5, herein) The following are approved site-specific criteria, variances and use reclassifications:

7.2.d.1. James River - (Reserved)

7.2.d.2. Potomac River

7.2.d.2.1. A site-specific numeric criterion for aluminum, not to exceed 500 ug/l, shall apply to the section of Opequon Creek from Turkey Run to the Potomac River.

7.2.d.3. Shenandoah River - (Reserved)

7.2.d.4. Cacapon River - (Reserved)

7.2.d.5. South Branch - (Reserved)

7.2.d.6. North Branch - (Reserved)

7.2.d.7. Monongahela River

7.2.d.7.1. Flow in the main stem of the Monongahela River, as regulated by the Tygart and Stonewall Jackson Reservoirs, operated by the U. S. Army Corps of Engineers, is based on a minimum flow of 425 cfs at Lock and Dam No. 8, river mile point 90.8. This exception does not apply to tributaries of the Monongahela River.

7.2.d.8. Cheat River

7.2.d.8.1. In the unnamed tributary of Daugherty Run, approximately one mile upstream of Daugherty Run's confluence with the Cheat River, a site-specific numeric criterion for iron of 3.5 mg/l shall apply and the following frequency and duration requirements shall apply to the chronic numeric criterion for selenium (5ug/l): the four-day average concentration shall not be exceeded more than three times every three years (36 months), on average. Further, the following site-specific numeric criteria shall apply to Fly Ash Run of Daugherty Run: acute numeric criterion for aluminum: 888.5 ug/l and manganese: 5 mg/l.

7.2.d.9. Blackwater River - (Reserved)

7.2.d.10. West Fork River - (Reserved)

7.2.d.11. Tygart River - (Reserved)

7.2.d.12. Buckhannon River - (Reserved)

7.2.d.13. Middle Fork River - (Reserved)

7.2.d.14. Youghiogheny River - (Reserved)

7.2.d.15. Ohio River Main Stem - (Reserved)

7.2.d.16. Ohio River Tributaries.

7.2.d.16.1. Site-specific numeric criteria shall apply to the stretch of Conners Run (0-77-A), a tributary of Fish Creek, from its mouth to the discharge from Conner Run impoundment, which shall not have the Water Use Category A and may contain selenium not to exceed 62 ug/1; and iron not to exceed 3.5 mg/1 as a monthly average and 7 mg/1 as a daily maximum.

7.2.d.17. Little Kanawha River - (Reserved)

7.2.d.18. Hughes River - (Reserved)

7.2.d.19. Kanawha River Zone 1 - Main Stem

7.2.d.19.1. For the Kanawha River main stem, Zone 1, Water Use Category A shall not apply; and

7.2.d.19.2. The minimum flow shall be 1,960 cfs at the Charleston gauge.

7.2.d.19.3. A variance pursuant to 46 CSR 6, Section 5.1, based on naturally occurring pollutant concentrations, shall apply to Union Carbide Corporation's discharge to Ward Hollow of Davis Creek, which shall have the instream criteria for chlorides of 310 mg/l for Category A and C waters and for Category B1 (chronic aquatic life protection). This exception shall be in effect until action by the Secretary to revise the exception or until July 1, 2014, whichever comes first.

7.2.d.20. Kanawha River Zone 2 and Tributaries.

7.2.d.20.1. For the main stem of the Kanawha River only, the minimum flow shall be 1,896 cfs at mile point 72.

7.2.d.20.2. The stretch between the mouth of Little Scary Creek (K-31) and the Little Scary impoundment shall not have Water Use Category A. The following site-specific numeric criteria shall apply to that section: selenium not to exceed 62 ug/1 and copper not to exceed 105 ug/1 as a daily maximum nor 49 ug/1 as a 4-day average.

7.2.d.21. Pocatalico River - (Reserved)

7.2.d.22. Coal River - (Reserved)

7.2.d.23. Elk River - (Reserved)

7.2.d.24. Gauley River - (Reserved)

7.2.d.25. Meadow River - (Reserved)

7.2.d.26. Cherry River - (Reserved)

7.2.d.27. Cranberry River - (Reserved)

7.2.d.28. Williams River - (Reserved)

7.2.d.29. New River - (Reserved)

7.2.d.30. Greenbrier River - (Reserved)

7.2.d.31. Bluestone River - (Reserved)

7.2.d.32. Bluestone Lake - (Reserved)

7.2.d.33. East River - (Reserved)

7.2.d.34. Guyandotte River -

7.2.d.34.1. Pats Branch from its confluence with the Guyandotte River to a point 1000 feet upstream shall not have Water Use Category A and Category D1 designation.

7.2.d.35. Mud River - (Reserved)

7.2.d.36. Big Sandy River - (Reserved)

7.2.d.37. Tug Fork River - (Reserved)

§47-2-8. Specific Water Quality Criteria.

8.1. Charts of specific water quality criteria are included in Appendix E, Table 1.

8.1.a. Specific state (i.e. total, total recoverable, dissolved, valence, etc.) of any parameter to be analyzed shall follow 40 CFR 136, Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act, as amended, June 15, 1990 and March 26, 2007. (See also 47 C.S.R. 10, section 7.3 - National Pollutant Discharge Elimination System (NPDES) Program.)

8.1.b. Compliance with aquatic life water quality criteria expressed as dissolved metal shall be determined based on dissolved metals concentrations.

8.1.b.1. The aquatic life criteria for all metals listed in Appendix E, Table 2 shall be converted to a dissolved concentration by multiplying each numerical value or criterion equation from Appendix E, Table 1 by the appropriate conversion factor (CF) from Appendix E, Table 2.

8.1.b.2. Permit limits based on dissolved metal water quality criteria shall be prepared in accordance with the U.S. EPA document "The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion, EPA 823-B-96-007 June 1996.

8.1.b.3. NPDES permit applicants may petition the Secretary to develop a site-specific translator consistent with the provisions in this section. The Secretary may, on a case-by-case basis require an applicant applying for a translator to conduct appropriate sediment monitoring through SEM/AVS ratio, bioassay or other approved methods to evaluate effluent limits that prevent toxicity to aquatic life.

8.1.c. An "X" or numerical value in the use columns of Appendix E, Table 1 shall represent the applicable criteria.

8.1.d. Charts of water quality criteria in Appendix E, Table 1 shall be applied in accordance with major stream and use applications, sections 6 and 7, herein.

8.2. Criteria for Toxicants

8.2.a. Toxicants which are carcinogenic have human health criteria (Water Use Categories A and C) based upon an estimated risk level of one additional cancer case per one million persons (10^{-6}) and are indicated in Appendix E, Table 1 with an endnote (^{b}).

8.2.b. For waters other than the Ohio River between river mile points 68.0 and 70.0, a final determination on the critical design flow for carcinogens is not made in this rule, in order to permit further review and study of that issue. Following the conclusion of such review and study, the Legislature may again take up the authorization of this rule for purposes of addressing the critical design flow for carcinogens: Provided, That until such time as the review and study of the issue is concluded or until such time as the Legislature may again take up the authorization of this rule, the regulatory requirements for determining effluent limits for carcinogens shall remain as they were on the date this rule was proposed.

8.2.b.1. For the Ohio River between river mile points 68.0 and 70.0 the critical design flow for determining effluent limits for carcinogens shall be harmonic mean flow.

8.3. Criteria for Nutrients

8.3.a. Lakes

8.3.a.1. This subsection establishes nutrient criteria designed to protect Water Use Categories B and C. The following cool water nutrient criteria shall apply to cool water lakes. (See Appendix F for a representative list.) The following warm water nutrient criteria shall apply to all other lakes with a summer residence time greater than 14 days.

8.3.a.2. Total phosphorus shall not exceed 40 µg/l for warm water lakes and 30 µg/l for cool water lakes based on an average of four or more samples collected during the period May 1 to October 31. In lieu of such sampling, impairment may be evidenced at any time by noncompliance with section 3.2, as determined by the Secretary. Chlorophyll-a shall not exceed 20 µg/l for warm water lakes and 10 µg/l for cool water lakes based on an average of four or more samples collected during the period May 1–October 31. In lieu of such sampling, impairment may be evidenced at any time by noncompliance with section 3.2, as determined by the Secretary.

8.3.a.3. A lake shall not be considered impaired based upon an average total phosphorus concentration in excess of the criterion established in section 8.3.a.2, unless the chlorophyll-a criterion established therein is also exceeded.

8.4. Variances from Specific Water Quality Criteria. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that the conditions outlined in paragraphs 6.1.b.1 through 6.1.b.6, herein, limit the attainment of one or more specific water quality criteria. Variances shall apply only to the discharger to whom they are granted and shall be reviewed by the Secretary at least every three years. In granting a variance, the requirements for revision of water quality standards in 46 CSR 6 shall be followed.

8.5. Site-specific numeric criteria. The Secretary may establish numeric criteria different from those set forth in Appendix E, Table 1 for a stream or stream segment upon a demonstration that existing numeric criteria are either over-protective or under-protective of the aquatic life residing in the stream or stream segment. A site-specific numeric criterion will be established only where the numeric criterion will be fully protective of the aquatic life and the existing and designated uses in the stream or stream segment. The site-specific numeric criterion may be established by conducting a Water Effect Ratio study pursuant to the procedures outlined in US EPA's "Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals" (February 1994); other methods may be used with prior approval by the Secretary. In adopting site-specific numeric criteria, the requirements for revision of water quality standards set forth in 46 CSR 6 shall be followed.

§47-2-9. Establishment Of Safe Concentration Values.

When a specific water quality standard has not been established by these rules and there is a discharge or proposed discharge into waters of the State, the use of which has been designated a Category B1, B2, B3 or B4, such discharge may be regulated by the Secretary where necessary to protect State waters through establishment of a safe concentration value as follows:

9.1. Establishment of a safe concentration value shall be based upon data obtained from relevant aquatic field studies, standard bioassay test data which exists in substantial available scientific literature, or data obtained from specific tests utilizing one (1) or more representative important species of aquatic life designated on a case-by-case basis by the Secretary and conducted in a water environment which is equal to or closely approximates that of the natural quality of the receiving waters.

9.2. In those cases where it has been determined that there is insufficient available data to establish a safe concentration value for a pollutant, the safe concentration value shall be determined by applying the appropriate application factor as set forth below to the 96-hour LC 50 value. Except where the Secretary determines, based upon substantial available

scientific data that an alternate application factor exists for a pollutant, the following appropriate application factors shall be used in the determination of safe concentration values:

9.2.a. Concentrations of pollutants or combinations of pollutants that are not persistent and not cumulative shall not exceed 0.10 (1/10) of the 96-hour LC 50.

9.2.b. Concentrations of pollutants or combinations of pollutants that are persistent or cumulative shall not exceed 0.01 (1/100) of the 96-hour LC 50.

9.3. Persons seeking issuance of a permit pursuant to these rules authorizing the discharge of a pollutant for which a safe concentration value is to be established using special bioassay tests pursuant to subsection 9.1 of this section shall perform such testing as approved by the Secretary and shall submit all of the following in writing to the Secretary:

9.3.a. A plan proposing the bioassay testing to be performed.

9.3.b. Such periodic progress reports of the testing as may be required by the Secretary.

9.3.c. A report of the completed results of such testing including, but not limited to, all data obtained during the course of testing, and all calculations made in the recording, collection, interpretation and evaluation of such data.

9.4. Bioassay testing shall be conducted in accordance with methodologies outlined in the following documents: U.S. EPA Office of Research and Development Series Publication, Methods for Measuring the Acute Toxicity (EPA/600/4-90/027F, August 1993, 4th Edition) or Short Term Methods for Estimating Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/600/4-89/001), March 1989; Standard Methods for the Examination of Water and Wastewater (18th Edition); or ASTM Practice E 729-88 for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates and Amphibians as published in Volume 11.04 of the 1988 Annual Book of ASTM Standards. Test waters shall be reconstituted according to recommendations and methodologies specified in the previously cited references or methodologies approved in writing by the Secretary.

APPENDIX A
CATEGORY B-2 - TROUT WATERS

This list contains known trout waters and is not intended to exclude any waters which meet the definition in Section 2.19.

River Basin	County	Stream
James River		
J	Monroe	South Fork Potts Creek
Potomac River		
P	Jefferson	Town Run
P	"	Rocky Marsh Run
P	Berkeley	Opequon Creek
P	"	Tuscarora Creek (Above Martinsburg)
P	"	Middle Creek (Above Route 30 Bridge)
P	"	Mill Creek
P	"	Hartland Run
P	"	Mill Run
P	"	Tillance Creek
P	Morgan	Meadow Branch
PS	Jefferson	Flowing Springs Run (Above Halltown)
PS	"	Cattail Run
PS	"	Evitt's Run
PS	"	Big Bullskin Run
PS	"	Long Marsh Run
PC	Hampshire	Cold Stream
PC	"	Edwards Run and Impoundment
PC	"	Dillons Run
PC	Hardy	Lost River
PC	"	Camp Branch
PC	"	Lower Cove Run
PC	"	Moores Run
PC	"	North River (Above Rio)
PC	"	Waites Run

PC	"	Trout Run
PC	"	Trout Pond (Impoundment)
PC	"	Warden Lake (Impoundment)
PC	"	Rock Cliff Lake (Impoundment)
PSB	Hampshire	Mill Creek
PSB	"	Mill Run
PSB	Hardy	Dumpling Creek
PSB	Grant-Pendleton	North Fork South Branch
PSB	Grant	North Fork Lunice Creek
PSB	"	South Fork Lunice Creek
PSB	"	South Mill Creek (Above Hiser)
PSB	"	Spring Run
PSB	Pendleton	Hawes Run (Impoundment)
PSB	"	Little Fork
PSB	"	South Branch (Above North Fork)
River Basin	County	Stream
Potomac River		
PSB	Pendleton	Senena Creek
PSB	"	Laurel Fork
PSB	"	Big Run
PNB	Mineral	North Fork Patterson Creek
PNB	"	Fort Ashby (Impoundment)
PNB	"	New Creek
PNB	"	New Creek Dam 14 (Impoundment)
PNB	"	Mill Creek (Above Markwood)
Monongahela River		
M	Monongalia-Marion	Whiteday Creek (Above Smithtown)
MC	Monongalia	Morgan Run
MC	"	Coopers Rock (Impoundment)
MC	"	Blaney Hollow
MC	Preston	Laurel Run
MC	"	Elsey Run
MC	"	Saltlick Creek
MC	"	Buffalo Creek

MC	"	Wolf Creek
MC	Tucker	Clover Run
MC	"	Elklick Run
MC	"	Horseshoe Run
MC	"	Maxwell Run
MC	"	Red Creek
MC	"	Slip Hill Mill Branch
MC	"	Thomas Park (Impoundment)
MC	"	Blackwater River (Above Davis)
MC	"	Blackwater River (Below Davis)
MC	Randolph	Camp Five Run
MC	"	Dry Fork (Above Otter Creek)
MC	"	Glady Fork
MC	"	Laurel Fork
MC	"	Gandy Creek (Above Whitmer)
MC	"	East Fork Glady Fork (Above C & P Compressor Station)
MC	Randolph	Shavers Fork (Above Little Black Fork)
MC	"	Three Spring Run
MC	"	Spruce Knob Lake (Impoundment)
MW	Harrison	Dog Run (Pond)
MW	Lewis	Stonecoal
MT	Barbour	Brushy Fork (Above Valley Furnace)
MT	"	Teter Creek Lake (Impoundment)
MT	"	Mill Run
MT	Taylor-Barbour	Tygart Lake Tailwaters (Above Route 119 Bridge)
MT	Preston	Roaring Creek (Above Little Lick Branch)
MT	Randolph	Tygart River (Above Huttonsville)
MT	"	Elkwater Fork
River Basin	County	Stream
Monongahela River		
MT	Randolph	Big Run
MTB	Upshur-Randolph-Lewis	Right Fork Buckhannon River
MTB	Upshur	Buckhannon River (Above Beans Mill)

MTB	Upshur	French Creek
MTB	Upshur-Randolph	Left Fork Right Fork
MTN	Upshur	Right Fork Middle Fork River
MTM	Randolph	Middle Fork River (Above Cassity)
MY	Preston	Rhine Creek
Little Kanawha River		
LK	Upshur	Left Fork-Right Fork Little Kanawha River
LK	Upshur-Lewis	Little Kanawha River (Above Wildcat)
Kanawha River		
KE	Braxton	Sutton Reservoir
KE	"	Sutton Lake Tailwaters (Above Route 38/5 Bridge)
KE	Webster	Back Fork
KE	"	Desert Fork
KE	"	Fall Run
KE	"	Laurel Fork
KE	"	Left Fork Holly River
KE	"	Sugar Creek
KE	"	Elk River (Above Webster Springs)
KC	Raleigh	Stephens Lake (Impoundment)
KC	"	Marsh Fork (Above Sundial)
KG	Nicholas	Summersville Reservoir (Impoundment)
KG	"	Summersville Tailwaters (Above Collison Creek)
KG	Nicholas	Deer Creek
KG	Randolph-Webster	Gauley River (Above Moust Coal Tipple)
KG	Fayette	Glade Creek
KG	Nicholas	Hominy Creek
KG	"	Anglins Creek
KG	Greenbrier	Big Clear Creek
KG	"	Little Clear Creek and Laurel Run

KG	"	Meadow Creek
KG	Fayette	Wolf Creek
KG	Nicholas	Cherry River
KG	Greenbrier-Nicholas	Laurel Creek
KG	" "	North Fork Cherry River
KG	Greenbrier	Summit Lake (Impoundment)
KG	Greenbrier-Nicholas	South Fork Cherry River

River Basin	County	Stream
Kanawha River		
KGC	Pocahontas-Webster-Nicholas	Cranberry River
KGC	Pocahontas	South Fork Cranberry River
KGW	Pocahontas	Tea Creek
KGW	Pocahontas-Webster	Williams River (Above Dyer)
KN	Raleigh	Glade Creek
KN	Summers	Meadow Creek
KN	Fayette	Mill Creek
KN	"	Laurel Creek (Above Cotton Hill)
KN	Raleigh	Pinch Creek
KN	Monroe	Rich Creek
KN	"	Turkey Creek
KN	Fayette	Dunloup Creek (Downstream from Harvey Sewage Treatment Plant)
KN	Mercer	East River (Above Kelleysville)
KN	"	Pigeon Creek
KN	Monroe	Laurel Creek
KNG	Monroe	Kitchen Creek (Above Gap Mills)
KNG	Greenbrier	Culverson Creek
KNG	"	Milligan Creek
KNG	Greenbrier-Monroe	Second Creek (Rt. 219 Bridge to Nickell's Mill)
KNG	Greenbrier	North Fork Anthony Creek
KNG	"	Spring Creek
KNG	"	Anthony Creek (Above Big Draft)
KNG	Pocahontas	Watoga Lake

KNG	"	Beaver Creek
KNG	"	Knapp's Creek
KNG	"	Hills Creek
KNG	"	North Fork Deer Creek (Above Route 28/5)
KNG	"	Deer Creek
KNG	"	Sitlington Creek
KNG	"	Stoney Creek
KNG	"	Swago Creek
KNG	"	Buffalo Fork (Impoundment)
KNG	"	Seneca (Impoundment)
KNG	"	Greenbrier River (Above Hosterman)
KNG	"	West Fork-Greenbrier River (Above the impoundment at the tannery)
KNG	"	Little River-East Fork
KNG	"	Little River-West Fork
KNG	"	Five Mile Run
KNG	"	Mullenax Run
KNG	"	Abes Run
KNB	Mercer	Marsh Fork
KNB	"	Camp Creek
OG	Wyoming	Pinnacle creek
BST	McDowell	Dry Fork (Above Canebrake)

APPENDIX B

This list contains known waters used as public water supplies and is not intended to exclude any waters as described in Section 6.2, herein.

River Basin	County	Operating Company	Source
Shenandoah River			
S	Jefferson	Charlestown Water	Shenandoah River
Potomac River			
P	Jefferson	3-M Company	Turkey Run
P	"	Shepherdstown Water	Potomac River
P	"	Harpers Ferry Water	Elk Run
P	Berkeley	DuPont Potomac River Works	Potomac River
P	"	Berkeley County PSD	Le Feure Spring
P		Opequon PSD	Quarry Spring
P	"	Hedgesville PSD	Speck Spring
P	Morgan	Paw Paw Water	Potomac River
PSB	Hampshire	Romney Water	South Branch Potomac River
PSB	"	Peterkin Conference Center	Mill Run
PSB	Hardy	Moorefield Municipal Water	South Fork River
PSB	Pendleton	U.S. Naval Radio Sta.	South Fork River
PSB	"	Circleville Water Inc.	North Fork of South Branch, Potomac River
PSB	Grant	Mountain Top PSD	Mill Creek, Impoundment
PSB	"	Petersburg Municipal Water	South Branch, Potomac River
PNB	Grant	Island Creek Coal	Impoundment
PNB	Mineral	Piedmont Municipal Water	Savage River, Maryland
PNB	"	Keyser Water	New Creek
PNB	"	Fort Ashby PSD	Lake

Monongahela River

M	Monongalia	Morgantown Water Comm.	Colburn Creek & Monongahela River
M	"	Morgantown Ordinance Works	Monongahela River
M	Preston	Preston County PSD	Deckers Creek
M	Monongalia	Blacksville # 1 Mine	Impoundment
M	"	Loveridge Mine	Impoundment
M	"	Consolidation Coal Co.	Impoundment
M	Preston	Mason Town Water	Block Run
MC	Preston	Fibair Inc.	Impoundment
MC	Monongalia	Cheat Neck PSD	Cheat Lake
MC	"	Lakeview County Club	Cheat Lake-Lake Lynn
River Basin	County	Operating Company	Source

Monongahela River

MC	Monongalia	Union Districk PSD	Cheat Lake-Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	Preston	Hopemount State Hosp.	Snowy Creek
MC	"	Rowlesburg Water	Keyser Run & Cheat River
MC	"	Albright	Cheat River
MC	Tucker	Parsons Water	Shavers & Elk Lick Fork
MC	"	Thomas Municipal	Thomas Reservoir
MC	"	Hamrick PSD	Dry Fork
MC	"	Douglas Water System	Long Run
MC	"	Davis Water	Blackwater River
MC	"	Hambleton Water System	Roaring Creek
MC	"	Canaan Valley State	Blackwater River Park
MC	Pocahontas	Cheat Mt. Sewer	Shavers Lake
MC	"	Snowshoe Co. Water	Shavers Fork
MC	Randolph	Womelsdorf Water	Yokum Run
MW	Harrison	Lumberport Water	Jones Run
MW	"	Clarksburg Water Bd.	West Fork River
MW	"	Bridgeport Mun. Water	Deecons & Hinkle Creek
MW	"	Salem Water Board	Dog Run

MW	"	West Milford Water	West Fork River
MW	Lewis	W.V. Water-Weston District	West Fork River
MW	"	Jackson's Mill Camp	Impoundment
MW	"	West Fork River PSD	West Fork River
MW	"	Kennedy Compresssor Station	West Fork River
MW	"	Jane Lew Water Comm.	Hackers Creek
MW	Harrison	Bel-Meadow Country Club	Lake
MW	"	Harrison Power Station	West Fork River
MW	"	Oakdale Portal	Impoundment
MW	"	Robinson Port	Impoundment
MT	Marion	Fairmont Water Comm.	Tygart River
MT	"	Mannington Water	Impoundment
MT	"	Monongah Water Works	Tygart River
MT	"	Eastern Assoc.	Coal Corp Impoundment
MT	"	Four States Water	Impoundment
MT	Harrison	Shinnston Water Dept.	Tygart River
MT	Taylor	Grafton Water	Tygart River-Lake
MT	Barbour	Phillippi Water	Tygart River
MT	"	Bethlehem Mines Corp.	Impoundment
MT	"	Belington Water Works	Tygart River & Mill Run Lake
MT	Randolph	Elkins Municipal Water	Tygart River
MT	"	Beverly Water	Tygart River
MT	"	Valley Water	Tygart River
MT	"	Huttonsville Medium Security Prison	Tygart River
MT	"	Mill Creek Water	Mill Creek
MTB	Upshur	Buckhannon Water Board	Buckhannon River

River Basin	County	Operating Company	Source
Ohio River			
O Zone 1	Hancock	Chester Water & Sewer	Ohio River
O "	Brooke	City of Weirton	Ohio River
O Zone 1	Brooke	Weirton Steel Division	Ohio River
O "	Ohio	Wheeling Water	Ohio River
O "	Tyler	Sistersville Mun. Water	Ohio River

O	"	Pleasants	Pleasants Power Station	Ohio River
O	"	Cabell	Huntington Water Corp.	Ohio River
O	"	Marshall	Mobay Chemical Co.	Ohio River
O	"	Wood	E. I. DuPont	Ohio River
O	Zone 2	Marshall	Meron Water	Glass House Hollow
O	"	"	New Urindahana Water	Wheeling Creek System
O	"	Wetzel	Pine Grove Water	North Fork, Fishing Creek
O	"	Marshall	Consolidated Coal Co.	Impoundment
O	"	Tyler	Middlebourne Water	Middle Island Creek
O	"	Doddridge	West Union Mun. Water	Middle Island Creek
O	"	Mason	Hidden Valley Country	Lake/Impoundment
O	"	Jackson	Ripley Water	Mill Creek
O	"	Wayne	Wayne Municipal Water	Twelve Pole Creek
O	"	"	East Lynn Lake	East Lynn Lake
O	"	"	Monterey Coal Co.	Impoundment
Little Kanawha				
	LK	Wood	Claywood Park PSD	Little Kanawha River
	LK	Calhoun	Grantsville Mun. Water	Little Kanawha River
	LK	Gilmer	Glenville Utility	Little Kanawha River
	LK	"	Consolidated Gas Compressor	Steer Creek
	LK	Braxton	Burnsville Water Works	Little Kanawha River
	LK	Roane	Spencer Water	Spring Creek Mile Tree Reservoir
	LK	Wirt	Elizabeth Water	Little Kanawha River
	LKH	Ritchie	Cairo Water	North Fork Hughes River
	LKH	"	Harrisville Water	North Fork Hughes River
	LKH	"	Pennsboro Water	North Fork Hughes River
Kanawha River				
	K	Putnam	Buffalo Water	Cross Creek
	K	"	Winfield Water	Poplar Fork & Crooked Creek
	K	"	South Putnam PSD	Poplar Fork & Crooked Creek
	K	Kanawha	Cedar Grove Water	Kanawha River
	K	"	Pratt Water	Kanawha River
	K	Fayette	Armstrong PSD PO-K1-CO-EL	Kanawha River & Gum Hollow

K	"	Kanawha Water Co.-	Unnamed Tributary Kanawha Beards Fork
K	Kanawha	Midland Trail School	Impoundment
K	"	Cedar Coal Co.	Impoundment
K	Fayette	Elkem Metals Co.	Kanawha River
K	Fayette	Deepwater PSD	Kanawha River

River Basin	County	Operating Company	Source
Kanawha River			
K	Fayette	Kanawha Falls PSD	Kanawha River
K	"	W.V. Water-Montgomery	Kanawha River
Pocatalico River			
KP	Kanawha	Sissonville PSD	Pocatalico River
KP	Roane	Walton PSD	Silcott Fork Dam
Coal River			
KC	Kanawha	St. Albans Water	Coal River
KC	"	Washington PSD	Coal River
KC	Lincoln	Lincoln PSD	Coal River
KC	Boone	Coal River PSD	Coal River
KC	"	Whitesville PSD	Coal River
KC	Raleigh	Armco Mine 10	Marsh Fork
KC	"	Armco Steel-Montc. Stickney	Coal River
KC	Raleigh	Peabody Coal	Coal River
KC	"	Stephens Lake Park	Lake Stephens
KC	Boone	W.V. Water-Madison Dist.	Little Coal River
KC	"	Van PSD	Pond Fork
KC	Raleigh	Consol. Coal Co.	Workmans Creek
KC	Boone	Water Ways Park	Coal River
Elk River			
KE	Kanawha	Clendenin Water	Elk River

KE	"	W.V. Water-Kanawha Valley District	Elk River
KE	Kanawha	Pinch PSD	Elk River
KE	Clay	Clay Waterworks	Elk River
KE	"	Procious PSD	Elk River
KE	Braxton	Flatwoods-Canoe Run PSD	Elk River
KE	"	Sugar Creek PSD	Elk River
KE	"	W.V. Water-Gassaway Dist.	Elk River
KE	"	W.V. Water-Sutton Dist.	Elk River
KE	Webster	W.V. Water-Webster Springs	Elk River
KE		Holly River State Park	Holly River
Gauley River			
KG	Nicholas	Craigsville PSD	Gauley River
KG	"	Summersville Water	Impoundment/ Muddlety Creek
KG	"	Nettie-Leivasy PSD	Jim Branch
KG	Webster	Cowen PSD	Gauley River
KG	Nicholas	Wilderness PSD	Anglins Creek & Meadow River
KG	"	Richwood Water	North Fork Cherry River
KN	Fayette	Ames Heights Water	Mill Creek
KN	"	Mt. Hope Water	Impounded Mine (Surface)
KN	Fayette	Ansted Municipal Water	Mill Creek
River Basin	County	Operating Company	Source
New River			
KN	Fayette	Fayette Co. Park	Impoundment
KN	"	New River Gorge Campground	Impoundment
KN	"	Fayetteville Water	Wolfe Creek
KN	Raleigh	Beckley Water	Glade Creek
KN	"	Westmoreland Coal Co.	Farley Branch
Bluestone River			
KNB	Summers	Jumping Branch-Nimitz	Mt. Valley Lake
KNB	"	Bluestone Conf. Center	Bluestone Lake
KNB	"	Pipestem State Park	Impoundment
KNB	Mercer	Town of Athens	Impoundment

KNB	"	Bluewell PSD	Impoundment
KNB	"	Bramwell Water	Impoundment
KNB	"	Green Valley-Glenwood PSD	Bailey Reservoir
KNB	"	Kelly's Tank	Spring
KNB	"	W.V. Water Princeton	Impoundment/ Brusch Creek
KNB	"	Lashmeet PSD	Impoundment
KNB	"	Pinnacle Water Assoc.	Mine
KNB	"	W.V. Water Bluefield	Impoundment

Greenbrier River

KNG	Summers	W.V. Water Hinton	Greenbrier River & New River
KNG	"	Big Bend PSD	Greenbrier River
KNG	Greenbrier	Alderson Water Dept.	Greenbrier River
KNG	"	Ronceverte Water	Greenbrier River
KNG	"	Lewisburg Water	Greenbrier River
KNG	Pocahontas	Denmar State Hospital Water	Greenbrier River
KNG	"	City of Marlinton Water	Knapp Creek
KNG	"	Cass Scenic Railroad	Leatherbark Creek
KNG	"	Upper Greenbrier PSD	Greenbrier River
KNG	"	The Hermitage	Greenbrier River

Guyandotte River

OG	Cabell	Salt Rock PSD	Guyandotte River
OG	Lincoln	West Hamlin Water	Guyandotte River
OG	Logan	Logan Water Board	Guyandotte River
OG	"	Man Water Works	Guyandotte River
OG	"	Buffalo Creek PSD	Buffalo Creek/ Mine/Wells
OG	Logan	Chapmanville	Guyandotte River
OG	"	Logan PSD	Whitman Creek/ Guyandotte River
OG	Mingo	Gilbert Water	Guyandotte River
OG	Wyoming	Oceana Water	Laurel Fork
OG	"	Glen Rogers PSD	Impoundment
OG	Wyoming	Pineville Water	Pinnacle Creek
OG	Raleigh	Raleigh Co. PSD-Amigo	Tommy Creek
OMG	Cabell	Milton Water Works	Guyandotte River
OMG	"	Culloden PSD	Indian Fork Creek

River Basin	County	Operating Company	Source
Guyandotte River			
OMG	Putnam	Hurricane Municipal Water	Impoundment
OMG	Putnam	Lake Washington PSD	Lake Washington
Big Sandy River			
BS	Wayne	Kenova Municipal Water	Big Sandy River
BS	"	Fort Gay Water	Tug Fork
BST	Mingo	Kermit Water	Tug Fork
BST	"	Matewan Water	Tug Fork
BST	"	A & H Coal Co., Inc.	Impoundment
BST	"	Williamson Water	Impoundment
BST	McDowell	City of Welch	Impoundment/Wells
BST	"	City of Gary	Impoundment/Mine

APPENDIX C
CATEGORY E-3 - POWER PRODUCTION

This list contains known power production facilities and is not intended to exclude any waters as described in Section 6.6.c, herein.

River Basin	County	Station Name	Operating Company
Monongahela River			
M	Monongalia	Fort Martin Power Station	Monongahela Power
M	Marion	Rivesville Station	Monongahela Power
MC	Preston	Albright Station	Monongahela Power
Potomac	Grant	Mt. Storm Power Station	Virginia Electric & Power Company
Ohio River			
O - Zone 1	Wetzel	Hannibal (Hydro)	Ohio Power
O " "	Marshall	Kammer	Ohio Power
O " "	"	Mitchell	Ohio Power
O " "	Pleasants	Pleasants Station	Monongahela Power
O " "	"	Willow Island Station	Monongahela Power
O " "	Mason	Phillip Sporn Plant	Central Operating (AEP)
O " "	"	Racine (Hydro)	Ohio Power
O " "	"	Mountaineer	Appalachian Power Co.
K	Putnam	Winfield (Hydro)	Appalachian Power Co.
K	Kanawha	Marmet (Hydro)	Appalachian Power Co.
K	"	London (Hydro)	Appalachian Power Co.
K	"	Kanawha River	Appalachian Power Co.
K	"	John E. Amos	Appalachian Power Co.

APPENDIX D
CATEGORY C - WATER CONTACT RECREATION

This list contains waters known to be used for water contact recreation and is not intended to exclude any waters as described in section 6.4, herein.

River Basin	Stream Code	Stream	County
Shenandoah	S	Shenandoah River	Jefferson
Potomac	P	Potomac River	Jefferson
	P	" "	Hampshire
	P	" "	Berkeley
	P	" "	Morgan
	P-9	Sleepy Creek & Meadow Branch	Berkeley
	P-9-G-1	North Fork of Indian Run	Morgan
South Branch	PSB	South Branch of Potomac River	Hampshire
	PSB	" "	Hardy
	PSB	" "	Grant
	PSB-21-X	Hawes Run	Pendleton
	PSB-25-C-2	Spring Run	Grant
	PSB-28	North Fork South Branch Potomac River	Grant
North Branch	PNB	North Branch of Potomac River	Mineral
	PNB-4-EE	North Fork Patterson Creek	Grant
	PNB-7-H	Linton Creek	Grant
	PNB-17	Stoney River-Mt. Storm Lake	Grant
	PC	Cacapon River	Hampshire
Monongalia			
Cheat	MC	Cheat Lake/Cheat river	Monongalia/Preston

	MC	Alpine Lake	Preston
	MC-6	Coopers Rock Lake/ Quarry Run	Monongalia
	MC-12	Big Sandy Creek	Preston
	MSC	Shavers Fork	Randolph
	MTN	Middle Fork River	Barbour/Randolph/ Upshur
	MW	West Fork River	Harrison
	MW-18	Stonecoal Creek/ Stonecoal Lake	Lewis
River Basin	Stream Code	Stream	County
Ohio	O	Ohio River	Brooke/Cabell/ Hancock/Jackson/ Marshall/Mason/Ohio/ Pleasants/Tyler/ Wayne/Wood/Wetzel
	O-2-H	Beech Fork of Twelvepole Creek/Beech Fork Lake	Wayne
	O-2-Q	East Fork of Twelvepole Creek/East Lynn Lake	Wayne
	O-3	Fourpole Creek	Cabell
	O-21	Old Town Creek/ McClintic Ponds	Mason
	OMI	Middle Island Creek/ Crystal Lake	Doddridge
	OG	Guyandotte River	Cabell
	OG	Guyandotte River/ R. D. Bailey Lake	Wyoming
	OGM	Mud River	Cabell

Little Kanawha	LK	Little Kanawha River/ Burnsville Lake	Braxton
Kanawha	K	Kanawha River	Fayette/Kanawha/ Mason/Putnam
	K-1	Unnamed Tributary Krodel Lake	Mason
	KC	Coal River	Kanawha
	KC-45-Q	Stephens Branch/ Lake Stephens	Raleigh
	KE	Elk River	Kanawha/Clay/ Braxton/Webster/ Randolph
	KE	Sutton Lake	Braxton
	KN	New River	Fayette/Raleigh/ Summers
	KN-26-F	Little Beaver Creek	Raleigh
	KNG	Greenbrier River	Greenbrier/ Pocahontas/Summers
	KNG-23-E-1	Little Devil Creek/ Moncove Lake	Monroe
	KNG-28	Anthony Creek	Greenbrier
	KNG-28-P	Meadow Creek/ Lake Sherwood	Greenbrier
River Basin	Stream Code	Stream	County
	KNB	Bluestone River/ Bluestone Lake	Summers
	KG	Gauley River	Webster
Kanawha	KG	Gauley River/ Summersville Lake	Nicholas
	KGW	Williams River	Webster

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.1 Dissolved Aluminum (ug/l) For water with pH <6.5 or >9.0	750xCF[5]	750xCF[5]	750xCF[5]	87xCF[5]			
8.1.1 For water with pH ≥ 6.5 and ≤ 9.0, The four-day average concentration of dissolved aluminum determined by the following equation : $Al = e^{(1.3695[\ln(hardness)]+0.9121)} \times CF^5$ Where hardness is limited to the range of 26 mg/L to 220 mg/L, even if actual ambient hardness is greater or less than this range		X		X			
8.1.2 For water with pH ≥ 6.5 and ≤ 9.0, The one-hour average concentration of dissolved aluminum determined by the following equation : $Al = e^{(1.3695[\ln(hardness)]+1.8268)} \times CF^5$ Where hardness is limited to the range of 26 mg/L to 220 mg/L, even if actual ambient hardness is greater or less than this range	X		X				
8.2. Acute and chronic aquatic life criteria for ammonia shall be determined using the National Criterion for Ammonia in Fresh Water[d] from USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014, December 1999)	X	X	X	X			
8.3 Antimony (ug/l)					4300	14	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.4 Arsenic (ug/l)					10	10	100
8.4.1 Dissolved Trivalent Arsenic (ug/l)	340	150	340	150			
8.5 Barium (mg/l)						1.0	
8.6 Beryllium (ug/l)	130		130			~~.0077~~ 4	
8.7 Cadmium (ug/l) Hardness (mg/l $CaCO_3$) — Soluble Cd 0 - 35 — 1.0 36 - 75 — 2.0 76 - 150 — 5.0 > 150 — 10.0						X	
8.7.1 10 ug/l in the Ohio River (O Zone 1) main stem (see section 7.1.d, herein)						X	
8.7.2 The four-day average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(0.7409[\ln(hardness)]-4.719)} \times CF$[5]		X		X			
8.7.3 The one-hour average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(1.0166[\ln(hardness)]-3.924)} \times CF$[5]	X		X				
8.8 Chloride (mg/l)	860	230	860	230	250	250	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.9.1 Chromium, dissolved hexavalent (ug/l):	16	11	16	7.2		50	
8.9.2 Chromium, trivalent (ug/l) The one-hour average concentration of dissolved trivalent chromium determined by the following equation: $CrIII = e^{(0.8190[\ln(hardness)]+3.7256)} \times CF^5$	X		X				
8.9.3 The four-day average concentration of dissolved trivalent chromium determined by the following concentration: $CrIII = e^{(0.8190[\ln(hardness)]+0.6848)} \times CF^5$		X		X			
8.10 Copper (ug/l)						1000	
8.10.1 The four-day average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.8545[\ln(hardness)]-1.702)} \times CF^5$		X		X			
8.10.2 The one-hour average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.9422[\ln(hardness)]-1.700)} \times CF^5$	X		X				
8.11 Cyanide (ug/l) (As free cyanide $HCN+CN^-$)	22	5.0	22	5.0	5.0	5.0	
8.12 Dissolved Oxygen[c]: not less than 5 mg/l at any time.	X				X	X	X

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.12.1 Kanawha River main stem, Zone 1 - Not less than 4.0 mg/l at any time.	X						
8.12.2 Ohio River main stem - the average concentration shall not be less than 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time or place outside any established mixing zone - provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.	X						
8.12.3 Not less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.			X				
8.13 Fecal Coliform: Maximum allowable level of fecal coliform content for Water Contact Recreation (either MPN or MF) shall not exceed 200/100 ml as a monthly geometric mean based on not less than 5 samples per month; nor to exceed 400/100 ml in more than ten percent of all samples taken during the month.					X	X	
8.13.1 Ohio River main stem (zone 1) - During the non-recreational season (November through April only) the maximum allowable level of fecal coliform for the Ohio River (either MPN or MF) shall not exceed 2000/100 ml as a monthly geometric mean based on not less than 5 samples per month.					X	X	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.14 Fluoride (mg/l)						1.4	
8.14.1 Not to exceed 2.0 for category D1 uses.							X
8.15 Iron[c] (mg/l)		1.5		1.0		1.5	
8.16 Lead (ug/l)						50	
8.16.1 The four-day average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(\text{hardness})]-4.705)} \times CF^5$		X		X			
8.16.2 The one-hour average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(\text{hardness})]-1.46)} \times CF^5$	X		X				
8.17 Manganese (mg/l) (see §6.2.d)						1.0	
8.18 Mercury The total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury.					0.5	0.5	
8.18.1 Total mercury in any unfiltered water sample (ug/l):	2.4		2.4		0.15	0.14	
8.18.2 Methylmercury (water column) (ug/l):		.012		.012			

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Nickel (ug/l)					4600	510	
8.19.1 The four-day average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+0.0584)} \times CF$[5]		X		X			
8.19.2 The one-hour average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+2.255)} \times CF$[5]	X		X				
8.20 Nitrate (as Nitrate-N) (mg/l)						10	
8.21 Nitrite (as Nitrite-N) (mg/l)	1.0		.060				
8.22 Nutrients							
Chlorophyll –a (µg/l) (see §47-2-8.3)							
Total Phosphorus (µg/l) (see §47-2-8.3)							
8.23 Organics							
Chlordane[b] (ng/l)	2400	4.3	2400	4.3	0.46	0.46	0.46
DDT[b] (ng/l)	1100	1.0	1100	1.0	0.024	0.024	0.024
Aldrin[b] (ng/l)	3.0		3.0		0.071	0.071	0.071
Dieldrin[b] (ng/l)	2500	1.9	2500	1.9	0.071	0.071	0.071
Endrin (ng/l)	180	2.3	180	2.3	2.3	2.3	2.3

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Toxaphene[b] (ng/l)	730	0.2	730	0.2	0.73	0.73	0.73
PCB[b] (ng/l)		14.0		14.0	0.045	0.044	0.045
Methoxychlor (ug/l)		0.03		0.03	0.03	0.03	0.03
Dioxin (2,3,7,8- TCDD)[b] (pg/l)					0.014	0.013	0.014
Acrylonitrile[b] (ug/l)					0.66	0.059	
Benzene[b] (ug/l)					51	0.66	
1,2-dichlorobenzene (mg/l)					17	2.7	
1,3-dichlorobenzene (mg/l)					2.6	0.4	
1,4-dichlorobenzene (mg/l)					2.6	0.4	
2,4-dinitrotoluene[b] (ug/l)					9.1	0.11	
Hexachlorobenzene[b] (ng/l)					0.77	0.72	
Carbon tetrachloride[b] (ug/l)					4.4	0.25	
Chloroform[b] (ug/l)					470	5.7	
Bromoform[b] (ug/l)					140	4.3	
Dichlorobromomethane[b] (ug/l)					17	0.55	
Methyl Bromide (ug/l)					1500	47	
Methylene Chloride[b] (ug/l)					590	4.6	
1,2-dichloroethane[b] (ug/l)					99	0.035	
1,1,1- trichloroethane[b] (mg/l)						12	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
1,1,2,2-tetrachloroethane (ug/l)					11	0.17	
1,1-dichloroethylene[b] (ug/l)					3.2	0.03	
Trichloroethylene[b] (ug/l)					81	2.7	
Tetrachloroethylene[b] (ug/l)					8.85	0.8	
Toluene[b] (mg/l)					200	6.8	
Acenaphthene (ug/l)					990	670	
Anthracene (ug/l)					40,000	8,300	
Benzo(a) Anthracene[b] (ug/l)					0.018	0.0038	
Benzo(a) Pyrene[b] (ug/l)					0.018	0.0038	
Benzo(b) Fluoranthene[b] (ug/l)					0.018	0.0038	
Benzo(k) Fluoranthene[b] (ug/l)					0.018	0.0038	
Chrysene[b] (ug/l)					0.018	0.0038	
Dibenzo(a,h)Anthracene[b] (ug/l)					0.018	0.0038	
Fluorene (ug/l)					5300	1100	
Ideno(1,2,3-cd)Pyrene[b] (ug/l)					0.018	0.0038	
Pyrene (ug/l)					4000	830	
2-Chloronaphthalene (ug/l)					1600	1000	
Phthalate esters[6] (ug/l)		3.0		3.0			
Vinyl chloride[b] (chloroethene) (ug/l)					525	2.0	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
alpa-BHC (alpha- Hexachloro-cyclohexane)[b] (ug/l)					0.013	.0039	
beta-BHC(beta- Hexachloro-cyclohexane)[b] (ug/l)					0.046	0.014	
gamma-BHC (gamma- Hexachloro-cyclohexane)[b] (ug/l)	2.0	0.08	2.0	0.08	0.063	0.019	
Chlorobenzene (mg/l)					21	0.68	
Ethylbenzene (mg/l)					29	3.1	
Heptachlor[b] (ng/l)	520	3.8	520	3.8	0.21	0.21	
2-methyl-4,6-Dinitrophenol (ug/l)					765	13.4	
Fluoranthene (ug/l)					370	300	
8.23.1 When the specified criteria for organic chemicals listed in §8.23 are less than the practical laboratory quantification level, instream values will be calculated from discharge concentrations and flow rates, where applicable.							
8.24 pH[c] No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	X	X	X	X	X	X	X
8.25 Phenolic Materials							
8.25.1 Phenol (ug/l)					4,600,000	21,000	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.25.2 2-Chlorophenol (ug/l)					400	120	
8.25.3 2,4-Dichlorophenol (ug/l)					790	93	
8.25.4 2,4-Dimethylphenol (ug/l)					2300	540	
8.25.5 2,4-Dinitrophenol (ug/l)					14,000	70	
8.25.6 Pentachlorophenol[b] (ug/l)					8.2	0.28	
8.25.6.a The one-hour average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-4.869)	X		X				
8.25.6.b The 4-day average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-5.134).		X		X			
8.25.7 2,4,6-Trichlorophenol[b] (ug/l)					6.5	2.1	
8.26 Radioactivity: Gross Beta activity not to exceed 1000 picocuries per liter (pCi/l), nor shall activity from dissolved strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3 pCi/l.	X		X		X	X	X

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.26.1 Gross total alpha particle activity (including radium-226 but excluding radon and uranium shall not exceed 15 pCi/l and combined radium-226 and radium-228 shall not exceed 5pCi/l; provided that the specific determination of radium-226 and radium-228 are not required if dissolved particle activity does not exceed 5pCi/l; the concentration of tritium shall not exceed 20,000 pCi/l; the concentration of total strontium-90 shall not exceed 8 pCi/l in the Ohio River main stem.	X		X		X	X	X
8.27 Selenium (ug/l)	20	5	20	5		50	
8.28 Silver (ug/l) Hardness / Silver 0-50 / 1 51-100 / 4 101-200 / 12 >201 / 24				X		X	
8.28.1 0-50 / 1 51-100 / 4 101-200 / 12 201-400 / 24 401-500 / 30 501-600 / 43		X					

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.28.2 The one-hour average concentration of dissolved silver determined by the following equation: $Ag=e^{(1.72[\ln(hardness)]-6.59)} \times CF$[5]	X		X				
8.29 Temperature Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 87°F at any time during months of May through November and not to exceed 73°F at any time during the months of December through April. During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water more than 5°F above natural temperature. In lakes and reservoirs, the temperature of the epilimnion should not be raised more than 3°F by the addition of heat of artificial origin. The normal daily and seasonable temperature fluctuations that existed before the addition of heat due to other natural causes should be maintained.	X						
8.29.1 For the Kanawha River Main Stem (K-1): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 90°F in any case.	X						

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29.2 For the Bluestone R (KNB), Bluestone Lake (KN-60) East River (KNE), New River (KN), Gauley R. (KG) and Greenbrier River (KNG): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 81°F at any time during the months of May through November and not to exceed 73°F at any time during December through April.			X				
8.29.3 No heated effluents will be discharged in the vicinity of spawning areas. The maximum temperatures for cold waters are expressed in the following table: Daily Mean °F / Hourly Max °F Oct-Apr 50 / 55 Sep-&May 58 / 62 Jun-Aug 66 / 70			X				

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29.4 For Ohio River Main Stem (01) (see section 7.1.d, herein): Dates — Period Ave. — Inst. Max. Jan 1-31 — 45°F — 50°F February — 45 — 50 March 1-15 — 51 — 56 March 16-31 — 54 — 59 April 1-15 — 58 — 64 April 16-30 — 64 — 69 May 1-15 — 68 — 73 May 16-31 — 75 — 80 June 1-15 — 80 — 85 June 16-30 — 83 — 87 July 1-31 — 84 — 89 August 1-31 — 84 — 89 Sept 1-15 — 84 — 87 Sept 16-30 — 82 — 86 Oct 1-15 — 77 — 82 Oct 16-31 — 72 — 77 Nov 1-30 — 67 — 72 Dec 1-31 — 52 — 57		X					
8.30 Thallium (ug/l)					6.3	1.7	
8.31 Threshold odor[c] Not to exceed a threshold odor number of 8 at 104°F as a daily average.		X		X	X	X	
8.32 Total Residual Chlorine (ug/l - measured by amperometric or equivalent method)	19	11					

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.32.1 No chlorinated discharge allowed			X				
8.33 Turbidity No point or non-point source to West Virginia's waters shall contribute a net load of suspended matter such that the turbidity exceeds 10 NTU's over background turbidity when the background is 50 NTU or less, or have more than a 10% increase in turbidity (plus 10 NTU minimum) when the background turbidity is more than 50 NTUs. This limitation shall apply to all earth disturbance activities and shall be determined by measuring stream quality directly above and below the area where drainage from such activity enters the affected stream. Any earth disturbing activity continuously or intermittently carried on by the same or associated persons on the same stream or tributary segment shall be allowed a single net loading increase.		X		X	X	X	

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.33.1 This rule shall not apply to those activities at which Best Management Practices in accordance with the State's adopted 208 Water Quality Management Plan are being utilized, maintained and completed on a site-specific basis as determined by the appropriate 208 cooperative or an approved Federal or State Surface Mining Permit is in effect. This exemption shall not apply to Trout Waters.		X			X	X	
8.34 Zinc (ug/l) The four-day average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF$[5]		X		X			
8.34.1 The one-hour average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF$[5]	X		X				

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[3] These criteria have been calculated to protect human health from toxic effects through fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[4] These criteria have been calculated to protect human health from toxic and/or organoleptic effects through drinking water and fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[5] The appropriate Conversion Factor (CF) is a value used as a multiplier to derive the dissolved aquatic life criterion is found in Appendix E, Table 2.
[6] Phthalate esters are determined by the summation of the concentrations of Butylbenzyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Di-n-Butyl Phthalate and Di-n-Octyl Phthalate.

47CSR2
APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			

[a] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use is this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.
[b] Known or suspected carcinogen. Human health standards are for a risk level of 10^{-6}.
[c] May not be applicable to wetlands (B4) - site-specific criteria are desirable.
[d] The early life stage equation in the National Criterion shall be used to establish chronic criteria throughout the state unless the applicant demonstrates that no early life stages of fish occur in the affected water(s).

APPENDIX E
TABLE 2

Conversion Factors

Metal	Acute	Chronic
Aluminum	1.000	1.000
Arsenic (III)	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Chromium (III)	0.316	0.860
Chromium(VI)	0.982	0.962
Copper	0.960	0.960
Lead	1.46203-[(ln hardness)(0.145712)]	1.46203-[(ln hardness)(0.145712)]
Nickel	0.998	0.997
Silver	0.85	N/A
Zinc	0.978	0.986

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March 12, 2013

NOTICE OF EMERGENCY RULE DECISION BY THE SECRETARY OF STATE

AGENCY: Water Resources, Division of Water and Waste Management

RULE: Title 47CSR2, Requirements Governing Water Quality Standards

DATE FILED AS AN EMERGENCY RULE: January 30, 2013

DECISION NO. 3-13

Following review under W. Va. Code §29A-3-15a, it is the decision of the Secretary of State that the above emergency rule is **approved.** A copy of the complete decision with required findings is available from this office.

Natalie E. Tennant

NATALIE E. TENNANT
Secretary of State

the director shall specify the design of equipment, type of construction or particular method which a person shall use to reduce the discharge of a pollutant;

par. 9 It is the determination of the Secretary of State that the Water Resources has not exceeded its statutory authority in promulgating this emergency rule.

par. 10 (C) Emergency -- W. Va. Code §29A-3-15(f) defines "emergency" as follows:

(f) For the purposes of this section, an emergency exists when the promulgation of a rule is necessary for the immediate preservation of the public peace, health, safety or welfare or is necessary to comply with a time limitation established by this code or by a federal statute or regulation or to prevent substantial harm to the public interest.

par. 11 There are essentially three classes of emergency broadly presented with the above provision: 1) immediate preservation; 2) time limitation; and 3) substantial harm. An agency need only document to the satisfaction of the Secretary of State that there exists a nexus between the proposal and the circumstances creating at least one of the above three emergency categories.

par. 12 The facts and circumstances as presented by the Water Resources are as follows:

"As stated in the emergency rule justification, the listing of waters as impaired initiates the Total Maximum Daily Load (TMDL) process and the associated efforts result in significant expenditure of agency resources. For example, in the Monongahela and West Fork River watersheds, DEP has 31 streams listed as impaired for Aluminum and is currently in the early stages of the TMDL development process. The costs associated with this specific example, alone just in contractor support is ~$70000 and this does not include the expenditures of monitoring or DEP administrative efforts. If this emergency rule were in effect now some of this work may not have been deemed necessary and would have saved DEP both on contractor and internal costs, which could have been better utilized for more warranted tasks. Hence we can assume with much certainty that future costs savings will be achieved by this emergency rule action since DEP has projected numerous TMDL efforts targeting Al impairments in the Tygart and Cheat River Watersheds in 2013 and 2014."

par. 13 It is the determination of the Secretary of State that this proposal qualifies under the definition of an emergency as defined in §29A-3-15(f). . . To prevent substantial harm to the public interest.

par. 14 This decision shall be cited as Emergency Rule Decision 3-13 or ERD 3-13 and may be cited as precedent. This decision is available from the Secretary of State and has been filed with the Water Resources, Division of Water and Waste Management, the Attorney General and the Legislative Rule Making Review Committee.

s/Natalie E. Tennant

NATALIE E. TENNANT
Secretary of State

Entered_____

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SECRETARY OF STATE

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CONTENTS

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NEW PROPOSED RULES FILED FOR PUBLIC COMMENT THIS WEEK			
AGENCY	**RULE/TYPE**	**AUTHORITY**	**HEARING/COMMENT PERIOD/LOCATION**
Miners' Health, Safety and Training (56-12)	Assessing Health and Safety Violation Penalties Legislative	§22A-1-6 and 22A-1-21(a)(2)	Written Comments Only March 8, 2013, 4:00 pm WV Office of Miners' Health, Safety and Training 7 Players Club Drive, Suite 2 Charleston, WV 25311
Water Resources, Div. of Water & Waste Mgmt. (47-2)	Requirements Governing Water Quality Standards Legislative	§§22-11-4(a)(16); 22-11-7b	Public Hearing: March 27, 2013, 6:00 pm Dept. of Environmental Protection Coopers Rock Training Room 601 57th Street SE Charleston, WV 25304 Written Comments: March 27, 2013, conclusion of hearing Kevin R. Coyne Water Quality Standards Program WV Dept. of Environmental Protection 601 57th Street SE Charleston, WV 25304.

NEW EMERGENCY RULES FILED THIS WEEK				
AGENCY	**RULE/TYPE**	**AUTHORITY**	**EFFECTIVE DATE**	**DATE NOTICE FOR HEARING**
Insurance Commission (114-43A, amendment)	Provider Sponsored Networks	§33-25G-5	ERD by March 20, 2013	August 6, 2012

Public Hearing Sign In Sheet

Proposed Emergency Rule "Requirements Governing Water Quality Standards"
March 27, 2013, 6 p.m. Charleston

The Department of Environmental Protection asks for the information below so that agency staff may provide responses and information about decisions to you. The information you voluntarily provide on this sheet becomes part of the public record related to this topic and may be released if requested under the Freedom of Information Act.

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
JAMES VAN GUNDY	240 BOUNDARY AVE. ELKINS, WV 26241	SELF	304.636.4736	jjvg01@gmail.com	yes
ANGIE ROSSER	329 Davis Ave. Ste E Elkins WV 26241	WV Rivers Coalition	304-637-7201	arosser@wvrivers.org	Yes
JAMES KOTCON	414 7th Ave Avery R.R. Box Monongahela WV 26554	SIERRA CLUB	304-594-3772	Jkotcon@GMAIL.com	YES
Mike Castle	131 Summit Ridge Rd Hurricane WV 25526	Self	304-757-9801	mccastle@suddenlink.net	NO
Jeanie Heirthorn	517 Sixth Avenue St Albans WV 25177	HENV	304-727-1445	jheirthorn@heirthornlaw.com	no
Mark Dempsey	241 Washington Ave Charleston 25302	AEP	304-340-2120	mddempsey@aep.com	NO
Jason Bostic	PO Box 3923 Charleston WV, 25339	WV Coal Association	304-342-4153	jbostic@wvcoal.com	NO
Dave Yaussy	PO Box 1791 Charleston 25326	Robinson & McElwee	304 347-8359	dly@ramlaw.com	NO
Kawasaki	1001 Virginia St, E Charleston WV	Gazette	304-348-1702	kwaid@wvgazette.com	NO
BOB ORNDORFF	445 W MAIN ~~STREET~~ CLARKSBURG	DOMINION	304 627 3146	ROBERT.C.ORNDORFF@DOM.COM	NO
DON GARVIN	PO BOX 666 26301 Buckhannon 26201	WVEC	304 345-0078	DSGJR@aol.com	Yes
Frank Rose	161 Fifth Ave Fayetteville WV	SELF	304-573-4952	frose5@suddenlink.net	No

Public Hearing Sign In Sheet

Proposed Emergency Rule "Requirements Governing Water Quality Standards"
March 27, 2013, 6 p.m. Charleston

The Department of Environmental Protection asks for the information below so that agency staff may provide responses and information about decisions to you. The information you voluntarily provide on this sheet becomes part of the public record related to this topic and may be released if requested under the Freedom of Information Act.

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Bill Price	922 Quarrier Street	Sierra Club	304.389.1622	B.H.Price@suddenlink.net	Yes

Public Hearing Sign In Sheet

Proposed Emergency Rule "Requirements Governing Water Quality Standards"
March 27, 2013, 6 p.m. Charleston

The Department of Environmental Protection asks for the information below so that agency staff may provide responses and information about decisions to you. The information you voluntarily provide on this sheet becomes part of the public record related to this topic and may be released if requested under the Freedom of Information Act.

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Rob Goodwin	1573 Lee street Charleston	CRWU	304-712-8854	Rob@cmwu.net	✓

PUBLIC HEARING ON THE PROPOSED EMERGENCY RULE TO REVISE THE DISSOLVED ALUMINUM CRITERIA AND HUMAN HEALTH CATEGORY A BERYLLIUM CRITERION FOUND IN THE LEGISLATIVE RULE 47CSR2

PUBLIC HEARING

MARCH 27TH, 2013
6:00 P.M.

THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
601 57TH STREET SOUTHEAST
CHARLESTON, WEST VIRGINIA

Joel S. Gibson
Court Reporter

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P R O C E E D I N G S

MR. ALUISE: Good evening everybody. My name is Tom Aluise with the Public Information Office here at the DEP. We also have Kevin Coin and Linda Keller up here at the front of the room, from the Division of Water and Waste Management here at the agency.

We're conducting a public hearing tonight on our proposed emergency rule to revise the dissolved aluminum criteria and human health Category A beryllium criterion found in the Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards." The purpose for the hearing tonight is to give you the opportunity to share your comments or information regarding these two proposed criteria revisions, and the agency will only address comments pertaining to such.

Tonight's hearing is being recorded by a court reporter so that the comments and information shared can be taken into consideration and entered into the public record for this proposed emergency rule. In addition to oral comments provided at tonight's hearing, the agency will accept written comments anytime up to the conclusion of this hearing. No comments will be accepted after that

time. The agency will post its response to all comments, both oral and written, on the Water Quality Standards webpage. Once all comments are received and the agency finalizes its response document, the final emergency rule proposal will be submitted for EPA approval. It should be noted that these revisions will be included in the upcoming Triennial Review, scheduled to begin this spring.

To ensure that we successfully achieve the purpose of this hearing, we ask that everyone keep comments on topic, please, so that our time together is used efficiently.

If you are speaking tonight, when you come to the podium, please state your name and where you live or if you are with any groups or organizations.

If you have written comments that you would like to submit in addition to your spoken comments, just give them to me after you speak or at the conclusion of the hearing.

And we have five people who have signed up to speak, and our first speaker is James VanGundy.

MR. VANGUNDY: Thank you. My name is Doctor James VanGundy. I live in Elkins, West Virginia. I hold a PhD in aquatic ecology from the

University of Utah, and I've been professionally concerned with water quality issues for the past 48 years.

I've been employed by the State of Pennsylvania as a water pollution control specialist. In the early 1980's I served on the old West Virginia Water Quality Advisory Committee, and I recently completed six years of service on West Virginia's Environmental Quality Board.

I speak only for myself tonight, and I'm here to speak in opposition to the emergency rule -- proposed emergency rule changing standards for aluminum and beryllium, although my comments will only deal with the changes to aluminum -- to the aluminum standard.

It seems to me that this emergency rule is unlawful under West Virginia law, because I have seen no convincing demonstration that an emergency indeed exists; an emergency that threatens substantial harm to the public interest. It does deal with preventing economic harm to the extractive industries, the mining and quarrying industries quite clearly, because their costs for treatment will be less. The DEP has stated that it will also save money because

they will not, if I understand this correctly, will save money for DEP because they will not have to do the TMDLs on list on streams that under the current standards are impaired with respect to aluminum, but under the higher standards, this more lenient standard would not be considered impaired.

I understand that USEPA recently within the last couple of days has told DEP that there were streams that DEP did not list on the 303 list that must be listed, so I don't know how that impacts the proposed savings to DEP for not having to do TMDLs. Anyway, it doesn't seem to me that there is substantial harm to the public interest in adhering to the current standards, indeed by allowing further degradation of the waters of West Virginia, I think it harms rather than benefits the public interest.

Additionally, it seems to me that DEP has acted in defiance of the spirit, if not the letter, of the provisions of the Clean Water Act that require public participation for agency decisions. Indeed, we have this hearing tonight, but it's really what, two weeks after the Secretary of State has OK'd it, and if you had received EPA approval, it would be law, so that seems to me to be public participation

quite a bit after the fact.

Even if the emergency action is found to be legal, I don't believe this action is supported by the available science. The chemistry of aluminum in water is quite complex. I'm sure many of you already appreciate that. Not only is it complex, it's currently incompletely understood. There's a number of different chemical species of aluminum that can exist in water, and how they are transformed one into another under the very dynamic and unpredictable conditions one encounters in a real stream in the real world, it's very difficult to say.

The current scientific literature dealing with aluminum toxicity -- I guess I should state that I do not consider an expert in aluminum chemistry, or for that matter the toxic effects of aluminum towards aquatic life, but I do probably know more about aquatic systems, stream systems in particular, which have been my research interest. I probably know more than the average fellow, and I've talked to a number of people who know considerably more about aluminum -- the toxicity of aluminum in aquatic systems than I do.

Anyway, it's my understanding that the -- in

the scientific literature dealing with aluminum toxicity towards aquatic life is not very extensive, and much of the existing literature deals with acute rather than chronic effects. Different aluminum studies have presented contradictory results, often due to the fact that inadequate attention was paid to the numerous factors that may influence aluminum toxicity. Factors such as temperature, pH, hardness, dissolved oxygen, dissolved organic materials, a number of ionic species such as sulphate and nitrate and fluoride, and various silicate anions, phosphate, and others. In addition, sensitivity to aluminum is known to vary significantly between species, and indeed, between life history stages within the same species.

It's been known for some time, as a matter of fact, I remember being taught this as a graduate student many years ago, that water hardness within a certain range can ameliorate the toxicity of metals such as zinc and copper. However, its effect on aluminum toxicity is not nearly as clear cut, and again, the available literature sometimes indicates that increasing hardness does reduce the toxicity of aluminum, and in other cases appears to potentiate

the toxicity of aluminum, so the science is quite unsettled. Furthermore, the DEP's emergency rule assumes that within pH range of most natural waters, that is 6.5 to nine, that hardness is the only factor that is influencing aluminum toxicity, and that is seldom, if ever, the case.

Receiving streams are dynamic systems, and conditions change constantly, both in time and in space. In a stream with significant plant growth for instance, pH may vary widely by as much as a couple pH units. Keep in mind pH is a logarithmic scale, so that's a 100-fold change in ion concentrations, from daylight hours to nighttime hours because of the photosynthesis of plants. Seasonal changes in temperature and changes in flow due to precipitation or a lack of it also affect stream chemistry. The meeting and mixing of streams with different chemistry is of particular concern, as at least one study has shown that the toxicity of aluminum increases within these mixing zones, even at circumneutral pH. Although I've only looked at one study that shows those results, it's one of the few studies in the field relating aluminum toxicity to real biotic communities in a real stream, so it is a

particularly significant study occurring in a refereed scientific journal.

The DEP's own data shows that a large number of West Virginia streams currently suffer some degree of biological impairment, and it's well known that some of that impairment is due to mining activity. A number of studies have also shown that total dissolved solids values, which include the ions that contribute to hardness as well as aluminum, increase rapidly within a stream following disturbance of its watershed due to surface mining either for coal or for limestone. A number of well-documented studies have shown that some degree of biological impairment often accompanies this increase in TDS, often very early in the mining history of -- within a watershed.

Water hardness is usually attributed to calcium and magnesium, because these are usually the only polyvalent metals found in most natural waters in any significant quantity. But in waters draining disturbed watersheds, they may not be the only ions contributing to hardness, and in fact, other metals such as iron and aluminum may contribute to hardness.

What the rule does, of course, is make acceptable levels of aluminum discharge dependent

upon the hardness that's found in the stream. In a way that seems like kind of a dream come true for the mining industry, because since both -- as disturbance increases in a watershed, both aluminum yield and hardness increase together. So the more aluminum there is, usually the more hardness there is, and the more hardness there is, the more permissible the emergency rule is to the discharge of aluminum. So it's kind of a game that you can't lose if you're a disturber of a watershed.

Whether these higher levels of aluminum will cause biological harm within a receiving stream is simply not known with any degree of certainty. The understanding of aluminum chemistry, as I mentioned, is not well understood, and the toxicity of aluminum, especially in real life streams, is even more poorly understood. So it seems to me what the DEP is doing with this rule is it's -- in the absence of any real data, or at least not much real data, concerning aluminum toxicity, they're just going to go ahead and throw more aluminum at the ecosystem, and in some cases that may not cause harm, in other cases it may. The hard fact is we simply don't know. We don't know enough about this issue.

In the justification for the -- for this emergency rule, no reference that I could find was made to any scientific evidence that supports the DEP's position on this. There is kind of a tangential reference to recent changes that have been made in aluminum water quality standards in Colorado and New Mexico in reference to a report that I believe was commissioned by the Colorado Mining Association. I've taken a look at that report, and I would not call it a balanced approach, but it is what it is.

There is an important difference, however, between West Virginia's proposed aluminum standard and those that Colorado and New Mexico have adopted, and that is that the standards in Colorado and New Mexico are based on total recoverable aluminum, while the West Virginia standard, as I understand it, is based only on dissolved aluminum, and that's a significant difference, because if we look at a lot of water quality data and what percentage that actually has measured aluminum, especially those that have measured what form the aluminum is in. If the aluminum it turns out that on an average in the low 40's percent of total aluminum is dissolved, so if

West Virginia uses a dissolved standard, it's really about two and a half times more lenient than the standards that Colorado and New Mexico have adopted, and that certainly is of concern.

So I respectfully ask that the West Virginia DEP rescind the emergency rule and conduct either itself, or commission further studies on the issue of aluminum toxicity in preparation for the upcoming Triennial Review that was just mentioned a few minutes ago. Anyway, I thank you for the opportunity for my concerns to be heard.

MR. ALUISE: Thank you. Our next speaker is Angie Rosser.

MS. ROSSER: Good evening. My name is Angie Rosser, I'm the executive director of the West Virginia Rivers Coalition. We are based out of Elkins, West Virginia as well.

Since 1989, and with currently around 1,800 active supporters, the West Virginia Rivers Coalition works towards the conservation and restoration of West Virginia's exceptional rivers and streams. We represent the interests of people who use and enjoy our rivers as one of our most valuable resources and contributors to our quality of life, so I share with

many of our members a love of being able to safely swim and fish and paddle our rivers. Our rivers are very special to our state and a reason that I live here.

West Virginia Rivers Coalition opposes the revisions to the aluminum water quality criteria as set out in the proposed emergency rule. We join with other citizen groups in submitting in depth written comments that were submitted yesterday to the DEP enumerating our concerns in more detail about the flawed process in which this rule was presented and the lack of scientific justification for the revision.

When it comes to our water resources, there is simply too much at stake to hastily and blindly make such a drastic change to our water quality criteria that risks damage to the integrity and health of our streams. This kind of proposal requires much more substantial study and consideration of the potential impact on aquatic life, on public health, recreation and tourism, and the long term costs to the state and its taxpayers.

The Rivers Coalition urges the DEP to withdraw the proposed rule and either retain the

existing standard or carry out a much more extensive scientific research justifying and documenting hardness as a mitigating factor for aluminum toxicity, which we heard from the prior speaker is a very -- very complex in nature, so we hope that the state takes its time in providing the adequate research to know that our rivers are kept clean and safe for use. Thank you.

MR. ALUISE: Our next speaker is James Kotson.

MR. KOTSON: My name is James Kotson. I am currently the Conservation Chair for the West Virginia chapter of the Sierra Club. I also co-signed some written comments that you have just received, but I would like to add two additional thoughts that have been generated from this.

The process for public comment has already been mentioned, but specifically I am very concerned that what the DEP has done appears to a cynical eye to have been a deliberate attempt to avoid meaningful input from the public. The fact that this emergency rule was released without any consultation with the environmental community and that a public hearing was not scheduled on this until after the rule already

became effective, clearly illustrates that this public comment process will not provide any meaningful input in order to inform the agency's thinking on the rule. This comment process is clearly designed to consult with the public after a decision has already been made, and that is wrong.

A good example of that is with the standard on beryllium. We don't have a lot of technical comments on beryllium, but I would simply point out that nothing in the agency's thinking explained why there was any emergency with regard to the beryllium standard. There is no indication of how many sites are affected; what kinds of treatment costs are involved in any way, shape, or form. The only justification is that EPA is considering a change in the standard and so therefore, West Virginia has to do that as quickly as possible.

Beryllium is a carcinogen. It has a wide range of other adverse health effects. Before the agency dramatically increases the amount of known carcinogens that we allow in public drinking water supplies, you would think that we would go through a rational deliberative process. The Clean Water Act provides for that kind of a process during what they

call the Triennial Review. Every three years there's an opportunity to review water quality standards, to incorporate that. It's meaningful process with good public involvement. There is no need for an emergency rule on beryllium.

The second issue I raise is with regard to the aluminum standard, and I would simply point out that although there is some evidence to suggest that the toxicity of aluminum to aquatic life changes with hardness, at this point there does not seem to be any limit on the amount of hardness in West Virginia waters. It is well established, and the EPA has plenty of data to show that, as we reflected in our comments, that mining has a tendency to increase the amount of hardness in the water. But there is no water quality standard for hardness or total dissolved solids or any of the other specific minerals that make up hardness. And there is nothing that I can see in this rule or any other that would prevent a mining company that has high discharges of aluminum to come back into compliance by simply spiking the water in some way with dissolved solids, and in this case, the solution to pollution is more pollution. That's wrong. And I would urge that the

DEP reconsider this emergency rule. I don't believe the science is good enough to justify that change in the aluminum standard. Even if you were to do that, you cannot with good scientific logic allow this kind of correlation with hardness to be used to establish an aluminum discharge limit. Such a discharge limit should not be done unless you're also imposing some type of limit on total dissolved solids and the amount of hardness for which there is no -- currently no water quality standard, or by limiting hardness to what we would call a natural background level. The natural background levels in almost all West Virginia streams are dramatically lower than those that are impacted by mining.

If there is any rational scientific basis for correlating aluminum discharge levels and aluminum standards with hardness, that should be correlated with the natural background hardness, not with whatever the coal company can get away with. Thank you.

MR. ALUISE: Thank you. Our next speaker is Don Garvin.

MR. GARVIN: Hi, I'm Don Garvin, Legislative Coordinator for the West Virginia

Environmental Council. We have a -- we are signatories to the group sign-on letter put together by what I used to refer to as my water gurus. They are now Angie's water gurus.

I can't begin to express how disappointed I am in the agency. I can't believe this emergency rule was filed, and when the DEP was granted water quality rule-making authority by the legislature, there was language in the statute -- I'm pretty sure it was in the statute, or in the rule, that the DEP guaranteed to maintain the public comment process utilized by the environmental quality board. They haven't done that to this day, and this is the worst example I've seen. It's all about process. Not one discussion of the issue was made in the water quality program meetings the last six months or a year. Not one mention of this issue was made in the DEP advisory council meetings as just a short a time ago as January.

This is why we fought so hard to keep environmental rule-making in the environmental quality board. Because there was a process, a lengthy process. We would have been discussing this for a year in monthly meetings. We barely get three

meetings a year now. I think it's four. That's my main gripe.

The EPA ought to look at this. Take a good, hard look at this. The public has been cut off. There's no emergency. There's inadequate scientific justification. The only reason the Secretary of State cited to us for granting the emergency rule was the Triennial Review process is coming up. Well, you haven't started that yet, and it's March. Then as far as that goes, the Triennial Review process goes, the cows are already out of the barn. It's going to be law, and because of this process, the DEP, this agency will be unable to put the cows back in the barn. I make these comments with respect to the people in the room, but I wanted you to know how strongly disappointed I am about the agency's actions. Thank you.

MR. ALUISE: Thank you. Our next speaker is Bill Price.

MR. PRICE: So my name is Bill Price. I am a staff person with the Sierra Club National, in the Environmental Justice program here in West Virginia and Central Appalachia.

MR. VANGUNDY: Bill, could you speak

up just a little bit?

MR. PRICE: I can. I have to tell you that when I first heard about this that I got the word "emergency," I got all excited. You know, an emergency requires action. My heart started beating a little faster, my palms got a little sweaty, and I was ready to call all my friends and motivate them about this emergency that we supposedly have in regards to aluminum standards. You know, you've got to barricade the doors, you've got to man the torpedoes, all hands on deck when you have an emergency like this.

Imagine my shock and then my dismay when I read that the emergency was about protecting the profits of the coal industry and not the water quality standards and the health of the people in this state. I said shock, but I have to admit, I wasn't all that shocked. But I am dismayed and angry. There is an emergency in this state, but it has nothing to do with the profitability of the coal industry; it as to do with the ongoing and growing health emergency in communities that may be impacted by mountaintop removal coal mining and for that matter fracking. That's the emergency. And what I

want to know is when the DEP is going to start facing that emergency, and dealing with that emergency, and not the profitability of the industry. When that day comes, I'm ready to man the torpedoes. And I'm ready to do whatever it takes to face and solve that emergency. This is not an emergency. You've got technical comments. I'm not a scientist. I don't know. All I know is if this goes through, it does not protect the people. It only protects the profitability of an industry.

I don't know -- it's unclear to me whether or not you are going to notify the EPA about this or not until -- I think I heard you say, "final rule." I will tell you there are individuals and groups in this room that will notify the EPA if you don't sooner than that. It's sort of a pre-emptive strike. It's what you do when there is an emergency. Thank you.

MR. ALUISE: And with that -- that was our last speaker. Does anyone else --

MR. PRICE: He came in late.

MR. ALUISE: Okay.

MR. GOODWIN: I'm Rob Goodwin. You're commenting on this -- I guess I'll call it, industry

profit arrangement rule making that we have here. I'm understanding it has to do with weakening aluminum requirements in the State of West Virginia. You know I used to kind of take interest in these public notices and rule-makings right now, but it's gotten to the point that if it has to do with water quality, it's really about -- you know, a matter of reading it here, because all you know is just, well, one more strike -- let's weaken some -- rollback some regulations here, and boost up the industry, and you know, all those miners that got laid off, here that we're claiming they're going to go back to work and things are going to be okay. That seems to be the solution and you know, maybe what this is about, but no, what this is really about, it's about just a continuing decrease in the amount of care for the streams in West Virginia. It's a decreasing amount of, you know, just reaching out-ness, I guess, to those that fish the streams in this state, that actually enjoy living next to streams in this state, and it's bogus, it's got to stop. It seems like all it is is just some sort of political ploy for the governor, the politicians of this state to think that if they just push and they -- you know, and they roll

back some regulations here and there to benefit the coal industry, they'll get elected, and they won't have to deal with all the other great issues in this state that are occurring.

And so, I obviously oppose this. I oppose, you know, changing regulations as opposed to just actually complying with them. We have an industry here that brags about how good and environmentally compliant they are. Well, I think it's about time that they actually start complying with regulations than trying and asking to change them every single time they become tough to meet. And I would also specifically request that -- I've been to these before and I know that the West Virginia Coal Association essentially writes these things and give them to West Virginia DEP, but they often don't like to actually speak and present at these hearings. They just come and sit in the back, and so I would request, specifically, that -- Mr. Bostic is here in the room, if you would come up and present exactly details and some facts, because this is about profit and jobs and the industry. I would like you come up and lay out here how many jobs is this going to create. Do this analysis, you ask here time and time

again -- you sue the EPA because basically they're not doing a jobs impact analysis on their bills. Well, come and show us, how many West Virginia jobs is this weakening of regulations going to create. Tell us. Bring us the facts. Maybe it will. Maybe it will change our minds. But you don't bring us the facts. The only time the facts matter about trying to prove something is when we come to you. When we come to you and try to prove that there's degradation in the state and that there's a problem, when we come to you and try to prove that there's people getting sick from this water, that's the only time scrutinizing and putting the proof and the facts matter. But when it comes to you, you just write a regulation, say that it creates jobs, say that it does this, say that it does that, your word is taken for it and it gets approved and it doesn't matter a damn what we have to say. So, Mr. Bostic, I call on you specifically because you're here, and anyone else in the Coal Association, come up here and explain yourself how this is going to benefit West Virginia. Thank you.

MR. ALUISE: Okay. Do we have any other speakers this evening? Okay. In that case

this concludes the public hearing this evening. Thank you very much for coming.

REPORTER'S CERTIFICATE

STATE OF WEST VIRGINIA,

COUNTY OF KANAWHA, to wit:

I, Joel S. Gibson, Notary Public in and for the State of West Virginia, duly commissioned and qualified, do hereby certify that the foregoing hearing was transcribed by me

I further certify that I am not connected by blood or marriage with any of the parties to this action, am not a relative or employee or attorney or counsel of any of the parties, nor am I a relative or employee of such attorney or counsel, or financially interested in the action, or interested, directly or indirectly, in the matter in controversy.

Given under my hand this 27th day of March, 2013.

_____

Joel S. Gibson, CCR
Notary Public

My commission expires January 11, 2021.

47 CSR 2. REQUIREMENTS GOVERNING WATER QUALITY STANDARDS

RESPONSE TO COMMENTS

On February 8, 2013, the Division of Water & Waste Management (DWWM) commenced a forty-five day public comment period and subsequently held a public hearing on March 27, 2013 to accept oral comments on an emergency rule to address the dissolved aluminum criteria and human health category A beryllium criterion in 47CSR2. DWWM also accepted written comments through the conclusion of the public hearing on Wednesday, March 27, 2012. Thirty-four commenters submitted written comments regarding the emergency rule and six commenters provided verbal comments, two of which also supplemented their written comments. Also, four written comments were received after the deadline and are included with the rule package but were not considered for response. DWWM addresses these comments below.

1. COMMENTER: Roger and Janey Wilmoth

COMMENT A: *Dissolved Aluminum Criteria*

The commenters state the western mining waters are significantly different in chemical composition than eastern mining states. They believe the studies on aluminum toxicity that are presented in western states are highly unlikely to be directly transferrable to the conditions in eastern states. They also believe switching from regulating total aluminum to only regulating the dissolved aluminum reflects a significant weakening of the standard and promotes significant degradation of the receiving stream. Therefore they oppose this

revision and request necessary toxicity studies be conducted and then propose appropriate changes.

RESPONSE A: In the analysis of the initial approach, the DWWM requested that the applicant utilize the toxicity study completed by Cleveland, Little, Wiedmeyer and Buckler (1989), which included toxicity studies on brook trout, and this study was included in the calculation of the final equation. DWWM also consulted with EPA staff on the applicability and transferability of the studies to this region and confirmed that they can be used for this criteria approach. Per the comment regarding the use of dissolved versus total for the aluminum standard, it is the policy of the EPA Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than total recoverable metal. This conclusion regarding metals bioavailability is supported by a majority of the scientific community within and outside EPA. It should also be noted that the current aluminum water quality standard is listed in the dissolved form.

2. COMMENTER: Pamela F. Faggert - Dominion

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter supports the passage of the Emergency Rule and agrees that without its passage, members of the regulated community may incur unnecessary treatment costs and subject some of the State's water to inclusion on the EPA's list of impaired water when such waters are not adversely impacted. The commenter concurs with the scientific studies and feels the proposed hardness-based approach offers a water quality calculation that more appropriately relies on site-specific characteristics as opposed to the existing one-size-fits-all numeric criteria. Also,

they feel this approach will offer certain increased protections to the aquatic environment than provided under the existing standards with respect to low hardness environments.

RESPONSE A: The DWWM agrees with the commenter and believes the emergency rule will continue to protect the designated uses of West Virginia rivers and streams

3. COMMENTER: Allen Johnson

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenters feels obligated to question rulings that undercut established science in order to protect an extractive industry and from a theological standpoint feels pollution that can be substantially detrimental to ecological health and human health is morally unacceptable and sinful.

RESPONSE A: The agency does not believe that this action is "undercutting established science" as was stated in the comment. Since the release of the current recommended ambient water quality criteria for aluminum in 1988, several acute and chronic aluminum toxicity studies have been published in the scientific literature. These toxicity studies meet the EPA guidelines for ambient water quality criteria development and also result in additional data being available for deriving an aluminum acute-chronic ratio. These studies also present evidence that a scientifically defensible relationship exists between the stream hardness concentration and the toxicity of dissolved aluminum in waters within a pH range of greater-than or equal to 6.5 to less-than or equal to 9.0. Therefore expressing the aluminum criteria on the basis of a hardness equation, rather than as a single fixed value, is now warranted. The information and data presented in these studies has been vetted and approved by EPA, and is considered acceptable for updating

the aluminum criteria, which will protect the aquatic life use by tightening aluminum standards in low hardness waters as well as prevent overprotection in high hardness streams.

The beryllium revision in the emergency rule is applicable to the human health Category A and represents the maximum contaminant level goal that is recommended by EPA in absence of a federal national recommended water quality criteria. The current beryllium aquatic life criteria of 130µg/l are not being changed.

4. COMMENTER: Jean McAulay

COMMENT A: *Dissolved Aluminum Criteria*

The commenter expresses her opposition to the Emergency rule that would allow higher levels of aluminum in the water and feels it is important to safeguard the water in the streams and rivers of West Virginia.

RESPONSE A: See Response to Comment 3.A

5. COMMENTER: Gary R. Zuckett – WV Citizen Action Group

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter believes that the WV DEP Division of Water and Waste Management's filing an emergency rule for aluminum and beryllium will weaken state water quality standards for no plausible reason and significantly subverts the legislative intent of the emergency rule process by circumventing adequate public participation and scrutiny in the rule making process. The commenter feels the proposed revisions are draconian and equate to an exponential increase over current standards for aluminum and beryllium.

RESPONSE A: See Response to Comment 3.A. and 6.B.

6. COMMENTER: Carol Nix

COMMENT A: *Dissolved Aluminum Criteria*

The commenter inquires as to field studies conducted that support this criteria. The commenter also presents several questions:

Does the science support allowing increased aluminum at all pH levels?

Upon what does the agency base their science?

Are there citations somewhere that I (the commenter) missed?

RESPONSE A: Waters with a pH of less than 6.5 are below the acceptable pH range identified by EPA, and such waters favor the dissolution of aluminum into more bioavailable monomeric and ionic forms. Consistent with EPA's existing criteria for aluminum, the updated aluminum criteria will only consider toxicity studies conducted with in the pH range of 6.5 and 9.0 and is reflected in the proposed criteria where the hardness based equation can only be utilized in waters where pH is within this 6.5 to 9.0 range.

The information concerning the additional studies used can be found in GEI Consultant's report "Updated Freshwater Aquatic Life Criteria for Aluminum" (August 2011) and is available via the internet (http://www.dep.wv.gov) and/or upon request. Further information can also be found in the Response to 3.A.

The revised aluminum standards are based on the protection of the aquatic life of West Virginia rivers and streams. This data is considered acceptable for updating the aluminum criteria, which will protect this use by tightening aluminum standards in low hardness waters as well as prevent overprotection in high hardness streams without regard to current "citations".

COMMENT B: *Emergency Rule*

The commenter feels the rule change in the manner of an emergency rule undermines the credibility of the DEP when it circumvents normal procedures and also undermines the public's trust in the department. The commenter believes for this reason alone the changes should be abandoned.

RESPONSE B:

As found in the *West Virginia's State Administrative Procedures Act*, an emergency rule may be promulgated when an emergency exists. W. Va. Code §29A-3-15(f) defines emergency narrowly:

"For the purposes of this section, an emergency exists when the promulgation of an emergency rule is necessary (1) for the immediate preservation of the public peace, health, safety or welfare, (2) to comply with a time limitation established by this code or by a federal statute or regulation, or (3) to prevent substantial harm to the public interest."

When an agency proposes an emergency rule, it is filed with the Secretary of State and Legislative Rule Making Review Committee The Secretary of State's office is required by law (W. Va. Code §29A-3-15) to review all emergency rules to determine the following:

- That the scope of statutory authority has not been exceeded
- Whether there exists a justified emergency
- Whether the agency complied with these procedures

The Secretary of State has 42 days to review the rule and decide if an emergency truly exists. The DWWM filed the emergency rule with the Secretary of State on January 30, 2013 and a notice of a public hearing on the proposed rule on February 6, 2013. A 45 day comment period was scheduled beginning February 8, 2013 and continued until the public hearing on March 27, 2013. On March 12, 2013 the Secretary of State concurred with and approved the emergency rule based on the

prevention of "substantial harm to the public interest". However, the emergency rule will need approval by EPA before it becomes effective. It should also be noted that prior to the filing of the emergency rule, DWWM conducted several public meetings and presented information concerning the proposed revisions (refer to State Register June 8, August 24, and November 2, 2012; presentation slides for the public meetings can be found on the DWWM water quality standards meetings archive page). Also, the DWWM solicited input from the public from September 11 to October 10, 2012 on potential revisions to the state's water quality standards and presented an overview of the submitted comments during the November 2012 public meeting.

7. COMMENTER: Marian Buckner

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter strongly urges the DEP to oppose the emergency rule that weakens water quality standards for aluminum and beryllium. The commenter feels this emergency rule fails to protect the designated uses of WV streams as required under the federal Clean Water Act.

RESPONSE A: See Response to Comment 3.A.

8. COMMENTER: Barbara Frierson

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter strongly opposes weakening the WV water quality standards for aluminum and beryllium especially doing so in the invalid and underhanded way through the emergency rule process.

RESPONSE A: See Response to Comment 3.A. and 6.B.

COMMENT B: *Emergency Rule*

The commenter believes the proposed changes are not based on any recognizable emergency and the agency is attempting to pass such a rule change without providing extensive public participation and comment. The commenter demands that all such proposals to go at least through the normal rulemaking process.

RESPONSE B: See Response to Comment 6.B. It should also be noted that this change will be required to go through the normal rule making process and included in the 2014 Triennial Review.

9. COMMENTER: Paul Baker

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes that there is not sufficient scientific evidence to go through with this rule change.

RESPONSE A: See Response to Comment 3.A.

10. COMMENTER: Rita Lewis

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes the proposed emergency rule and feels it will harm aquatic life and human health by lowering standards for acute and chronic aluminum toxicity and beryllium. The commenter believes any changes should go through the normal rulemaking process.

RESPONSE A: See Response to Comment 3.A. It should also be noted that this change will be required to go through the normal rule making process and included in the 2014 Triennial Review.

11. COMMENTER: Steve Malafy

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter is against the emergency rule that they fells will weaken water quality standards and endanger aquatic wildlife. The commenter believes the present standards should be upheld.

RESPONSE A: See Response to Comment 3.A.

12. COMMENTER: Carl Bolyard

COMMENT A: *Dissolved Aluminum Criteria*

The commenter opposes the proposed emergency rule that would allow greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. The commenter feels the proposed rule does not have the science to show that it will protect the designated use of WV streams as required under the federal Clean Water Act and will cause a conflict with the EPA.

RESPONSE A: See Response to Comment 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the emergency rule does not provide adequate public participation in the rule making process. The commenter states that there was only one hearing, at the capitol, and this rule is being pushed through on a short time frame without a through comment period. The commenter indicates that there is no emergency that justifies the promulgation of this rule.

RESPONSE B: See Response to Comment 8.B. and 6.B.

13. COMMENTER: Shannon Holliday

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes the ruling that would weaken WV water quality standards and feels the WVDEP has an obligation to protect the public's interest.

RESPONSE A: See Response to Comment 3.A.

14. COMMENTER: Mark J. Frondorf

COMMENT A: *Dissolved Aluminum Criteria*

The commenter opposes this emergency rule and feels there is no justification to impose a rule that will weaken water quality standards for aluminum toxicity to aquatic life. The commenter believes the emergency rule will fail to protect WV streams as required under the federal Clean Water Act and fails to protect the public's interest by protecting the commons.

RESPONSE A: See Response to Comment 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the WVDEP has failed to provide adequate public participation in the rulemaking process.

RESPONSE B: See Response to Comment 6.B. and 8.B.

15. COMMENTER: John Kobak

COMMENT A: *Dissolved Aluminum Criteria*

The commenter opposes the proposed emergency rule relative to quality standards for aluminum toxicity to aquatic life. The commenter believes there is no

emergency that justifies the proposed revisions of this rule and there is no science showing that the changes protect designated stream use and public health.

RESPONSE A: See Response to Comment 3.A. and 6.B

16. COMMENTER: Scott Aylor

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter is opposed to easing pollution restrictions to WV streams and rivers.

RESPONSE A: See Response to Comment 3.A.

17. COMMENTER: Marjorie A. Clarkson

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter is opposed to lowering the water quality standards for aluminum toxicity and Category A for beryllium.

RESPONSE A: See Response to Comment 3.A.

18. COMMENTER: Donald Briggs

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes this emergency rule that would weaken water quality standards for WV streams. The commenter believes the emergency rule will fail to protect the designated use of WV streams as required under the federal Clean Water Act and fails to protect the long term public's interest.

RESPONSE A: See Response to Comment 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the WVDEP needs to increase public participation in the rulemaking process.

RESPONSE B: See Response to Comment 8.B.

19. COMMENTER: Richard T. Clark

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes any change in regulations that would weaken water quality standards for WV streams.

RESPONSE A: See Response to Comment 3.A.

20. COMMENTER: Lee Orr – Trout Unlimited

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes any reduction of water quality standards that could potentially impact protections to trout waters. The commenter is also concerned that the changes to the dissolved aluminum standard are based on pH and hardness levels which are not static on individual streams and can change dramatically. Also, the commenter is concerned that the changes to the beryllium criterion are based on drinking water standards rather that those intended to protect aquatic health.

RESPONSE A: The studies present evidence that a scientifically defensible relationship exists between the stream hardness concentration and the toxicity of dissolved aluminum in waters within a pH range of greater-than or equal to 6.5 to less-than or equal to 9.0. Therefore expressing the aluminum criteria on the basis of a hardness equation, rather than as a single fixed value, is now warranted and it is considered acceptable for updating the aluminum criteria which will protect the

aquatic life use by tightening aluminum standards in low hardness waters as well as prevent overprotection in high hardness streams.

Since it has been found that aluminum toxicity is significantly affected by site-specific factors, a number of programmatic challenges are presented. The DWWM has the key role in the risk management process of balancing these factors in the management of its water programs. The site-specific nature of this issue will need a permit-by-permit approach to implementation.

The beryllium revision in the emergency rule is applicable to the human health Category A and represents the maximum contaminant level goal that is recommended by EPA in absence of a federal national recommended water quality criteria. The current beryllium aquatic life criteria of 130µg/l is not being changed. Also see response to 3.A.

21. COMMENTER: David Hepler

COMMENT A: *Dissolved Aluminum Criteria*

The commenter opposes the proposed revisions of standards for aluminum toxicity to aquatic life and feels this emergency rule will fail to protect the designated use of WV streams as required under the federal Clean Water Act.

RESPONSE A: See Response to Comment 3.A.

22. COMMENTER: Kathryn A. Stone

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter believes the emergency rule will fail to protect the designated use of WV streams as required under the federal Clean Water Act and fails to protect the public interest.

RESPONSE A: See Response to Comment 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the WVDEP failed to provide participation in the rule making process.

RESPONSE B: See Response to Comment 6.B. and 8.B.

23. COMMENTER: Sam Golston

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes the standard should be raise in order to protect the drinking water due to aluminum being a contributor to Alzheimers disease.

RESPONSE A: The revised aluminum criteria are applicable to the protection of the aquatic life use only.

24. COMMENTER: Bill Reger-Nash

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes the proposed emergency rule that would allow greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. The commenter feels the proposed rule fails to protect the designated use of WV streams as required under the federal Clean Water Act and protect the public's interest. The commenter believes

RESPONSE A: See Response to Comment 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the WVDEP failed to provide public participation in the rule making process and there is no emergency that justifies the promulgation of this rule.

RESPONSE B: See Response to Comment 6.B and 8.B.

25. COMMENTER: Sara Wilts

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter opposes the proposed emergency rule that would allow greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. The commenter feels the proposed rule fails to protect the designated use of WV streams as required under the federal Clean Water Act and protect the public's interest. The commenter believes the WV criteria is more lenient that the equation used in Colorado due to the fact that it applies to dissolved aluminum rather than total recoverable aluminum in Colorado. The commenter also suggests the use of the Biotic Ligand Model which takes all of the important aspects of water chemistry into account as an alternative for some metals criteria.

RESPONSE A: See Response to Comment 3.A. Also, the Biotic Ligand Model for aluminum is in development and not currently available. If and when EPA approves this method DWWM can consider this approach as a potential standard change.

COMMENT B: *Emergency Rule*

The commenter believes the WVDEP failed to provide public participation in the rule making process.

RESPONSE B: See Response to Comment 6.A and 8.B.

26. COMMENTER: Charles L. Harris

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. The commenter suggests that plans to implement this rule are suspended and the current standard for aluminum maintained as is. The commenter provides the following additional comments:

> *Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity*
>
> *When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality*
>
> *Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults)*
>
> *The paper by Steve McCormick showed how episodic aluminum toxicity to Atlantic salmon smolts increases with lower pH*
>
> *The proposed rule change reference a study but provides no reference to that study. It is important that this study be evaluated by outside parties.*
>
> *Any changes to the criteria in waters with a pH below 6.5 would be of great concern.*

RESPONSE A: See Response to Comment 3.A.

27. COMMENTER: Richard McGraw

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. The commenter suggests that plans to implement this rule are suspended and the current standard for aluminum maintained as is. The commenter provides the following additional comments:

Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity

When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality

Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults)

The paper by Steve McCormick showed how episodic aluminum toxicity to Atlantic salmon smolts increases with lower pH

The proposed rule change reference a study but provides no reference to that study. It is important that this study be evaluated by outside parties.

Any changes to the criteria in waters with a pH below 6.5 would be of great concern.

RESPONSE A: See Response to Comment 3.A.

28. COMMENTER: Jeff Witten

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. The commenter suggests that plans to implement this rule are suspended and the current standard for aluminum maintained as is. The commenter provides the following additional comments:

Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity

When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality

Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults)

The paper by Steve McCormick showed how episodic aluminum toxicity to Atlantic salmon smolts increases with lower pH

The proposed rule change reference a study but provides no reference to that study. It is important that this study be evaluated by outside parties.

Any changes to the criteria in waters with a pH below 6.5 would be of great concern.

RESPONSE A: See Response to Comment 3.A.

29. COMMENTER: Thomas M. Boggs – West Virginia Chamber of Commerce

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter applauds the agency's work in developing these revised criteria which are scientifically justified and make West Virginia's regulatory approach to these criteria consistent with other areas of the country.

RESPONSE A: See Response to Comment 2.A.

30. COMMENTER: Angie Rosser – West Virginia Rivers Coalition

COMMENT A: *Dissolved Aluminum Criteria*

The commenter opposes the revisions to the aluminum water quality criteria as set out in the proposed emergency rule. The commenter is concerned about the flawed process in which the rule was presented and the lack of scientific justification for the revision. The commenter believes this kind of proposal required much more substantial study and consideration of the potential impact on aquatic life, public health, recreation and tourism, and long-term costs to the state and its taxpayers.

RESPONSE A: See Response to Comment 3.A.

31. COMMENTER: Marc E. Kolanz – Materion Brush Inc.

COMMENT A: *Beryllium Criteria*

The commenter supports the proposed revision for beryllium and feels it is a step in the right direction but believes the proposed new standard is more conservative than necessary. The commenter states the proposed overly protective standard of 4µg/l is at least a start in eliminating adverse consequences to both the regulated

community and the agency while adequately protecting human health and the environment.

RESPONSE A: For a pollutant for which EPA has not published a recommended water quality criterion for "water and organisms" and for which EPA has promulgated a MCLG, EPA generally recommends the MCLG for non-carcinogenic pollutants. The MCLG represents the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur and that allows an adequate margin of safety. The maximum contaminant level goal (MCLG) is derived in a three-step process that includes the calculation of a reference dose (RfD). The RfD is an estimate of the amount of a chemical that a person can be exposed to on a daily basis that is not anticipated to cause adverse systemic health effects over the person's lifetime. The DWWM feels the proposed beryllium criterion of 0.004 mg/L is needed to provide for the protection of the human health use of surface water.

32. COMMENTER: James J. Van Gundy

COMMENT A: *Dissolved Aluminum Criteria*

The commenter believes the agency's action is not supported by the available science. The commenter states that in the absence of solid information concerning the relationship between the various chemical species of aluminum and WV's various species of aquatic life, effect on dynamic streams systems, complexity of aluminum water chemistry and watershed disturbance impact, prudence demands that water quality criteria and standards be established in an environmentally conservative manner. Also, the standards of Colorado and New Mexico are based on total recoverable aluminum while the agency's proposed aluminum standard is based on dissolve aluminum only making WV's standard considerably more

permissive. Further study is needed on the issue of aluminum toxicity in preparation for the upcoming triennial review of water quality standards.

RESPONSE A: See Responses to Comment 1.A.and 3.A.

COMMENT B: *Emergency Rule*

The commenter believes the emergency action is unlawful under WV law because the agency has not demonstrated that an emergency that threatens "substantial harm to the public interest" exists in this situation. The commenter also states the agency has acted in defiance of the spirit if not the letter of the provisions of the federal Clean Water Act governing public participation in agency decision making.

RESPONSE B: See Response to Comment 6.B.

33. COMMENTER: Margaret James – Appalachian Mountain Advocates

COMMENT A: *Dissolved Aluminum Criteria*

The commenter strongly opposes WVDEP's proposed revisions to the aluminum water quality criteria. The commenter believes the proposed rule change will significantly weaken the aluminum criteria and WVDEP lacks the sufficient information to promulgate hardness based aluminum criteria. The commenter feels aluminum toxicity is complex and WVDEP has not considered any of the complex interactions affecting aluminum toxicity. Also, the standards of Colorado and New Mexico are based on total recoverable aluminum while the agency's proposed aluminum standard is based on dissolved aluminum only making the Colorado and New Mexico criteria more stringent. The commenter believes WVDEP must abandon the flawed aluminum criteria.

RESPONSE A: See Responses to Comment 1.A.and 3.A.

COMMENT B: *Emergency Rule*

The commenter believes there is no emergency that justifies the promulgation of this rule and the agency failed to provide adequate public participation.

RESPONSE B: See Response to Comment 6.B.

34. COMMENTER: Jason D. Bostic – WV Coal Association

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter fully supports WVDEP's efforts to adopt a hardness-based standard for aluminum to better protect aquatic life by reflecting the actual toxicity and simplifying NPDES compliance with the aluminum criteria. Also, the commenter completely supports WVDEP's effort in the emergency rule to adopt the beryllium MCL of 0.004 mg/l as the human health Category A criterion and feels the present criterion is not scientifically justifiable.

RESPONSE A: See Response to Comment 2.A.

35. COMMENTER: James Kotcon – WV Sierra Club

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter states that beryllium is a carcinogen and has a wide range of adverse health effects. The commenter believes the agency needs to go through a rational deliberative process before dramatically increasing the amount of known carcinogens in public drinking water supplies.

RESPONSE A: See Response to Comment 31.A. It should also be noted that EPA recognized beryllium as a carcinogen in air and not in water. Both EPA and OSHA have exposure and air release standards and these are not being revised nor changed by this rule action.

COMMENT B: *Hardness and total dissolved solids (TDS)*

The commenter is concerned that there is no water quality standard for hardness or total dissolved solids or any of the specific minerals that make up hardness and that the science does not justify the change to the aluminum standard. The commenter believes some type of limit on total dissolved solids and the amount of hardness should be imposed or limiting hardness to a natural background level.

RESPONSE B: The comment regarding TDS is outside the scope of this proposed rule and, therefore, no response is required. With regard to the comment on the natural hardness background levels, this issue will be addressed via the permitting process which will take into account such things as natural background levels and downstream protection.

COMMENT C: *Emergency Rule*

The commenter believes there has been a deliberate attempt by WVDEP to avoid meaningful input from the public. The commenter also states that the emergency rule was released without any consultation with the environmental community and a public hearing was not scheduled until after the rule already became effective which clearly illustrates that this public comment process will not provide any meaningful input.

RESPONSE C: See Response to Comment 6.B.

36. COMMENTER: Don Garvin

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter expressed disappointment in the WVDEP and the filing of the emergency rule due to the lack of discussion of the issue in the water quality

meetings during the last six months/year. The commenter also believes there is no emergency or scientific justification.

RESPONSE A: See Response to Comment 6.B.

37. COMMENTER: Bill Price

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter feels the emergency rule is about protecting the profits of the coal industry and not the water quality standards and the health of the people in the state. The commenter believes the emergency is the ongoing and growing health emergency in communities that may be impacted by mountaintop removal coal mining and fracking.

RESPONSE A: See Response to Comment 3.A.

A portion of this comment is beyond the scope of the proposed criteria revisions and therefore, requires no response.

38. COMMENTER: Bill Goodwin

COMMENT A: *Dissolved Aluminum and Beryllium Criteria*

The commenter believes that there should be compliance of regulations rather than changing them.

RESPONSE A: See Response to Comment 6.A.

WEST VIRGINIA RIVERS COALITION

329 Davis Avenue, Suite 7 • Elkins, WV 26241 • (304) 637-7201 • www.wvrivers.org

March 27, 2013

RE: Proposed changes to the aluminum water quality criteria

Attn: Kevin Coyne, WV Department of Environmental Protection

Since 1989 and with currently around 1,800 active supporters, West Virginia Rivers Coalition (WVRC) works toward the conservation and restoration of West Virginia's exceptional rivers and streams. We represent the interests of people who use and enjoy our rivers as one of our state's most valuable resources and contributors to West Virginian's quality of life.

The West Virginia Rivers Coalition opposes the revisions to the aluminum water quality criteria as set out in the proposed emergency rule. WVRC joins with other citizen's groups in submitting in-depth written comments to the WVDEP enumerating our concerns about the flawed process in which this rule was presented and the lack of scientific justification for the revision.

When it comes to our water resources, there is too much at stake to hastily and blindly make such a drastic change to our water quality criteria that risks damage to the integrity and health of our streams. This kind of proposal requires much more substantial study and consideration of the potential impact on aquatic life, public health, recreation and tourism, and long-term costs to the state and its taxpayers.

The West Virginia Rivers Coalition urges the WVDEP to withdrawal the proposed rule and either retain the existing standard or carry out more extensive scientific research justifying hardness as a mitigating factor in aluminum toxicity.

Angie Rosser
Executive Director

West Virginia Department of Environmental Protection
Public Hearing on Emergency Water Quality Standards change
Aluminum and Beryllium
Charleston, WV
March 27, 2013

Gentlemen,

My name is Dr. James Van Gundy and I live in Elkins, West Virginia. I hold a Ph.D. in Aquatic Ecology from the University of Utah and have been professionally concerned with water quality issues for the past 48 years. I have taught college level courses in Aquatic Ecology, Water Resource Management, and Environmental Toxicology. I was employed by the state of Pennsylvania for several years as a Water Pollution Control Specialist. In the early 1980's I served on the old West Virginia Water Quality Advisory Committee and more recently served six years on West Virginia's Environmental Quality Board. I currently sit on the City of Elkins Sanitary Board and the Board of Directors of the Shavers Fork Coalition.

I am here to speak in opposition to the Emergency Rule changing West Virginia's water quality standards for Aluminum and Beryllium, particularly the proposed change for Aluminum. I believe that this action is unlawful under West Virginia law because WVDEP has not demonstrated that an emergency that threatens "substantial harm to the public interest" exists in this instance. Indeed, by allowing further degradation of the State's water resources, it harms rather than benefits the public interest. In addition, I believe that by this action the West Virginia DEP has acted in defiance of the spirit if not the letter of the provisions of the Federal Clean Water Act governing public participation in agency decision making.

Even if this "emergency" action is found to be legal, West Virginia DEP's action in this matter is not supported by the available science. The chemistry of Aluminum in water is complex and currently incompletely understood. The biological effects of Aluminum in aquatic systems are even more poorly understood because of the large variety of organisms potentially affected and the multiple chemical and physical factors that influence the toxicity of Aluminum toward aquatic organisms. The current scientific literature dealing with Aluminum toxicity towards aquatic life is not extensive and what does exist deals largely with acute rather than chronic effects. Different Aluminum studies have presented seemingly contradictory results, often due to the fact that inadequate attention was paid to the many factors that may influence Aluminum toxicity. Among these factors are temperature, pH, hardness, dissolved oxygen, dissolved organic materials, and the presence of ionic substances such as sulfate, fluoride, nitrate, silicates, phosphate, and others, In addition, sensitivity to Aluminum is known to vary significantly between species and often between life history stages of the same organism.

While it has been known for some time that water hardness within a certain range can ameliorate the toxicity of metals such as Zinc and Copper, its effect on Aluminum toxicity is not nearly as clear-cut. Furthermore, DEP's Emergency rule assumes that within the pH range of most natural waters (pH=6.5–9.0) hardness is the only factor that affects the toxicity of Aluminum and this is seldom if ever the case.

The situation is further complicated by the fact that receiving streams are dynamic systems within which conditions change both in time and space. In a stream with significant plant growth for example, pH may vary considerably between daylight and nighttime hours. Seasonal changes in temperature and changes in flow due to precipitation or the lack of it, also affect stream chemistry. The meeting and mixing of streams with different chemistry is of particular concern as at least one study has shown that the toxicity of Aluminum increases within such mixing zones, even at circumneutral pH. The mechanisms behind this observed effect are not well understood.

The West Virginia Department of Environmental Protection's own data shows that a large number of West Virginia streams currently suffer some degree of biological impairment, and it is well known that the observed impairment in many of these streams is due to mining activity. Aluminum is only one of the potential pollutants that mining activity may produce, it is very difficult to assess the role that Aluminum plays in the biological impairment observed within an actual stream.

A number of studies have shown that Total Dissolved Solids (TDS) values, which include those ions that contribute to hardness, rapidly increase within a stream following disturbance of its watershed due to surface mining. A number of well-documented studies have also shown that some degree of biological impairment often accompanies this increase in TDS. Water hardness is usually attributed to Calcium and Magnesium ions in water because these are usually the only polyvalent metals found in significant amounts in undisturbed natural waters. However, in waters affected by human activities such as mining and quarrying, other metals such as Iron and Aluminum may contribute significantly to hardness.

The West Virginia DEP's justification for the Emergency Rule argues that it provides additional protection for streams with low hardness. Such low hardness values would most likely only be encountered in the smaller headwater streams of the Appalachian Plateau section of the state, which includes the West Virginia coalfields. However, since watershed disturbance by mining would likely quickly increase the hardness of such streams, the promised additional protection might well never be realized.

This Emergency Aluminum rule appears to offer a dream scenario for the mining and quarrying industry in West Virginia, because while Aluminum levels increase as disturbance to a watershed increases, so does water hardness. Under this emergency rule,

the Aluminum standard becomes increasingly permissive as hardness increases. Thus, the more Aluminum that is released from a mined or quarried site, the more Aluminum the WV DEP permits to be discharged. Whether these higher levels of Aluminum will cause biological harm within the receiving streams or not is simply unknown. The justification for the Emergency Rule cites no evidence that these elevated levels of Aluminum do not harm aquatic life. In the absence of solid information concerning the relationship between the various chemical species of Aluminum and West Virginia's various species of aquatic life, prudence demands that water quality criteria and standards be established in an environmentally conservative manner.

Finally, DEP's justification for this rule states that Colorado and New Mexico have made similar changes to their Aluminum water quality standard and that these have been approved by USEPA. The Colorado and New Mexico standards however are based on Total Recoverable Aluminum while WV DEP's proposed standard is based on Dissolved Aluminum only. This makes West Virginia's standard considerably more permissive than either Colorado's or New Mexico's.

I respectfully ask that the West Virginia Department of Environmental Protection rescind this Emergency Rule and conduct further study on the issue of Aluminum toxicity in preparation for the upcoming triennial review of water quality standards.

I thank you for this opportunity for my concerns to be heard.

James J. Van Gundy

James J. Van Gundy, Ph.D.

Coyne, Kevin R

From: DEP Comments
Sent: Monday, March 25, 2013 12:59 PM
To: Coyne, Kevin R
Subject: FW: Emergency WQS Rule

From: Dick and Karen McGraw [mailto:randkmcgraw@suddenlink.net]
Sent: Friday, March 22, 2013 9:16 AM
To: DEP Comments
Subject: Emergency WQS Rule

Kevin Coyne
Water Quality **Standards**
WV DEP 601 57th Street, S.E.
Charleston, WV

Dear Mr. Coyne,

As a Trout Stream frontage owner and concerned citizen, I would like to register my concern for the proposed emergency rule concerning Aluminum. First, it is not clear to me that there is any kind of emergency that warrants the establishment of a lower water quality standard. Because of the known toxicity of Aluminum to aquatic life, any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. I have consulted with scientific experts on the Trout Unlimited staff to get their input on the proposed change. Here are their findings related to Aluminum toxicity and the proposed emergency rule:

1. Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity.
2. When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality.
3. Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults).
4. The paper by Steve McCormick et al. at Conte Fish Center* showed how episodic (2-day) aluminum toxicity to Atlantic salmon smolts increases with lower pH.
They observed at least some mortality at a pH of 5.7 and Al of 175ug/L, the pH at which Al measured at the gill also began to increase. No mortality was observed at a pH of 6, and Gill Al levels were at baseline levels.
***McCormick et al. Aquaculture 362-363 (2012) 224–231**
5. The proposed rule change references a study but provides no reference to that study. This is important as so that the study can be evaluated by outside

parties for its applicability to WV, as well as understand any caveats of the study discussed by the authors that might be pertinent to the proposed rule change.
6.
I would be most concerned with any changes to rule changes in waters with a pH below 6.5.

Because of the above facts and the reality that most of WV trout waters are low pH, this rule presents a real threat to trout in our State waters. Hence, I suggest that plans to implement this rule are suspended and the current standard for Aluminum maintained as is.

Thank you very much,
Richard McGraw
Elkins, WV

S

Coyne, Kevin R

From: DEP Comments
Sent: Monday, March 25, 2013 1:02 PM
To: Coyne, Kevin R
Subject: FW: Emergency Rule for Aluminum / 47CSR2

From: clharris [mailto:troutguy2@frontier.com]
Sent: Friday, March 22, 2013 8:59 AM
To: DEP Comments
Subject: Emergency Rule for Aluminum / 47CSR2

Kevin Coyne
Water Quality **Standards**
WV DEP 601 57th Street, S.E.
Charleston, WV

Dear Sir: As a member of the Governors' DEP Public Advisory Council I would like to register my concern for the proposed emergency rule concerning Aluminum. First, it is not clear to me that there is any kind of emergency that warrants the establishment of a lower water quality standard. Because of the known toxicity of Aluminum to aquatic life, any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. I have consulted with scientific experts on the Trout Unlimited staff to get their input on the proposed change. Here are their findings related to Aluminum toxicity and the proposed emergency rule:

1. Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity.

2. When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality.

3. Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults).

4. The paper by Steve McCormick et al. at Conte Fish Center* showed how episodic (2-day) aluminum toxicity to Atlantic salmon smolts increases with lower pH.

They observed at least some mortality at a pH of 5.7 and Al of 175ug/L, the pH at which Al measured at the gill also began to increase. No mortality was observed at a pH of 6, and Gill Al levels were at baseline levels.

*McCormick et al. Aquaculture 362-363 (2012) 224–231

5. The proposed rule change references a study but provides no reference to that study. This is important as so that the study can be evaluated by outside parties for its applicability to WV, as well as

understand any caveats of the study discussed by the authors that might be pertinent to the proposed rule change.

6.

I would be most concerned with any changes to rule changes in waters with a pH below 6.5.

Because of the above facts and the reality that most of WV trout waters are low pH, this rule presents a real threat to trout in our State waters. Hence, I suggest that plans to implement this rule are suspended and the current standard for Aluminum maintained as is.

Charles L. Harris
Member, DEP Public Advisory Council

S

Coyne, Kevin R

From: DEP Comments
Sent: Monday, March 25, 2013 1:02 PM
To: Coyne, Kevin R
Subject: FW: Emergency WQS Rule

From: Jeff [mailto:jbwitten@aol.com]
Sent: Friday, March 22, 2013 6:54 AM
To: DEP Comments
Subject: Emergency WQS Rule

Kevin Coyne
Water Quality **Standards**
WV DEP 601 57th Street, S.E.
Charleston, WV

Dear Sir: As a member of WV Trout Unlimited and Trout Steam frontage owner, I would like to register my concern for the proposed emergency rule concerning Aluminum. First, it is not clear to me that there is any kind of emergency that warrants the establishment of a lower water quality standard. Because of the known toxicity of Aluminum to aquatic life, any kind of relaxed standard should only be considered after careful scientific review that indicates no harm will be done. I have consulted with scientific experts on the Trout Unlimited staff to get their input on the proposed change. Here are their findings related to Aluminum toxicity and the proposed emergency rule:

1. Aluminum is not very soluble in water with a pH over 6, which means it is not available to be toxic to fish in waters with a few milligrams per liter of alkalinity.
2. When in solution, aluminum ions cause osmoregulation and respiration problems for fish, resulting in mortality.
3. Aluminum toxicity is thought to be highest at the juvenile life stages for salmonids (versus yolk-sac or adults).
4. The paper by Steve McCormick et al. at Conte Fish Center* showed how episodic (2-day) aluminum toxicity to Atlantic salmon smolts increases with lower pH.
They observed at least some mortality at a pH of 5.7 and Al of 175ug/L, the pH at which Al measured at the gill also began to increase. No mortality was observed at a pH of 6, and Gill Al levels were at baseline levels.
***McCormick et al. Aquaculture 362-363 (2012) 224–231**

5. The proposed rule change references a study but provides no reference to that study. This is important as so that the study can be evaluated by outside parties for its applicability to WV, as well as understand any caveats of the study discussed by the authors that might be pertinent to the proposed rule change.
6.
I would be most concerned with any changes to rule changes in waters with a pH below 6.5.

Because of the above facts and the reality that most of WV trout waters are low pH, this rule presents a real threat to trout in our State waters. Hence, I suggest that plans to implement this rule are suspended and the current standard for Aluminum maintained as is.

Jeff Witten

Coyne, Kevin R

From: DEP Comments
Sent: Monday, March 25, 2013 1:03 PM
To: Coyne, Kevin R
Subject: FW: Aluminum standards water quality

I think I sent you this one, already, but just in case ....

-----Original Message-----
From: SAM GOLSTON [mailto:sam_golston@hotmail.com]
Sent: Wednesday, February 13, 2013 7:47 PM
To: DEP Comments
Subject: Aluminum standards water quality

With all the negative findings including aluminum being a contributor to Alzheimer's disease, I feel we should raise the standard in order to protect the water we as citizens of WV are drinking. I know that the extractive industries would like the standard to be lowered but our health is much more important and health costs could cost the State more monkey in the long run.

Sam Golston
202 Edgewood Lane
Lewisburg, WV 24901

Sent via iPad

Coyne, Kevin R

From: Roger Wilmoth in Cincinnati <roger_wilmoth@msn.com>
Sent: Monday, March 25, 2013 3:18 PM
To: Coyne, Kevin R
Subject: Comment on Proposed Emergency Rule for Aluminum
Attachments: Coyne Aluminum Letter 3.22.13.pdf

March 22, 2013

Kevin Coyne
Water Quality Standards
WV DEP 601 57th Street, S.E.
Charleston, WV

Dear Kevin:

My wife and I own property on the banks of the Shavers Fork, which as you know is a high-quality trout stream. The regulated discharge from the JF Allen Pond Lick Quarry enters a tributary that discharges into the Shavers Fork immediately adjacent to and upstream from our property. We and our neighbors have personally observed numerous discharge violations from the Pond Lick site. I am incredibly concerned about your proposed **"emergency"** rule to increase the aluminum limit as a function of hardness. ***The only emergency we are aware of is the fact that JF Allen in his Pond Lick Quarry cannot meet the aluminum standards to which they agreed be codified as a condition for their discharge permit.*** How convenient that the DEP is now proposing an "emergency" rule. We are very suspicious that these two situations are closely related.

The justification of which this rule change is based is work done on toxicity of waters in the southwestern US. I (Roger) am a retired USEPA research engineer and manager. Many years ago, I worked on the Effluent Guidelines for Coal Mining, as well as the one for Ore and Mineral Mining, and was also a member of the team that wrote the OSM regulations. As you may or may not be aware, western mining waters are significantly different in chemical composition than eastern mining waters. The western water matrix is composed of significant concentrations of heavy metals, most of which are either not present in the east or are present in far, far smaller concentrations. These matrix effects are undoubtedly significant to fish toxicity. The studies on toxicity in the west are highly likely to be ***NOT directly transferrable*** to the eastern situations. It is premature at least to consider such an action as you are proposing without studies on the types of waters affected. There could be a relationship in the east of aluminum toxicity and hardness, but no data exist at this time to support such an "emergency" rule change as you as proposing.

I note that you are also, without specifically mentioning it, proposing a switch between the "total" aluminum that is now in the JF Allen permit and "dissolved" aluminum. How convenient that is for JF Allen since they cannot meet their suspended solids limits either. As you understand, the "dissolved" values are those remaining in the filtrate after passing the sample through a 0.45-micron filter. While those dissolved values would represent the **immediate** threat to flora and fauna, the **long-term threat** is from the "total" values as those represent the material being dumped into the receiving stream that can deposit on the bed of the stream and will redisperse during high flow and subsequently re-dissolve at later times. Therefore switching from regulating the "total" to only regulating the "dissolved" reflects a ***significant weakening*** of the performance standard and promotes significant degradation of the receiving stream to which JF Allen had previous agreed. Bet JF Allen is happy about this weakening process you have proposed!

Do the necessary toxicity studies and then propose appropriate changes. If the science is behind it, we will support a **later appropriate revision**. Remember your goal and the charge of the DEP is to **protect the environment**.

Sincerely,

Roger and Janey Wilmoth
RT 1 Box 114A Faulkner Rd
Elkins, WV 26241
Email: roger_wilmoth@msn.com

Roger C. Wilmoth
Rt 1 Box 114A
Elkins, WV 26241

and

5786 Observation Ct
Milford, OH 45150

email: roger_wilmoth@msn.com
cell: 513-226-4488
Attachment: pdf of signed copy of the above letter

March 22. 2013

Kevin Coyne
Water Quality Standards
WV DEP 601 57th Street, S E.
Charleston. WV

Dear Kevin:

My wife and I own property on the banks of the Shavers Fork, which as you know is a high-quality trout stream. The regulated discharge from the JF Allen Pond Lick Quarry enters a tributary that discharges into the Shavers Fork immediately adjacent to and upstream from our property. We and our neighbors have personally observed numerous discharge violations from the Pond Lick site. I am incredibly concerned about your proposed **"emergency"** rule to increase the aluminum limit as a function of hardness. ***The only emergency we are aware of is the fact that JF Allen in his Pond Lick Quarry cannot meet the aluminum standards to which they agreed be codified as a condition for their discharge permit.*** How convenient that the DEP is now proposing an "emergency" rule. We are very suspicious that these two situations are closely related.

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Sincerely,

Roger and Janey Wilmoth

Roger and Janey Wilmoth
RT 1 Box 114A Faulkner Rd
Elkins. WV 26241
Email: roger_wilmoth@frontier.com

Coyne, Kevin R

From: M Janes <mjanes100@gmail.com>
Sent: Tuesday, March 26, 2013 2:53 PM
To: DEP Comments
Cc: Coyne, Kevin R
Subject: comments on the emergency aluminum rule
Attachments: aluminum comments 3-27-13.pdf; Aluminum pH_Analysis.xlsx; Aluminum Summary Report_WV_03182013 Mitchelmore.pdf

Hello – Please find comments attached. Confirmation of receipt is appreciated. Thank you.

Margaret Janes
Appalachian Mountain Advocates
www.appalmad.org
252-715-2226
mjanes100@gmail.com

Appalachian Mountain Advocates •
League of Women Voters of West Virginia •
Ohio Valley Environmental Coalition • Sierra Club •
West Virginia Environmental Council •
West Virginia Highlands Conservancy • West Virginia Rivers Coalition

March 27, 2013

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304
Atten: Kevin Coyne
dep.comments@wv.gov

RE: Proposed changes to the aluminum water quality criteria

Dear Mr. Coyne:

These comments are made on behalf of Appalachian Mountain Advocates, League of Women Voters of West Virginia, Ohio Valley Environmental Coalition, Sierra Club, West Virginia Environmental Council, West Virginia Highlands Conservancy, and West Virginia Rivers Coalition. We strongly oppose West Virginia Department of Environmental Protection's ("WVDEP") proposed revisions to the aluminum water quality criteria. The revisions are drastic and equate to greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively.[1] The Clean Water Act ("CWA") requires that States "adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use." 40 C.F.R. 131.11(a)(1). Unfortunately as shown below, in a rush to provide emergency regulatory relief to dischargers, WVDEP has failed to comply with this mandate. Furthermore, WVDEP's promulgation of this change through the emergency rule procedures prevented meaningful public participation and thus violated CWA requirements for revisions to water quality standards. *See* 40 C.F.R. § 131.20(b). Thus, WVDEP must withdraw the proposal and either retain the existing standard or carry out more extensive scientific research justifying hardness as a mitigating factor in aluminum toxicity.

We include in our comments the attached report by Dr. Carys Mitchelmore, a toxicologist from the University of Maryland.

///

[1] Mitchelmore, Carys. Opinion Report on the West Virginia DEP's Emergency Rule For Changes to the Water Quality Standard for Aluminum. January, 2013 at 2.

There is No Emergency That Justifies the Promulgation of This Rule

WVDEP's proposed rule weakening the aluminum and beryllium water quality standards does not meet the requirements for promulgation as an emergency rule. An emergency rule may only be promulgated where necessary: "(1) for the immediate preservation of the public peace, health, safety or welfare, (2) to comply with a time limitation established by this code or by a federal statute or regulation, or (3) to prevent substantial harm to the public interest." W. Va. Code § 29A-3-15(f). The rule is not necessary to prevent substantial harm to the public interest, but rather is intended to protect the private profits of a small number of coal mine and industrial facility operators.

WVDEP claims that the emergency rule is necessary to prevent "substantial harm to the public's interest in economical and meaningful expenditures of resources in environmental regulation."[2] Emergency Rule Justification at 1. WVDEP claims that the existing standards need to be changed because they subject certain members of the "regulated community" to "unnecessary treatment costs." WVDEP is thus protecting not the public's interest, but the interests of a small number of polluters who do not wish to pay to treat their waste.

WVDEP also claims that its duty to develop TMDLs in one watershed based on the existing water quality standards constitutes an emergency. *Id.; see also* Appendix B: Fiscal Note for Proposed Rules. WVDEP claims that the development of a small number of TMDLs diverts significant resources (just over $87,000) from other programs. Regardless of whether it develops those TMDLs, however, WVDEP is obligated to implement and enforce all provisions of its statutory and regulatory program for the protection of West Virginia's waters. Avoidance of those TMDLs would not significantly benefit the public.

To the extent that the weakening of the standards provides any benefit to the public, those benefits would be extremely short-lived. The benefits that WVDEP claims will accrue during that period can only be realized after EPA approval and other time consuming regulatory processes, which will take numerous months. Those alleged benefits will only run until WVDEP's emergency rule expires on June 12, 2014, 15 months after its filing date of March 12, 2013. W. Va. Code § 29A-3-15(a). Minimal benefits provided over such a short time frame cannot be said to prevent "prevent substantial harm to the public interest."

The federal regulations governing state amendments to water quality standards make clear that such amendments do not take effect until they are approved by the EPA. 40 C.F.R § 131.21(c). That is, regardless of changes to state law, WVDEP must continue to apply its existing water quality standards until new water quality standards are approved by EPA. EPA has 60 days to approve or 90 days to disapprove a state's submissions. *Id.*, § 131.21(a).

[2] All of the WVDEP's justifications appear to be directed primarily at the Aluminum standard. It does not offer any "emergency" justifications for the weakening of the Beryllium standard.

Even if EPA approves the weakened standards, WVDEP cannot absolve polluters of their treatment obligations until the polluter applies for and receives a modification to its WVNPDES permit. In a February 26, 2013 Order to all mining-related NPDES permittees with aluminum effluent limitations, WVDEP stated that it would require sixth months of hardness and pH data to calculate a site-specific aluminum criteria and ordered sampling to begin in March, 2013. Thus, permittees would not be able to submit applications for modification until September, 2013 at the earliest. After receiving an application for modification from the permittee, WVDEP must then prepare a new draft permit and put the permit out for public comment for at least 30 days. *See* 40 C.F.R. §§ 124.6, 124.10. This process generally takes several months. Only then could any allegedly "unnecessary treatment costs" be avoided. The "emergency" rule would thus protect polluters for only a few months before its expiration in April, 2014.

Likewise, WVDEP's development of TMDLs is governed by the 303(d) list that must be submitted and approved by EPA. *See* 40 CFR §§ 130.7, 130.10; *Monongahela Power Co. v. Chief, Office of Water Resources, Div. of Environmental Protection*, 211 W.Va. 619, 623 (W.Va. 2002). The portion of WVDEP 2012 303(d) list setting the priority schedule for development of the aluminum TMDLs was approved by EPA on March 25, 2013. That schedule governs WVDEP's development of TMDLs until WVDEP develops and submits and EPA approves a revision to the 303(d) list. Thus any minimal cost savings to WVDEP would again come after a lengthy and uncertain regulatory process, which would itself consume significant agency resources.

The true public interest lies not in WVDEP's short-term protection of polluters or avoidance its legal mandates, but in protecting West Virginia's waters. Both State and federal water quality laws make clear that the public has a strong interest in the protection of its waters. *See Ohio Valley Environmental Coalition, Inc. v. Hobet Min., LLC*, 723 F.Supp.2d 886, 925 (S.D.W. Va. 2010) (recognizing the "clear public interest in environmental protection, including the protection of aquatic resource"); *In re Mountain Laurel Resources Co.*, 1999 WL 33542427, *5 (S.D.W. Va. 1999) (recognizing that "it is beyond dispute that there is a strong public interest in abating the water pollution"); 33 U.S.C. § 1251(a)(1) (setting a national goal to eliminate the discharge of pollutants by 1985); W. Va. Code, § 22-11-2(a)(1), (2). As explained in these comments, the proposed standards would not protect West Virginia's waterways. Thus any minimal benefit to the public that might possibly accrue from private companies avoiding the cost of treating their pollution or WVDEP avoiding development of TMDLs for one pollutant are outweighed by the damage that will result to West Virginia's streams as a result of these changes. The weakened standards thus fail to "prevent substantial harm to the public interest," as required by the regulations governing emergency rules.

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WVDEP Failed to Provide Adequate Public Participation

Amendment of a water quality standard through the promulgation of an emergency rule is fundamentally incompatible with the public participation requirements of the CWA because it does not allow for meaningful consideration of comments submitted by the public. WVDEP's revisions to West Virginia's water quality standards are governed by Section 303(c) of the CWA, 33 U.S.C. § 1313(c), and implementing regulations. Section 303(c)(1) states that the agency "shall from time to time (but at least once each three year period beginning with October 18, 1972) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards." EPA's regulation governing public participation in State review and revision of water quality standards mandates that "[t]he State shall hold a public hearing for the purpose of reviewing water quality standards, in accordance with provisions of State law, EPA's water quality management regulation (40 CFR 130.3(b)(6)) and public participation regulation (40 CFR Part 25)." 40 C.F.R. § 131.20(b).

According to EPA's regulation, "Public participation includes providing access to the decision-making process, seeking input from and conducting dialogue with the public, assimilating public viewpoints and preferences, and demonstrating that those viewpoints and preferences have been considered by the decision-making official." 40 C.F.R. § 25.3. The regulations make clear that "[m]erely conferring with the public after an agency decision" does not satisfy the agency's obligations to involve the public in its decision-making process. Id. at § 25.4(d).

By promulgating this revision as an "emergency" regulation, WVDEP has denied the public access to the decision-making process. There are no channels in the emergency rule promulgation process of W. Va. Code §§ 29A-3-15, 15a, and 15b through which public input can be meaningfully received, considered, and assimilated. WVDEP did not consult with the public prior to submitting the emergency rule to the Secretary of State on January 30, 2013. The Secretary of State's approval of the rule on March 12, 2013 means that the rule is final and effective under state law. A hearing is scheduled for March 27, 2013, but this hearing will occur nearly three months after WVDEP submitted the rule to the Secretary of State and, incredibly, two weeks after the Secretary of State's statutory deadline for approval or disapproval of the emergency rule. The state process for promulgation and approval of this rule will thus be fully concluded prior to any opportunity for public input. Indeed, the West Virginia process for emergency rules, which requires the Secretary of State to act within 42 days of promulgation, is necessarily at odds with the federal public participation regulations governing state revisions to water quality standards, which require 45 days' notice prior to holding a public hearing on proposed revisions. *See* 40 C.F.R. § 25.5.

By holding a hearing only after the conclusion of the emergency rule process, WVDEP is not taking the public's viewpoint seriously, but is rather "[m]erely conferring with the public after an agency decision." *See* 40 C.F.R. § 25.4(d). WVDEP's actions thus do not satisfy the public participation requirements of the CWA and implementing regulations.

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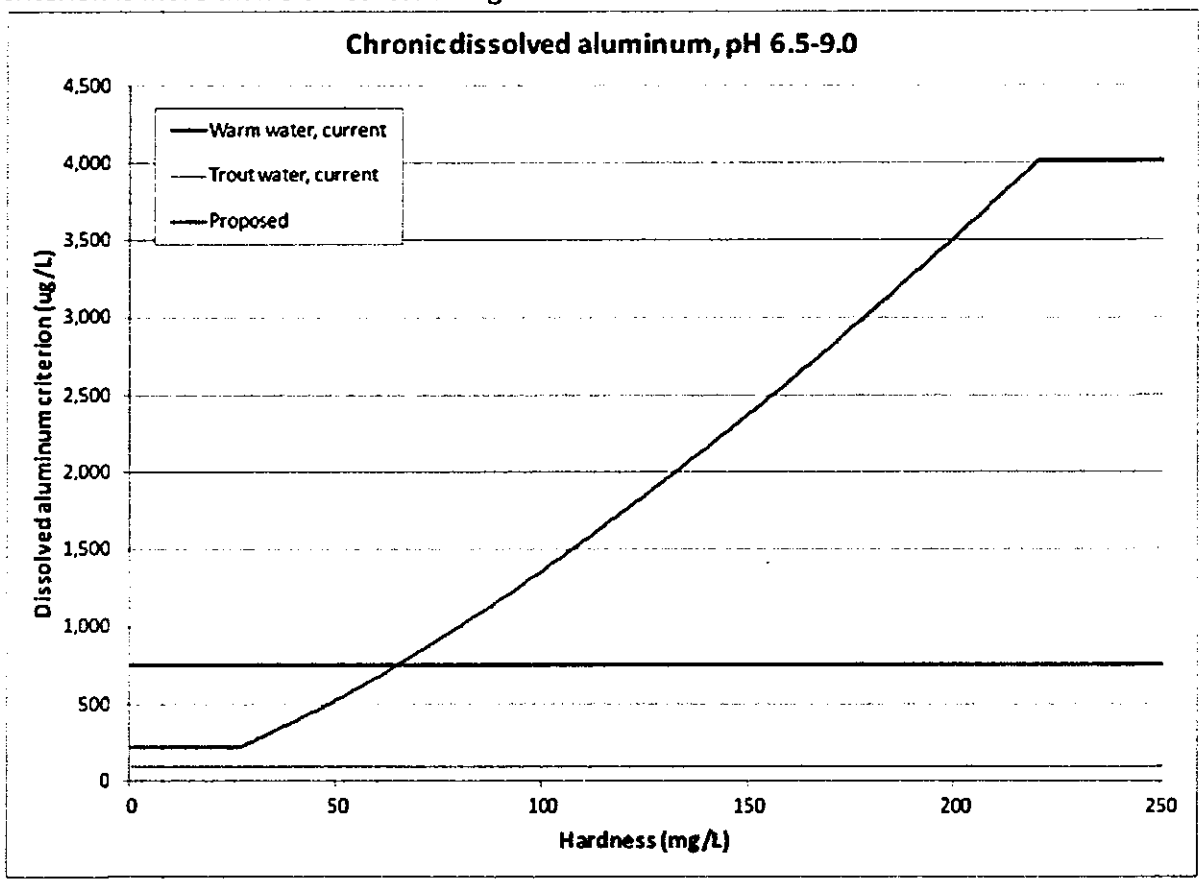
The proposed rule change will significantly weaken the aluminum criteria

The proposed rule requires the calculation of aluminum criteria based on the hardness of the stream. The new equation in the rule would significantly weaken protections, as compared to the existing rule.

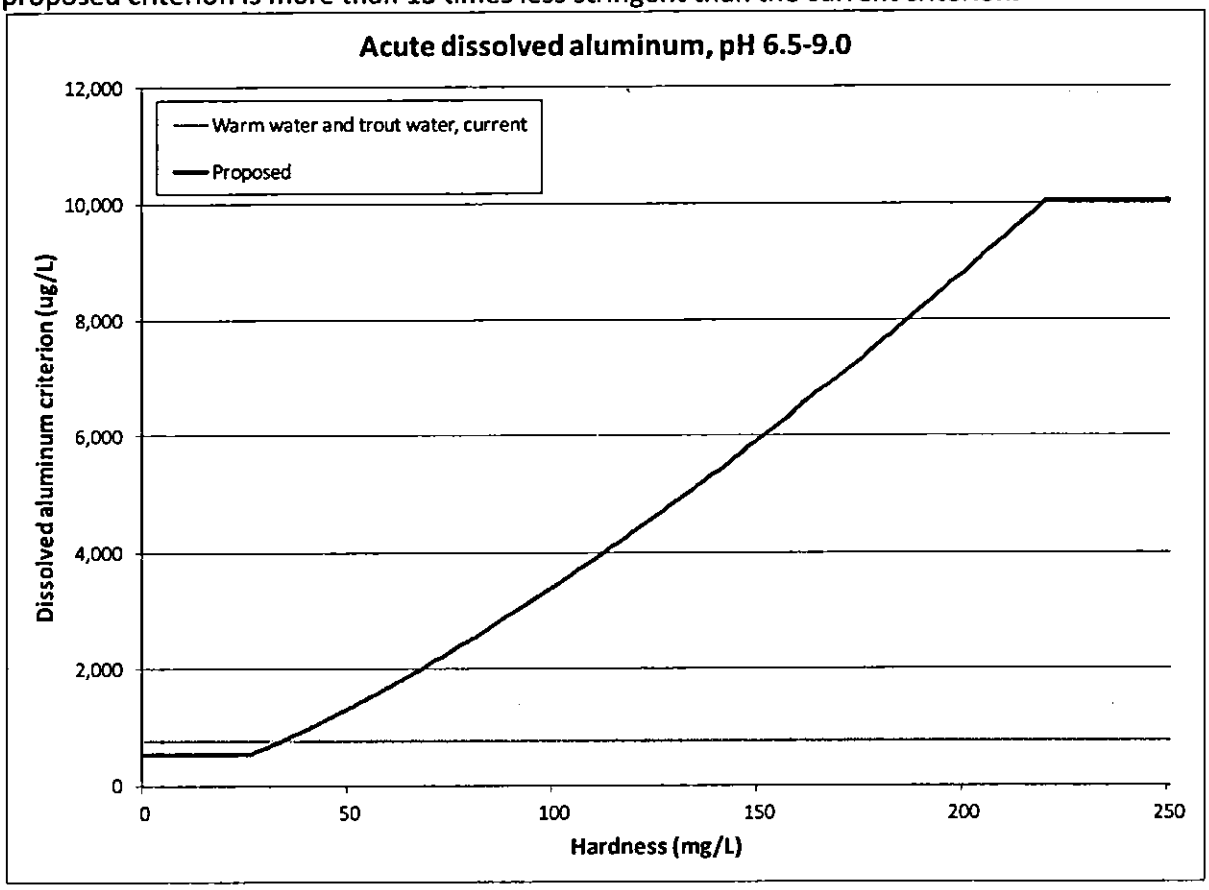
As shown in the first chart below, the emergency rule would weaken the current criterion for trout waters at all hardness values. As hardness increases, it will become increasingly less stringent. Once hardness reaches 220 mg/L, the proposed criterion is more than 46 times less stringent than the current criterion.

The first chart also compares the proposed chronic criterion to the current criterion for warm waters. In this case, the proposed criterion would provide additional protections if hardness is less than 65 mg/L—a condition that might be found in very few streams, and certainly not in streams already impacted by coal mining. However, at all other hardness values, the proposed criterion is weaker than the current criterion. Once hardness reaches 220 mg/L, the proposed criterion is more than 5 times less stringent than the current criterion.



Additionally, a single acute criterion currently applies to both trout and warm waters. As shown in the following table, the proposed criterion is slightly more protective in streams with hardness below 34 mg/L— conditions that might be found in very few streams, and certainly

not in streams already impacted by coal mining. However, at all other hardness values, the proposed criterion is weaker than the current criterion. Once hardness reaches 220 mg/L, the proposed criterion is more than 13 times less stringent than the current criterion.



In short, in any but the most pristine streams, the emergency rule would weaken the existing aluminum criteria. And in high-hardness conditions witnessed in streams that are impacted by coal mining, the emergency rule represents a significant weakening of the existing criteria—more than 46 times weaker for the chronic trout water criterion, more than 5 times weaker for the chronic warm water criterion, and more than 13 times weaker for the acute criterion.

WVDEP lacks sufficient information to promulgate hardness based aluminum criteria

WVDEP says that "[d]issolved aluminum toxicity, like other metals, has a direct relationship to hardness, and numerous scientific studies have validated the impact of hardness as it relates to toxicity to the aquatic community."[3] WVDEP, however, has mischaracterized the state of the science. In fact, there are few peer reviewed studies on the effects of hardness on aluminum toxicity. According to Dr. Carys Mitchelmore, an aquatic toxicologist from the University of Maryland:

[3] See WVDEP Secretary of State filing at 5.

> changes to the water quality standards for aluminum in West Virginia are inappropriate given the paucity of peer-reviewed studies and definitive data sets that specifically investigate the relationship between aluminum toxicity and water hardness. Studies should include definitive LC50 or EC50 values at multiple and wide-ranging hardness levels. Unlike other metals (e.g. Cd, Cu, Zn), where we have a good understanding of the relationship between water hardness and toxicity, there are very few similar robust data sets regarding this relationship with aluminum. There are indeed hundreds of papers detailing this relationship in the aforementioned metals but very few for aluminum (with the majority of studies having been carried out in the 1970-1980's). Whereas there are studies that suggest this relationship there are others that also disprove this relationship. It is unclear whether differences are due to the specific aquatic species under study (or life-stage) or something else that confounds this relationship (i.e. other water quality parameters such as pH or dissolved organic matter) until more detailed replicate studies in numerous aquatic species are carried out. These studies are also laboratory studies that do not replicate complex field conditions.[4]
>
> Furthermore, many studies were not designed specifically to look at this aluminum/hardness relationship and hence are limited in their use of only a few concentrations of aluminum and often only two (or a small concentration range) of hardness levels were used. This is especially the case for subacute and chronic studies where very little data is available.[5]

Presumably, this is why the Environmental Protection Agency ("EPA") did not promulgate hardness based aluminum criteria at the same time it promulgated them for other metals.

Further, WVDEP apparently (although no specific reference is provided) relied on a report by GEI Consultants done in conjunction with Colorado's hardness based aluminum criteria as its primary justification for the current proposal. The report was sponsored by the Colorado Mining Association and is not peer-reviewed. GEI included data developed after EPA promulgated aluminum criteria 304(a) guidance. In her critique of that report Dr. Mitchelmore explains:

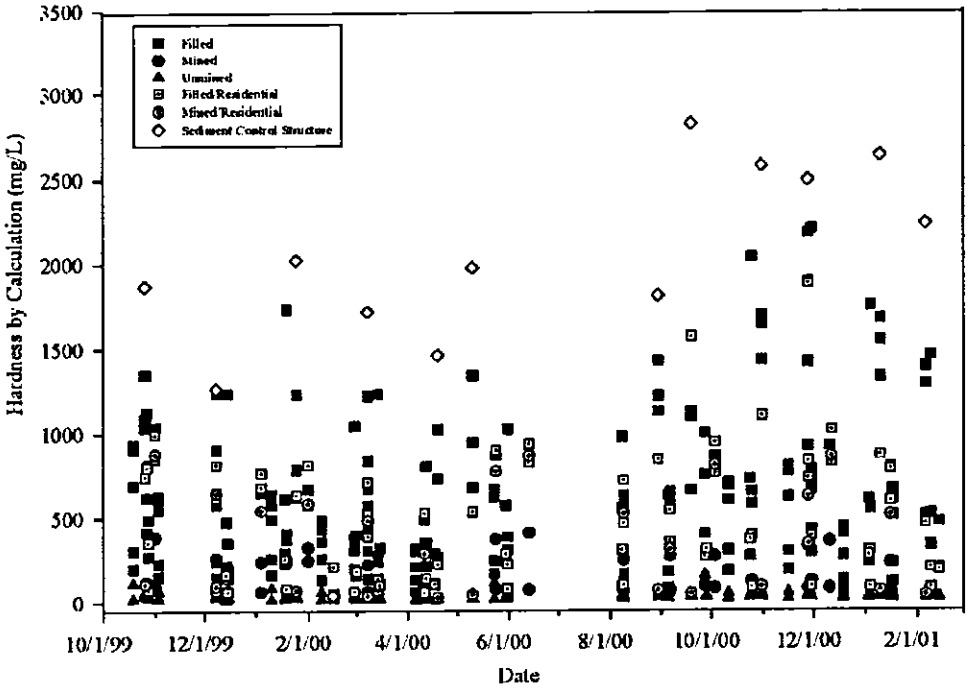
> However, this data is also limited in scope (number of aquatic species, replicated studies, definitive LC50 levels, pH levels differing between studies and often a small range of hardness or only two hardness data points used). Indeed, the GEI report (2010) notes that there are very few LC50 data available in the pH range of 6.5 to 9. Furthermore, in the GEI report (2010) used to derive the chronic aluminum/hardness equation for Colorado it was noted that only a few studies were available and that the hardness values used in the literature only represented a small range (i.e. 7.5-45 mg/L). Furthermore, they present data from a study by Cleveland (see Table 2; Cleveland

[4] Mitchelmore at 2.
[5] Id.

manuscript reference in GEI, 2010) where the toxicity (using pH 6.5) of aluminum increased with increasing hardness.

The hardness values evaluated in the GEI report i.e. 7.5-45 mg/l are far lower than those commonly seen in West Virginia downstream from coal mining discharges. For example in the chemistry study done for the Mountain Top Mining Environmental Impact Statement, EPA researchers generally found elevated hardness at coal mining sites versus unmined sites as shown in the chart below.[6]

Figure II-1. Hardness Concentration for All Sites vs. Date



The hardness reported by EPA greatly exceeded values of those addressed in the GEI report sometimes by approximately 50 times.[7] Further, WVDEP has collected a significant amount of hardness data at its ambient water quality monitoring stations across the state; these data demonstrate that hardness values in West Virginia streams are often significantly higher than 45 mg/L.[8] Importantly, there appears to be no study that evaluates aluminum toxicity at the elevated hardness levels common in some West Virginia streams, the very streams where dischargers are asking for relief from aluminum regulation. WVDEP thus has no valid scientific

[6] Bryant, Gary, McPhilliamy, Scott, USEPA Region III. Childers, Hope, Signal Corporation. A Survey of the Water Quality of Streams in the Primary Region of Mountaintop / Valley Fill Coal Mining; October 1999 to January 2001. Mountaintop Mining / Valley Fill Programmatic Environmental Impact Assessment. April 8, 2002 at 44.

[7] From chart at filled sites.

[8] See https://apps.dep.wv.gov/dwwm/wqdatac/

basis or justification to support the proposed revision, which significantly and incrementally weakens the criteria as hardness values rise above 45 mg/L.[9]

Aluminum Toxicity is Complex and Further Undermines WVDEP's Proposal

"Aluminum toxicity depends on many factors other than water hardness, for example major drivers include pH and also the amount of dissolved organic material (DOM) in the water (see review by Gensemer and Playle, 1999). The solubility, speciation and/or complexation of aluminum is highly dependent upon multiple ambient water quality characteristics that ultimately determine bioavailability and toxicity."[10] Researchers characterizing the state of the science concluded that "...predicting Al toxicity as pH values increase above 7 may not be a simple matter and is restricted by our limited understanding of Al bioavailability under such conditions. In particular, the toxicity of Al(OH)4 -, which predominates at pH 7, is very poorly understood" (Gensermer and Playle, 1999)."[11] WVDEP has not considered any of these complex interactions affecting aluminum toxicity. The agency has not justified its new standard's failure to account for this complexity.

The Colorado and New Mexico Criteria Are More Stringent than WVDEP's Proposal

WVDEP says that new studies (i.e. GEI report noted above) were used to update and support new hardness based approaches to dissolved aluminum criteria in Colorado and New Mexico. WVDEP mischaracterizes those criteria.

In Colorado, the aluminum criteria are for total aluminum and not dissolved.[12] This means that the Colorado criteria are much more stringent than what is proposed by the WVDEP. For example, monitoring required for two coal mining NPDES permits in West Virginia showed the relationship between dissolved and total aluminum over time for three separate outfalls. On average 42% of total aluminum was dissolved.[13] In other words, on average the Colorado criteria are nearly 2 ½ times more stringent than WVDEP's proposed criteria.

In New Mexico, the aluminum criteria are based on a modified method for generating dissolved aluminum. Generally in order to analyze a sample for a dissolved parameter the test water is filtered to remove particles. The standard filter size for a dissolved analysis is .45 µm pore.[14] New Mexico aluminum criteria, however, are "...based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department" (NMED 2011).[15] A study done by the New Mexico Environment Department

[9] Note: we do not believe the GEI report is sufficient to justify a hardness based criteria in any state but it is particularly problematic in West Virginia where streams have extremely high hardness.
[10] Mitchelmore at 3.
[11] Id.
[12] Colorado Regulation #31 at 56.
[13] See attached spreadsheet Aluminum_pH analysis. Data obtained through FOIA request.
[14] See http://testamericalabs.blogspot.com/2011/01/what-is-difference-between-toal-metals.html
[15] New Mexico Aluminum Filtration Study. August 24, 2012 at 2.

concluded that a 10 µm pore size minimized mineral-phase aluminum without restricting amorphous or colloidal phases and that if turbidity was less than 30 NTU, no filtration was needed.[16]

Thirty NTU equates to approximately 46 mg/l total suspended solids ("TSS").[17] In reviewing the TSS associated with the example NPDES monitoring reports noted in the paragraph above, the TSS associated with those discharges are all substantially less than 46 mg/l and thus would not require filtering under the New Mexico criteria. More generally NPDES discharges are usually restricted to an average monthly TSS of 35 mg/l. Thus, in effect, the New Mexico criteria are based on total aluminum and are also nearly 2 ½ times more stringent that what WVDEP is proposing.

///

[16] Id.

[17] A log-linear model showed strong positive correlation between TSS and turbidity (R2 = 0.96) with a regression equation of ln(TSS) = 1.32 ln(NTU) + C, with C not significantly different than zero for eight of the nine sampled streams. See www.depts.washington.edu/cuwrm/research/tssturb.pdf.

Conclusion

WVDEP has failed to comply with the requirements of the Clean Water Act and must abandon its flawed aluminum criteria. In the past ten years dischargers have led efforts to make West Virginia's aluminum criteria less and less protective. In each instance the state has complied. The current proposal is yet another industry-led charge to abandon environmental protection in favor of corporate profits. It is long past time that WVDEP puts the needs of the environment and citizens first.

Sincerely,

Margaret Janes, Senior Policy Analyst
Appalachian Mountain Advocates
21 Wild Pony Lane
Southern Shores, NC 27949

Ben Luckett, Staff Attorney
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901

Helen Gibbins, Natural Resources Director
League of Women Voters of West Virginia

Diane Bady, Co-Director
Ohio Valley Environmental Coalition

Jim Kotcon
Sierra Club

Don Garvin, Legislative Coordinator
West Virginia Environmental Council

Cindy Rank, Mining Committee Chair
West Virginia Highlands Conservancy

Angie Rosser, Executive Director
West Virginia Rivers Coalition

date	tss	tot	dis	fd	pH	Dataset	Permit
1/30/2007	2	0.22	0.104	0.473	6.89	1	WV1014597(1)
2/6/2007	4	0.3	0.115	0.383	6.88	1	WV1014597(1)
2/18/2007	1	0.21	0.155	0.738	7.2	1	WV1014597(1)
3/6/2007	10	0.31	0.148	0.477	7.02	1	WV1014597(1)
3/22/2007	1	0.21	0.11	0.524	6.83	1	WV1014597(1)
4/10/2007	1	0.13	0.064	0.492	7.09	1	WV1014597(1)
4/23/2007	1	0.21	0.091	0.433	6.9	1	WV1014597(1)
5/8/2007	1	0.16	0.099	0.619	6.97	1	WV1014597(1)
5/24/2007	1	0.19	0.121	0.637	6.97	1	WV1014597(1)
6/13/2007	1	0.15	0.114	0.76	6.91	1	WV1014597(1)
6/23/2007	1	0.13	0.096	0.738	6.95	1	WV1014597(1)
7/10/2007	1	0.1	0.098	0.98	7.09	1	WV1014597(1)
7/17/2007	13	0.12	0.0015	0.013	7.02	1	WV1014597(1)
1/8/2008	1	0.22	0.111	0.505	7.1	1	WV1014597(1)
1/16/2008	1	0.2	0.085	0.425	6.93	1	WV1014597(1)
1/24/2008	1	0.3	0.075	0.25	7.05	1	WV1014597(1)
2/1/2008	32	0.98	0.136	0.139	6.68	1	WV1014597(1)
2/9/2008	1	0.28	0.116	0.414	7.57	1	WV1014597(1)
2/25/2008	2	0.31	0.122	0.394	7.31	1	WV1014597(1)
3/4/2008	6	0.34	0.1	0.294	7.02	1	WV1014597(1)
3/12/2008	1	0.41	0.096	0.234	7.26	1	WV1014597(1)
3/20/2008	2	0.01	0.0015	0.15	7.25	1	WV1014597(1)
5/7/2008	1	0.07	0.008	0.114	6.83	1	WV1014597(1)
5/15/2008	4	0.45	0.135	0.3	6.83	1	WV1014597(1)
5/23/2008	1	0.37	0.079	0.214	7.83	1	WV1014597(1)
5/31/2008	1	0.27	0.126	0.467	7.04	1	WV1014597(1)
6/8/2008	1	0.16	0.117	0.731	7.28	1	WV1014597(1)
6/16/2008	2	0.15	0.118	0.787	7.64	1	WV1014597(1)
1/8/2008	1	0.08	0.02	0.25	6.25	2	WV1014597(2)
1/16/2008	1	0.05	0.0015	0.03	6.56	2	WV1014597(2)
1/29/2008	33	0.81	0.063	0.078	7.01	2	WV1014597(2)
2/1/2008	16	0.71	0.06	0.085	5.12	2	WV1014597(2)
2/9/2008	1	0.05	0.018	0.36	6.12	2	WV1014597(2)
2/18/2008	1	0.06	0.031	0.517	5.14	2	WV1014597(2)
2/25/2008	1	0.03	0.005	0.167	6.54	2	WV1014597(2)
3/4/2008	1	0.02	0.004	0.2	6.85	2	WV1014597(2)
3/12/2008	1	0.01	0.0015	0.15	6.19	2	WV1014597(2)
3/20/2008	1	0.08	0.022	0.275	6.31	2	WV1014597(2)
3/28/2008	7	0.14	0.028	0.2	6.85	2	WV1014597(2)
4/9/2008	1	0.07	0.009	0.129	6.5	2	WV1014597(2)
4/13/2008	1	0.06	0.017	0.283	6.48	2	WV1014597(2)
4/21/2008	1	0.08	0.01	0.125	6.28	2	WV1014597(2)
4/29/2008	12	0.09	0.02	0.222	6.77	2	WV1014597(2)
5/7/2008	9	0.06	0.029	0.483	6.22	2	WV1014597(2)
5/15/2008	4	0.05	0.018	0.36	7.49	2	WV1014597(2)
5/31/2008	1	0.04	0.014	0.35	7.52	2	WV1014597(2)
2/13/2007	0.01	0.04	0.03	0.75	6.42	3	WV1002040
2/22/2007	0.01	0.05	0.02	0.4	5.6	3	WV1002040
3/7/2007	0.01	0.03	0.02	0.6667	6.74	3	WV1002040
3/21/2007	0.01	0.04	0.03	0.75	6.93	3	WV1002040
4/3/2007	0.01	0.03	0.02	0.6667	6.59	3	WV1002040
4/18/2007	0.01	0.11	0.04	0.3636	5.9	3	WV1002040
5/20/2007	0.01	0.07	0.03	0.4286	5.43	3	WV1002040
5/29/2007	0.01	0.02	0.01	0.5	5.52	3	WV1002040
6/14/2007	0.01	0.06	0.02	0.3333	5.63	3	WV1002040
6/21/2007	0.01	0.07	0.02	0.2857	5.17	3	WV1002040
7/16/2007	0.01	0.04	0.03	0.75	5.2	3	WV1002040
7/24/2007	0.01	0.03	0.02	0.6667	5.43	3	WV1002040
8/8/2007	0.01	0.04	0.01	0.25	5.32	3	WV1002040
8/16/2007	0.01	0.05	0.03	0.6	5.48	3	WV1002040
9/18/2007	0.01	0.09	0.05	0.5556	5.58	3	WV1002040
9/26/2007	0.01	0.1	0.08	0.8	5.26	3	WV1002040
10/11 /2007	0.01	0.1	0.09	0.9	4.79	3	WV1002040
10/31/2007	0.01	0.08	0.02	0.25	5.9	3	WV1002040

Opinion Report on the West Virginia DEP's Emergency Rule For Changes to the Water Quality Standard For Aluminum (January, 2013).

By

Dr. Carys L. Mitchelmore
Associate Professor,

University of Maryland Center for Environmental Science,
Chesapeake Biological Laboratory,
Solomons, MD 20688.

March 18th, 2013

In Summary:

I believe West Virginia's proposed change for aluminum water quality standards from a fixed threshold to hardness-based criteria to be inappropriate given that;

(1) There are very limited peer reviewed studies and definitive toxicity data available regarding this relationship, especially in the pH range of 7-9.
(2) Aluminum toxicity is complex and dependent upon many other water quality parameters (e.g. dissolved organic material, pH), species and life-stages.
(3) Aluminum toxicity in laboratory tests may not represent the array of toxicity mechanisms (i.e. especially physical toxicity) for aluminum in field situations.
(4) West Virginia's proposal is to use dissolved aluminum levels. This differs from the EPA's guideline that total recoverable aluminum be used. The use of total recoverable is the most conservative and consistent approach.

Detailed report:

In West Virginia the current water quality standard for aquatic life for aluminum is based on fixed values i.e. set at 750 µg/L for acute toxicity and 87 µg/L or 750 µg/L for chronic toxicity for warm and trout waters respectively. These values are based on the current USEPA

water quality guidelines for aluminum with an acute toxicity level of 750 µg/L and a chronic level of 87 µg/L (USEPA, 1988).

West Virginia proposes to change the water quality standard for aluminum (see WVDEP, 2013) from its current fixed toxicity thresholds to one based upon a relationship with water quality hardness. The proposed changes state that in waters with pH values in the range of > 6.5 to < 9.0 toxicity threshold levels would be calculated on a scale based on one water quality parameter, that of hardness. For example, at hardness levels of 220 mg/L or greater this would set the acute and chronic toxicity levels to be 10,030 and 4,019 µg/L respectively. These would represent a > 13-fold and > 46-fold increase over the current water quality standards for aluminum for acute and chronic toxicity to aquatic life respectively.

It is my opinion that the changes to the water quality standards for aluminum in West Virginia are inappropriate given the paucity of peer-reviewed studies and definitive data sets that specifically investigate the relationship between aluminum toxicity and water hardness. Studies should include definitive LC50 or EC50 values at multiple and wide-ranging hardness levels. Unlike other metals (e.g. Cd, Cu, Zn), where we have a good understanding of the relationship between water hardness and toxicity, there are very few similar robust data sets regarding this relationship with aluminum. There are indeed hundreds of papers detailing this relationship in the afore mentioned metals but very few for aluminum (with the majority of studies having been carried out in the 1970-1980's). Whereas there are studies that suggest this relationship there are others that also disprove this relationship. It is unclear whether differences are due to the specific aquatic species under study (or life-stage) or something else that confounds this relationship (i.e. other water quality parameters such as pH or dissolved organic matter) until more detailed replicate studies in numerous aquatic species are carried out. These studies are also laboratory studies that do not replicate complex field conditions.

Furthermore, many studies were not designed specifically to look at this aluminum/ hardness relationship and hence are limited in their use of only a few concentrations of aluminum and often only two (or a small concentration range) of hardness levels were used. This is especially the case for subacute and chronic studies where very little data is available. Studies are often treated the same and compared together yet they represent differing pH ranges (although they are all in the pH 6.5-9 range required for these new West Virginia guidelines) and there are very few that are in the pH 8-9 range. In addition, some of the mechanisms driving

aluminum toxicity in field situations may be missed in traditional laboratory tests. For example, aluminum can physically alter the habitat by clogging interstitial spaces.

The West Virginia emergency rule states that there is a direct relationship between water hardness and aluminum toxicity in waters of pH 6.5-9, although no references are provided to support this statement (WVDEP, 2013). It is also unclear how the equations used to set the new West Virginia toxicity thresholds for aluminum (i.e. see 8.1.1 and 8.1.2 in Table 1, Appendix E; WVDEP, 2013) were derived. The equations are similar to those used by Colorado (e.g. see GEI, 2010) but they differ slightly resulting in different toxicity threshold values. It is unclear why these equations for the same hardness based criteria exist.

A further issue with the proposed new standards for West Virginia is that they state the use of dissolved aluminum concentrations, rather than total recoverable aluminum as detailed in the USEPA guidelines (USEPA, 1988). As stated earlier Colorado uses a similar hardness based criteria for Aluminum, however, it should be noted that these criteria are based on total recoverable aluminum levels (as in the 1988 EPA guidelines) and thus are much more stringent than those proposed for the West Virginia guidelines that use dissolved aluminum concentrations.

Aluminum toxicity depends on many factors other than water hardness, for example major drivers include pH and also the amount of dissolved organic material (DOM) in the water (see review by Gensemer and Playle, 1999). The solubility, speciation and/or complexation of aluminum is highly dependent upon multiple ambient water quality characteristics that ultimately determine bioavailability and toxicity. There are many peer-reviewed papers that focus on the toxicity of aluminum at lower pH, some at neutral pH, but very few in higher alkalinity waters (or above pH 8). The new proposed guidelines do address this elevated toxicity at lower pH as the standard EPA limits are used in waters of pH < 6.5 or pH >9.0 (USEPA, 1988). However, as mentioned earlier there are very few publications addressing toxicity at pH > 8.0. The increased solubility of aluminum in pH <6 and >8 is known and the toxicity of aluminum to aquatic life in lower pH waters is very well documented. Indeed Gensemer and Playle stated in their future recommendation section that "...predicting Al toxicity as pH values increase above 7 may not be a simple matter and is restricted by our limited understanding of Al bioavailability under such conditions. In particular, the toxicity of $Al(OH)_4^-$, which predominates at pH 7, is very poorly understood" (Gensermer and Playle, 1999).

Furthermore, the toxicity of aluminum can be greatly altered by organism microenvironments. For example, the chemical condition of fish gill surfaces can modify aluminum speciation, sorption and precipitation resulting in chemical or physical toxicity. There is evidence that calcium (i.e. hardness) can compete with monomeric aluminum (and other soluble hydroxide forms) and prevent its binding to fish gills and impacts on ionic regulation but this is just one of the proposed toxicity mechanisms of action for aluminum (Gensemer and Playle, 1999; Gunderson et al., 1994). For example, particulate aluminum can cause physical suffocation and/or irritation especially if it precipitates out in the fish gill microenvironment and polymeric and colloidal forms may be important in fish growth inhibition (Gunderson et al., 1994).

As mentioned earlier, the lack of definitive LC50 (acute) and EC50 (chronic) data and studies using multiple hardness levels at pH levels 6.5 and above (and especially in the range of pH 8-9 and with the pH standardized for each study) is why I believe these new guidelines to be inappropriate. For the new hardness based criteria for Colorado new data (since 1988 and those not included in the USEPA (1988) guidelines) were presented (GEI, 2013). However, this data is also limited in scope (number of aquatic species, replicated studies, definitive LC50 levels, pH levels differing between studies and often a small range of hardness or only two hardness data points used). Indeed, the GEI report (2010) notes that there are very few LC50 data available in the pH range of 6.5 to 9. Furthermore, in the GEI report (2010) used to derive the chronic aluminum/hardness equation for Colorado it was noted that only a few studies were available and that the hardness values used in the literature only represented a small range (i.e. 7.5-45 mg/L). Furthermore, they present data from a study by Cleveland (see Table 2; Cleveland manuscript reference in GEI, 2010) where the toxicity (using pH 6.5) of aluminum increased with increasing hardness.

The study by Gunderson et al (1994) investigated the effect of pH, hardness and humic acid on aluminum toxicity to rainbow trout in acute (96 hour mortality) and sub acute (16 day growth, cumulative mortality). Aluminum induced mortality was different at pH's that are within the range used to apply the new proposed West Virginia guidelines. A higher aluminum-induced mortality was observed at weakly alkaline pH (7.95-8.58) than near-neutral pH (7.14-7.64). The study also found pH (pH range 7.14-8.58) to be the most important independent variable affecting mortality. Furthermore the study found no significant relationship ("negligible hardness

effects"; Gunderson et al, 1994) between 96-hour LC50s and hardness (i.e. at 83.6 $CaCO_3$ mg/L LC50 was 7670 µg/L aluminum but at the higher 115.8 $CaCO_3$ mg/L the LC50 was lower at 6930 µg/L). However, in the subacute tests growth rates were higher at the weakly alkaline compared to the near-neutral pH and hardness did not significantly protect against aluminum-induced growth inhibition although the addition of humic acid did (Gundersen et al., 1994).

In summary given the paucity (and often conflicting) data regarding the relationship of hardness with acute and (especially) chronic toxicity of aluminum particularly at alkaline pH levels (pH 7-9) it is inappropriate to change the current threshold toxicity values for aluminum.

References:

GEI Consultants, Inc. 2010. Ambient Water Quality Standards for Aluminum – review and Update. March 2010, 36 pp.

Gensemer, R.W. and Playle, R.C. 1999. The Bioavailability and Toxicity of Aluminum in Aquatic Environments. Critical Reviews in Environmental Science and Technology, 29, 4, 315-450.

Gundersen, D.T., Bustaman, S., Seim, W.K. and Curtis, L.R. 1994. pH, Hardness, and Humic Acid Influence Aluminum Toxicity to Rainbow Trout (*Oncorhynchus mykiss*) in weakly alkaline waters. Can. J. Fish. Aquat. Sci, 51, 1345-1355.

United States Environmental Protection Agency (USEPA). 1988. Ambient water quality criteria for aluminum. EPA/440/5-86-008.

WVDEP. Emergency Briefing Document. 2013. "Requirements Governing Water Quality Standards", 47CSR2. January 30, 2013, 60pp.

Coyne, Kevin R

From:	Jason Bostic <JBostic@wvcoal.com>
Sent:	Wednesday, March 27, 2013 7:42 AM
To:	Coyne, Kevin R; DEP Comments
Cc:	Clarke, Thomas L; Halstead, Lewis A; Hunter, Russ M; Borth, William C; Parsons, Mark J; Mandirola, Scott G; Boggs, Kristin A
Subject:	Public Comment Period: Emergency Rule Revisions to 47 CSR 2
Attachments:	WVCA Comments- Emergency Rule 47 CSR 2.pdf; Emerg. Rule Attachment A.pdf; Emerg. Rule Attachment B.pdf; Emerg. Rule Attachment C.pdf

March 27, 2013

Mr. Kevin Coyne
West Virginia Department of Environmental Protection
Division of Water & Waste Management
601 57th Street
Charleston, WV 25304
Via Electronic Mail: Kevin.R.Coyne@wv.gov
dep.comments@wv.gov

Re: Public Comment Period on Emergency Rule Revisions to 47 CSR 2- State Water Quality Standards

Dear Mr. Coyne:

Attached please find the comments of the West Virginia Coal Association on the emergency rule revisions to the state's water quality standards for aluminum and beryllium.

Respectfully Submitted,

Jason D. Bostic
Vice-President
West Virginia Coal Association

West Virginia Coal Association

PO Box 3923, Charleston, WV 25339 • (304) 342-4153 • Fax 342-7651 • www.wvcoal.com

March 27, 2013

Mr. Kevin Coyne
West Virginia Department of Environmental Protection
Division of Water & Waste Management
601 57th Street
Charleston, WV 25304
Via Electronic Mail: Kevin.R.Coyne@wv.gov
dep.comments@wv.gov

Re: Public Comment Period on Emergency Rule Revisions to 47 CSR 2- State Water Quality Standards

Dear Mr. Coyne:

Pursuant to the public notice published by the West Virginia Department of Environmental Protection (WV DEP), the West Virginia Coal Association (WVCA) offers the following comments regarding the emergency rule revisions to the state's water quality standards for aluminum and beryllium.

The West Virginia Coal Association (WVCA) is a non-profit state coal trade association representing the interests of the West Virginia coal industry on policy and regulation issues before various state and federal agencies that regulate coal extraction, processing, transportation and consumption. WVCA's general members account for 95 percent of the Mountain State's underground and surface coal production. WVCA also represents associate members that supply an array of services to the mining industry in West Virginia. WVCA's primary goal is to enhance the viability of the West Virginia coal

industry by supporting efficient and environmentally responsible coal removal and processing through reasonable, equitable and achievable state and federal policy and regulation. WVCA is the largest state coal trade association in the nation.

Overall, WV DEP is to be commended for the pronounced improvements to the water quality standards rulemaking process since assuming that duty from the Environmental Quality Board in 2005. The professional manner in which WV DEP considers revisions to the program continually improves, as does the agency's commitment to science, public involvement and adherence to the public policy goals established by the West Virginia Legislature. WVCA believes the emergency rule to revise the aluminum and beryllium standards further advances the effectiveness of the state's water quality standards program.

Aluminum Criteria

WVCA fully supports WV DEP's efforts to adopt a hardness-based standard for aluminum to better protect aquatic life and simplify NPDES compliance with the aluminum criteria. While West Virginia has made great strides in revising its water quality standards for aluminum in years past to reflect the prevailing natural conditions within the state's waters, WVCA believes the revisions contemplated in the emergency rule will finally adopt truly protective aluminum criteria for West Virginia.

Because aluminum is a very common, naturally occurring element, many streams in the state exceed the numeric criteria for aluminum, with no corresponding signs of impairment to the aquatic life. The result is a CWA Section 303(d) list of "impaired

waters" with several streams identified as impaired for aluminum, mandating the preparation of Total Maximum Daily Load (TMDL), at state expense, to bring those waters into compliance with a flawed standard. *Additionally, reliance on the current aluminum standard has burdened NPDES permit holders as they struggle to maintain compliance with a standard that, from an aquatic life use protection standpoint, is meaningless.*

As with many other metals, the toxicity of aluminum is inversely related to water hardness. In other words, aluminum's potential toxicity to aquatic life decreases as the water hardness increases. EPA has developed hardness-dependent equations for a number of metals to reflect this relationship. For example, West Virginia has adopted EPA's hardness-dependent equations for other metals such as cadmium, trivalent chromium, copper, lead, nickel, silver, and zinc. *Similar hardness-based criteria, as proposed in the emergency rule should, be adopted for aluminum to reflect the actual toxicity of the constituent.*

Other states have adopted similar hardness-based aluminum standards. New Mexico recently adopted a hardness-based standard that was approved by EPA in April 2012.[1] The State of Colorado received EPA approval of its hardness-based standard in August 2011.[2]

[1] *See generally* attachment "A", Letter dated April 30, 2012 from EPA Region VI to the New Mexico Surface Water Quality Bureau.
[2] *See generally* attachment "B", Letter dated August 4, 2011 from EPA Region VIII to the Colorado Water Quality Control Commission.

WVCA has previously provided detailed, technical comments to the agency regarding the state's aluminum standard. WVCA has attached this previous submission and supporting scientific rationale to these comments in its entirety as attachment "C" and we ask the agency to consider these previous comments during its deliberations on the current emergency rulemaking initiative.

Beryllium Criteria

WVCA completely supports WV DEP's efforts in the emergency rule to adopt the beryllium MCL of 0.004 mg/l as the human health Category A criterion.

WV DEP has historically maintained water quality criteria for beryllium that was proposed, but then specifically rejected, by EPA. West Virginia's public drinking water supply/Category A criterion for beryllium is 0.0077 µg/l. However, the national recommended criterion for beryllium for the protection of human health is 4 µg/l, which is the maximum contaminant level (MCL) for drinking water. The West Virginia beryllium criterion is nearly three orders of magnitude below the EPA recommended standard.

The current West Virginia criterion appears to be based upon a proposed federal criterion published in 1991.[3] ***This proposed rule was never adopted by EPA, and the proposed criterion of 0.0077 µg/l does not appear in any past version of EPA's nationally recommended water quality criteria.*** This discarded proposed federal recommendation remains in effect for the state and as virtue of its misplaced and illegal

[3] 56 Federal Register 58420, November 6, 1991, pg. 58442.

application of Category A use designation (see comments submitted previously by WVCA regarding to the 2014 Triennial Review of water quality standards), is being applied on all streams to all NPDES permits by WV DEP.

Following the publication of the proposed human health water quality criteria, EPA promulgated the beryllium MCL of 0.004 mg/l in July 1992. West Virginia adopted its current beryllium criterion of 0.0077 µg/l in 1993; a full year *after* EPA adopted the beryllium MCL that remains the national recommended criterion to this day. Therefore, West Virginia's beryllium criterion was not based upon the best available science in 1993, and it certainly is no more scientifically justifiable now.

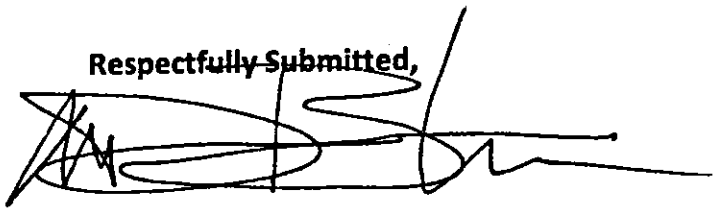
The standard for beryllium embodied in the emergency rule has been reaffirmed by EPA as recently as 2008, when EPA published a draft Integrated Risk Information System (IRIS) reassessment that proposed no changes to the reference dose upon which the beryllium MCL is based.[4]

Continued reliance on the current, unsupported beryllium standard has the potential to create substantial regulatory burdens. If beryllium is detected above the flawed standard, NPDES permit holders could face considerable cost and complications to assure compliance with a meaningless standard.

[4] *See generally* "Toxicological Review of Beryllium and Compounds" published by EPA in April 1998 and available at http://www.epa.gov/iris/subst/0012.htm

WVCA appreciates the opportunity to provide these comments regarding the emergency revisions to the state's water quality standards.

Respectfully Submitted,



Jason D. Bostic
Vice-President

UNITED STATES ENVIRONMENTAL PROTECT
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

APR 30 2012

West Virginia Coal Association
Emergency Rule Revisions to 47 CSR 2
March 27, 2013
Attachment "A"

James P. Bearzi, Chief
Surface Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building (N2050)
P.O. Box 5469
Santa Fe, NM 87502-5469

Dear Mr. Bearzi:

I am pleased to inform you that the Environmental Protection Agency (EPA or the Agency) has completed its review of the ***Standards for Interstate and Intrastate Surface Waters* 20.6.4. NMAC.** Revisions to New Mexico's water quality standards were adopted by the New Mexico Water Quality Control Commission and filed in accordance with the State's Water Quality Act on November 1, 2010. EPA initiated its review when these revisions became effective as State law on December 1, 2010. EPA reviewed and took action on the majority of the State's revisions on April 12, 2011.The Agency decided to take some additional time before acting on other revisions in order to allow both the New Mexico Environment Department an opportunity to provide additional supporting information and to enable a more detailed review of the State's new metals criteria. In today's decision, EPA is approving the majority of the remaining new/revised amendments with one exception, described below.

After further review, we have determined that the provisions found at section **20.6.4.10 D. Site-specific criteria** represent implementation procedures and do not constitute water quality standards that require EPA's review or action under Clean Water Act (CWA) Section 303(c) and, as such, will not be taking action on them. Furthermore, we had no obligation to act on section **20.6.4.10 D. Site-specific criteria** in our April 12, 2011, action and hereby rescind the previous EPA action on the provision. Any site-specific criteria adopted under this provision, however, would constitute new water quality standards subject to EPA review and approval or disapproval under CWA Section 303(c) on a case-by-case basis.

EPA is approving the revised language in section **20.6.4.13 J. Turbidity,** with the expectation that the revised provision will be implemented consistent with the antidegradation policy and implementation methods in the State's standards and Continuing Planning Process and related documents.

EPA previously took no action on the new or revised criteria for aluminum, cadmium, and zinc contained in section **20.6.4.900 I. (1) Acute and (2) Chronic Hardness-based Metals Criteria.** Based on an extensive review of the supporting documentation, we are approving the application of the hardness-dependent equation for aluminum to those waters of the State at a pH of 6.5 to 9.0 because it will yield criteria that are protective of applicable uses in waters within that pH range. However, EPA is disapproving the application of this equation in waters where the pH is below 6.5 as it may not be protective of applicable uses below that pH range.

Consistent with EPA's regulations, the previously approved 304(a) criteria for aluminum are thus the applicable water quality standards for purposes of the CWA in waters where the pH is at or below 6.5. In such cases, as the permitting authority in New Mexico, EPA will apply the previously approved 87 µg/L chronic total recoverable aluminum criterion. EPA is approving the hardness-dependent equations for both cadmium and zinc.

In acting on the State's revised water quality standards today, EPA is fulfilling its CWA Section 303(c) responsibilities. However, EPA's approval of water quality standards is considered a federal action which may be subject to the Section 7(a)(2) consultation requirements of the Endangered Species Act (ESA). EPA has initiated informal consultation under ESA Section 7(a)(2) with the U.S. Fish and Wildlife Service (USFWS) regarding our approval of certain new or revised water quality standards. EPA's approval of these standards is subject to the outcome of the ESA consultation process. Should the consultation process identify information regarding impacts on listed species or designated critical habitat that supports amending our approval, EPA will amend its approval decision for those new or revised water quality standards.

I appreciate the State's cooperative efforts to resolve these final few issues. If you need additional detail concerning this letter or the enclosed addendum to our original Record of Decision, please call me at (214) 665-3187, or have your staff may contact Russell Nelson at (214) 665-6646.

Sincerely,

William K. Honker, P.E.
Acting Director
Water Quality Protection Division

Enclosure

cc: James Hogan
Surface Water Quality Bureau
P.O. Box 5469
New Mexico Environment Department

Wally Murphy
Field Supervisor
Ecological Services Office
USFWS
2105 Osuna Road NE
Albuquerque, NM 87113-1001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

West Virginia Coal Association
Emergency Rule Revisions to 47 CSR 2
March 27, 2013
Attachment "B"

Ref: 8EPR-EP

AUG 04 2011

Peter Butler, Chair
Water Quality Control Commission
4300 Cherry Creek Drive South
Denver, CO 80222-1530

Subject: 2010 Revisions to the Basic Standards and Methodologies for Surface Waters

Dear Mr. Butler:

The purpose of this letter is to notify you of the status of the U.S. Environmental Protection Agency Region 8 (EPA) review of the revisions to the Basic Standards and Methodologies for Surface Waters (Regulation #31) adopted by the Colorado Water Quality Control Commission (Commission). The revisions were adopted on August 9, 2010 with an effective date of January 1, 2011. The submission letter included an Opinion of the Attorney General certifying that the standards were duly adopted pursuant to State law. Receipt of the revised standards on August 24, 2010 initiated EPA's review pursuant to Section 303(c) of the Clean Water Act (CWA or the Act) and the implementing federal water quality standards regulation (40 CFR Part 131).

EPA review of these water quality standards (WQS) revisions is complete, with the following exceptions:

- All provisions relating to discharger-specific variances, including those adopted with a January 1, 2013 delayed effective date
- Section 31.7(3)(a)(ii)(C) (Temporary Modifications)
- Section 31.8(2)(b)(i)(C) (Antidegradation)
- Molybdenum Table Value (Agriculture)
- Nitrate and Arsenic Table Values (Water Supply)

EPA's review of these revisions, and the supporting information and analyses, is nearing completion. With the exception of the provisions relating to discharger-specific variances, which were adopted with a delayed effective date, we estimate that our review of these revisions will be complete within 60 days.

We wish to commend the Standards Unit of the Water Quality Control Division (WQCD or the Division) for their outstanding work in support of this rulemaking action. Division staff developed proposed revisions, with input from the Standards Formulation stakeholder work

group, on a wide range of topics, including: antidegradation, arsenic, dissolved oxygen, *E. coli*, mercury, molybdenum, nitrate, temperature, temporary modifications, uranium, discharger-specific variances, and zinc. Developing these proposals required the Division to present information and solicit input during a series of stakeholder work group meetings during 2007-2009. In addition, the Division explained these issues to the Commission during the October 2008 issues scoping hearing, the November 2009 issues formulation hearing, and the June 2010 rulemaking hearing. The WQCD also developed detailed comments and recommendations on the aluminum, iron and zinc revisions proposed by the Colorado Mining Association (CMA), and the nonylphenol revision proposed by the Colorado Wastewater Utility Council (CWUC). Most revisions are well supported by the evidence submitted, and we wish to recognize the high caliber of work by the Standards Unit both prior to and during the rulemaking action.

CLEAN WATER ACT REVIEW REQUIREMENTS

CWA § 303(c)(2) requires States and authorized Indian Tribes to submit new and revised water quality standards to EPA for review. EPA is required to review and approve or disapprove the revised standards pursuant to CWA § 303(c)(3). The Region's goal has been, and will continue to be, to work closely and collaboratively with States and authorized Tribes throughout the standards revision process so that submitted revisions can be approved by EPA.

TODAY'S ACTION

The Region is approving the revisions to Regulation #31 adopted by the Commission on August 9, 2010, with the exception of the new and revised provisions EPA is not acting on today. The rationale for EPA's action is briefly outlined below and discussed in detail in Enclosure 1.

Today's letter applies only to water bodies in the State of Colorado, and does not apply to waters that are within Indian Country, as defined in 18 U.S.C. Section 1151. Today's letter is not intended as an action to approve or disapprove water quality standards applying to waters within Indian Country. EPA, or authorized Indian Tribes, as appropriate, will retain responsibilities for water quality standards for waters within Indian Country.

ENDANGERED SPECIES ACT REQUIREMENTS

It is important to note that EPA approval of water quality standards is considered a federal action which may be subject to the Section 7(a)(2) consultation requirements of the Endangered Species Act (ESA). Section 7(a)(2) of the ESA states that "each federal agency...shall...insure that any action authorized, funded or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical..."

EPA has initiated consultation under ESA Section 7(a)(2) with the U.S. Fish and Wildlife Service regarding our approval of certain new or revised water quality standards. EPA also has a Clean Water Act obligation, as a separate matter, to complete its water quality standards approval action. Therefore, in approving these water quality standards revisions today, EPA is

completing its CWA Section 303(c) responsibilities. However, because ESA consultation on EPA's approval of these standards is ongoing, EPA's approval is made subject to the outcome of the ESA consultation process. Should the consultation process with the U.S. Fish and Wildlife Service identify information regarding impacts on listed species or designated critical habitat that supports amending EPA's approval, EPA will, as appropriate, revisit and amend its approval decision for those new or revised water quality standards.

STANDARDS APPROVED WITHOUT CONDITION

All new and revised water quality standards in this category are approved without condition because the revisions are consistent with the requirements of the Clean Water Act and EPA's implementing regulation. New and revised provisions in this category are:

- Section 31.5. Definitions.
- Section 31.7. Overview.
- Section 31.7(1)(b)(ii). Ambient Quality-Based Standards.
- Section 31.7(3). Temporary Modifications (with exception of 31.7(3)(a)(ii)(C)).
- Section 31.14(15). Compliance schedules for discharges to segments with temporary modifications.
- Table I. (Recreation, Agriculture).
- Table III. (Water Supply).

STANDARDS APPROVED SUBJECT TO ESA CONSULTATION

All new and revised water quality standards in this category are approved, subject to ESA consultation. New and revised provisions in this category are:

- Table I. Physical and Biological Parameters (Aquatic Life).
- Table III. (Aquatic Life).

PROVISIONS EPA IS NOT ACTING ON TODAY

- All provisions relating to discharger-specific variances. New and revised provisions in this category are:
  - Section 31.7. Overview (portions that relate to discharger-specific variances).
  - Section 31.7(4). Granting, Extending and Removing Variances to Numeric Standards (Effective January 1, 2013).
  - Section 31.14 (17). Permit Actions that Implement Discharger-Specific Variances.

- Section 31.7(3)(a)(ii)(C) (Temporary Modifications). This new provision was adopted to authorize temporary modifications where "there is significant uncertainty regarding the timing of implementing attainable source controls or treatment."

- Section 31.8(2)(b)(i)(C) (Antidegradation). This revised provision was adopted to authorize Use Protected designations[1] for segments that meet the 31.5 definition of "effluent-dependent stream" or "effluent-dominated stream."

- Molybdenum Table Value (Agriculture). This provision consists of the new 300 µg/L table value standard for the protection of agriculture uses.

- Nitrate and Arsenic Table Values (Water Supply). These provisions include the revised table values for nitrate (Table II) and arsenic (Table III), as modified by the respective footnotes, that authorize the Division to exclude effluent limits from discharge permits if water supply uses are designated but not "actual."

CONCLUSION

EPA Region 8 congratulates the Commission and the Division for the many improvements to the Basic Standards and Methodologies for Surface Waters. If you have any questions concerning this letter, the most knowledgeable people on my staff are David Moon (303 312-6833) and Lareina Guenzel (303-312-6610).

Sincerely,

Carol L. Campbell

Carol L. Campbell
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Enclosure

[1] Under Colorado's antidegradation rule, antidegradation reviews are not required for segments with a Use Protected designation.

West Virginia Coal
PO Box 3923, Charleston, WV 25339 • (304) 342-4153 • Fi
jbostic@wvcoal.com

September 21, 2011

Mr. Scott G. Mandirola, Director
Division of Water and Waste Management
WV Department of Environmental Protection
601 57th Street, S.E.
Charleston, WV 25304
Via electronic mail Scott.G.Mandirola@wv.gov

Re: 47 CSR 2, *Requirements Governing Water Quality Standards*
Request to Revise Statewide Category B Aquatic Life Criteria for Aluminum

Dear Director Mandirola:

As you are aware, the aluminum aquatic life water quality criteria in West Virginia have received considerable attention over the past twenty years. Because aluminum is a very common, naturally occurring element, many streams in the State exceed the numeric criteria for aluminum, with no corresponding signs of impairment to the aquatic life that the criteria are intended to protect.

The current national recommended aluminum criteria are set forth in the *Ambient Aquatic Life Water Quality Criteria for Aluminum*, which was published by the United States Environmental Protection Agency ("EPA") in 1988 (the "1988 Criteria"). Considerable work has been conducted regarding aluminum toxicity since the 1988 Criteria were published. Accordingly, Henthorn Environmental Services LLC ("HENV") hired GEI Consultants, Inc., ("GEI") to prepare an update to the freshwater aquatic life aluminum criteria.

GEI reviewed the scientific literature conducted since publication of the 1988 Criteria, and used the data to recommend updated criteria for protection of aquatic life derived according to USEPA guidance (USEPA 1985). The results of GEI's work are set forth in the attached report. GEI has recommended the adoption of the following hardness-based formulas for the freshwater aluminum aquatic life criteria:

Acute Criterion		Chronic Criterion	
$CMC = e^{1.3695*\ln(\text{hardness})+1.8308} \times CF$	=	$FCV = e^{1.3695*\ln(\text{hardness})+0.9161} \times CF$	=

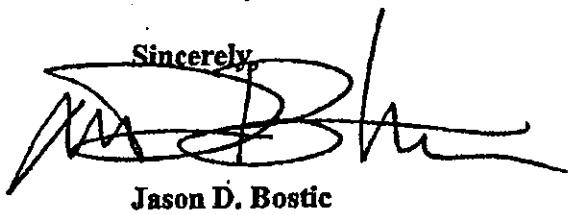
The toxicity of some metals is inversely related to water hardness. In other words, the metal's toxicity to aquatic life decreases as the water hardness increases. The United States Environmental Protection Agency ("EPA") has developed hardness-dependent equations for a number of metals to reflect this relationship. West Virginia has adopted EPA's hardness-dependent equations for cadmium, trivalent chromium, copper, lead, nickel, silver, and zinc. The hardness-based criteria developed by GEI for aluminum follow the same approach used by EPA for other metals.

Importantly, GEI has been involved in similar efforts to revise the aluminum criteria in New Mexico and Colorado. New Mexico has recently adopted the same hardness-based formulas presented by GEI in the attached report, and is awaiting EPA's approval of its revised aluminum water quality criteria. Colorado recently adopted the same acute hardness equation and a slightly modified version of the chronic hardness equation, and has received EPA approval.

Currently, West Virginia has a separate chronic aluminum criterion for Category B2 (trout) streams of 87 ug/l. This chronic criterion was based upon a single study conducted at an extremely low hardness concentration. GEI has considered and included this study in its report, and the hardness-based equations developed are protective of all Category B freshwater uses, including trout streams.

Thank you for your attention to this matter. If you have any questions, please contact me.

Sincerely,



Jason D. Bostic
Vice-President

cc: **Randy C. Huffman, Cabinet Secretary**
Kristin Boggs, General Counsel
Thomas L. Clarke, Director, Division of Mining & Reclamation
Kevin R. Coyne, Assistant Director

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

Updated Freshwater Aquatic Life Criteria for Aluminum

Submitted to:
Henthorn Environmental Services, LLC
517 Sixth Avenue
St. Albans, WV 25177

Submitted by:
GEI Consultants, Inc.
Ecological Division
4601 DTC Boulevard, Suite 900
Denver, CO 80237

August 2011
Project 114210

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List of Acronyms

ACR	acute-chronic ratio
Al	aluminum
AWQC	ambient water quality criteria
CCC	criterion continuous concentration (chronic criterion)
CMC	criterion maximum concentration (acute criterion)
EC_{50}	median effect concentration –point estimate for 50% effect
FACR	final ACR
FAV	final acute value
FCV	final chronic value
GMAVs	genus mean acute values
LC_{50}	median lethal concentration –point estimate for 50% lethality
LOEC	lowest observed effect concentration
SMAVs	species mean acute values
USEPA	U.S. Environmental Protection Agency

1.0 Introduction

The current ambient water quality criteria (AWQC) for aluminum (Al) were released in 1988 (USEPA 1988). Background information on Al chemistry in freshwater systems can also be found in USEPA (1988) and in Sposito (1996). Of particular importance in deriving AWQC for Al is the pH of the water used in toxicity tests. Between a pH of 6.5 and 9.0, Al occurs largely as poorly soluble polymeric hydroxides and as complexes with humic acids, phosphate, sulfate, and other anions (USEPA 1988; Sposito 1996). Waters with a pH <6.5 are below the acceptable pH range identified by the USEPA, and such waters favor the dissolution of Al into more bioavailable monomeric and ionic forms. Consistent with the USEPA's existing criteria for Al, the updated Al criteria recommended here only consider toxicity studies conducted within the pH range of 6.5 to 9.0, and thus should only apply to surface waters with pH levels within this range.

This report reviews the scientific literature conducted since publication of the 1988 AWQC for Al, and uses these data to recommend updated criteria for protection of aquatic life derived according to USEPA guidance (USEPA 1985). Section 2 of this report summarizes the basis of the existing Al criteria and then Section 3 summarizes additional Al toxicity studies published after release of the 1988 AWQC document. Sections 4-6 then use these data to recommend updates to freshwater aquatic life criteria for Al in a format that is consistent with USEPA guidance.

2.0 Summary of Existing Criteria

The USEPA's current acute and chronic criteria for protection of aquatic life are 750 and 87 µg/L, respectively. Development of these criteria followed the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (USEPA 1985). Specifically, the USEPA identified acute LC_{50} values for 15 aquatic species, which resulted in the calculation of 15 species mean acute values (SMAVs)[1]. These 15 SMAVs represented 14 genera, which resulted in the calculation of 14 genus mean acute values (GMAVs)[2]. The 5th percentile of these GMAVs, or final acute value (FAV), was calculated to be 1,496 µg/L. Division of the FAV by two resulted in an acute criterion (termed the criterion maximum concentration, or CMC) of 750 µg/L. Because limited chronic Al toxicity data were available, the final chronic value (FCV) was calculated using an acute-chronic ratio (ACR). The USEPA identified ACRs of 0.9958, 10.64, and 51.47. Because the two highest ACRs were based on acutely insensitive species, these were not considered in development of the final ACR (FACR). However, because the remaining ACR of 0.9958 was less than 2, the USEPA (1985) guidelines required that the FACR be set to 2, otherwise the chronic criterion would be higher than the acute criterion. This results in a FCV of 750 µg/L (equivalent to the CMC). Finally, the USEPA (1988) considered "other data" that were considered scientifically sound, but were from studies that did not strictly meet the guidelines for calculation of the FCV. From the "other data" cited in USEPA (1988), adverse effects were reported for two "important" species at Al concentrations below the FCV of 750 µg/L: (1) a 24 percent reduction in weight of young brook trout (*Salvelinus fontinalis*) was observed at an Al concentration of 169 µg/L (Cleveland et al. Manuscript) and (2) 58 percent striped bass (*Morone saxatilis*) mortality occurred at an Al concentration of 174.4 µg/L (Buckler et al. Manuscript). Aluminum concentrations of 88 and 87.2 µg/L from these same two studies resulted in negligible toxicity. Accordingly, the USEPA set the chronic criterion, or criterion continuous concentration (CCC), at 87 µg/L.

Since the release of the current AWQC for Al in 1988, several acute and chronic Al toxicity studies have been published in the scientific literature. Many of these toxicity studies meet the USEPA (1985) guidelines for AWQC development and also result in additional data for deriving an Al ACR. As discussed below, there is also evidence that the toxicity of Al to aquatic life is hardness-dependent (i.e., Al toxicity is greater in softer waters and decreases as water hardness increases).

[1] The species mean acute value, or SMAV, is the geometric mean of acute LC_{50} values for a single species.
[2] The genus mean acute value, or GMAV, is the geometric mean of SMAVs for a single genus.

3.0 Summary of New Toxicity Studies

The USEPA (1985) guidelines for AWQC development specify minimum study requirements for consideration in the development of acute and chronic criteria for protection of aquatic life. For example, acute toxicity studies must have an exposure duration of 96 hours (although 48 hours is acceptable for more short-lived species, such as cladocerans and midges), organisms must not be fed during the study, and the endpoint must be mortality, immobilization or a combination of the two. Chronic toxicity studies must be conducted using exposure durations that encompass the full life cycle or, for fish, early life stage and partial life cycle studies are acceptable. In addition, toxicant concentrations in the exposure solutions must be analytically verified in chronic studies. Finally, under the USEPA (1985) guidelines, toxicity studies that do not meet the specific study requirements may still be retained as "other data" if the study was otherwise scientifically valid. Such "other data" are not used in the calculation of the CMC and FCV, but may be used to justify lowering the acute or chronic criteria for a toxicant if the species and endpoint tested are considered to be "biologically or recreationally important," and if the CMC or FCV were determined to be inadequately protective of these species or endpoints. For Al, "other data" were used to lower the FCV in development of the chronic criterion, as discussed in Section 2.

The following summarizes the Al toxicity data published since 1988 that are considered acceptable for updating the Al criteria. Our primary source for these new data was a study conducted on behalf of the *Arid West Water Quality Research Project* (AWWQRP 2006), in which a thorough literature review was conducted, and recommendations made for updating aquatic life criteria. While the studies used in the present report are, for the most part, the same as those used in AWWQRP (2006), we recommend different final criteria equations to maximize consistency with USEPA guidance for derivation of aquatic life criteria (USEPA 1985).

3.1 Acute Toxicity

As summarized in Section 2, the acute Al toxicity database used to derive the current acute Al criterion was based on 14 GMAVs, which in turn was based on 15 SMAVs. The updated acute Al toxicity database includes seven additional species with tests considered to be of an acceptable type and duration according to USEPA (1985):

- *Asellus aquaticus*, isopod (Martin and Holdich 1986)
- *Crangonyx pseudogracilis*, amphipod (Martin and Holdich 1986)
- *Cyclops viridis*, copepod (Storey et al. 1992)
- *Gammarus pulex*, amphipod (Storey et al. 1992)
- *Tubifex tubifex*, worm (Khangarot 1991)
- *Hybognathus amarus*, Rio Grande silvery minnow (Buhl 2002)
- *Salmo salar*, Atlantic salmon (Hamilton and Haines 1995)

This results in acute Al toxicity data for a total of 22 species representing 19 genera. In addition, new acute toxicity studies were identified for several species already included in the 1988 AWQC, including the cladoceran *Ceriodaphnia dubia* (ENSR 1992a; Soucek et al. 2001), rainbow trout (*Oncorhynchus mykiss*) (Thomsen et al. 1988; Gundersen et al. 1994), and fathead minnow (*Pimephales promelas*) (Buhl 2002; ENSR 1992b). All acceptable acute LC_{50} and EC_{50} values for Al are summarized in Table 1a.

3.2 Chronic Toxicity

The 1988 AWQC for Al included chronic toxicity data for three species: (1) the cladoceran *C. dubia*; (2) the cladoceran *Daphnia magna*; and (3) the fathead minnow *P. promelas*. As part of this update, a chronic EC16 for reproductive effects in *D. magna* (Biesinger and Christensen 1972) was added to the chronic toxicity data set. The chronic toxicity value from Biesinger and Christensen (1972) was likely excluded in USEPA (1988) because Al test concentrations were not analytically verified. However, this study is included here because the chronic value is consistent with the corresponding measured value from the Kimball manuscript, thus reducing some of the uncertainty associated with the Al concentrations not being analytically verified. This study also provides additional useful information for deriving an ACR, as discussed further below. No additional chronic toxicity studies were identified that meet the USEPA's guidelines (i.e., life cycle study or an early life stage or partial life cycle study for fish). All acceptable chronic toxicity studies are summarized in Table 2a.

A total of four ACRs were derived: 0.9958 and 0.9236 for *C. dubia*, 12.19 and 51.47 for *D. magna*, and 10.64 for fathead minnows (Table 2b). It is uncertain why the *D. magna* ACR of 51.47 is considerably higher than the other ACRs, including the other *D. magna* ACR of 12.19. However, the combination of the high hardness (220 mg/L) and pH (8.30) would likely have mitigated the toxicity of Al compared to waters with a hardness of 45.3 mg/L and pH of 6.5-7.5 used in tests to derive the *D. magna* ACR of 12.19 from Biesinger and Christensen (1972). Therefore, it is more appropriate to select an ACR from tests conducted under conditions that likely maximize Al toxicity. The *D. magna* acute values from the two studies differed by a factor of 10, but the chronic values differed by just a factor of two (Table 2b). Because the *D. magna* ACR of 51.47 is driven by an insensitive acute value under high hardness and high pH conditions, this value was excluded from the final ACR. Calculating the geometric mean of the remaining ACRs results in a final ACR of 4.9923.

In USEPA (1988), it was noted that a Final Plant Value, as defined in USEPA (1985), was not obtained because there were no plant toxicity studies conducted with an important aquatic plant species in which Al was measured and in which the endpoint measured was biologically important. No new published algal or aquatic plant studies have been obtained, so this conclusion has not changed for the present update.

Table 1a: Acute toxicity of aluminum to aquatic animals.

Species Latin Name	Species Common Name	Method	Chemical	pH	Hardness (mg/L as $CaCO_3$)	LC_{50} or EC_{50} (µg Al/L)	LC_{50} or EC_{50} Adjusted to Hardness of 50 mg/L (µg Al/L)	Species Mean Acute Value at Hardness of 50 mg/L (µg Al/L)	Reference
Acroneuria sp.	Stonefly	S,M	$AlCl_3$	7.46	47.4	>22,600	>24,315	>24,315	Call 1984
Asellus aquaticus	Isopod	S,U	$Al_2(SO_4)_3$	6.75	50	4,370	4,370	4,370	Martin and Holdich 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.42	50	1,900	1,900	>2,164	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.86	50	1,500	1,500	-	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	8.13	50	2,560	2,560	-	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.5	26	720	1,783	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.6	46	1,880	2,107	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.8	96	2,450	1,003	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	8.1	194	>99,600	>15,554	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	-	7.6	98.5	2,880	1,138	-	Soucek et al. 2001
Ceriodaphnia sp.	Cladoceran	S,M	$AlCl_3$	7.36	47.4	2,300	2,475	3,134	Call 1984
Ceriodaphnia sp.	Cladoceran	S,M	$AlCl_3$	7.68	47.4	3,690	3,970	-	Call 1984
Crangonyx pseudogracilis	Amphipod	S,U	$Al_2(SO_4)_3$	6.75	50	9,190	9,190	9,190	Martin and Holdich 1986
Cyclops viridis	Copepod	S,U	Al_2O_3	6.9	-	>27,000	:	-	Storey et al. 1992
Daphnia magna	Cladoceran	S,M	$Al_2(SO_4)_3$	7.05	220	38,200	5,022	4,735	Kimball manuscript
Daphnia magna	Cladoceran	S,M	$AlCl_3$	7.61	45.4	>25,300	>28,875	-	Brooke et al. 1985
Daphnia magna	Cladoceran	S,U	$AlCl_3$	7	45.3	3,900	4,465	-	Biesinger and Christensen 1972
Dugesia tigrina	Flatworm	S,M	$AlCl_3$	7.48	47.4	>16,600	>17,859	>17,859	Brooke et al. 1985
Gammarus pulex	Amphipod	S,M	Al_2O_3	6.9	-	>2,700	:	-	Storey et al. 1992
Gammarus pseudolimnaeus	Amphipod	S,M	$AlCl_3$	7.53	47.4	22,000	23,669	23,669	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	7.46	47.4	55,500	59,711	32,922	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	6.59	47.4	>23,400	>25,175	-	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	7.55	47.4	30,600	32,922	-	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	8.17	47.4	>24,700	>26,574	-	Call 1984
Tanytarsus dissimilis	Midge	S,U	$Al_2(SO_4)_3$	6.85-7.71	17.43	>79,900	>338,321	>338,321	Lamb and Bailey 1981
Tubifex tubifex	Worm	R,U	$Al(NH_4SO_4)_2$	7.6	245	50,230	5,698	5,698	Khangarot 1991
Hybognathus amarus	Rio Grande silvery minnow	S,M	$AlCl_3$	8.1	140	>59,100	>14,428	>14,428	Buhl 2002

Species Latin Name	Species Common Name	Method	Chemical	pH	Hardness (mg/L as $CaCO_3$)	LC_{50} or EC_{50} (µg Al/L)	LC_{50} or EC_{50} Adjusted to Hardness of 50 mg/L (µg Al/L)	Species Mean Acute Value at Hardness of 50 mg/L (µg Al/L)	Reference
Ictalurus punctatus	Channel catfish	S,M	$AlCl_3$	7.54	47.4	>47,900	**>51,534**	>51,534	Call 1984
Lepomis cyanellus	Green sunfish	S,M	$AlCl_3$	7.55	47.4	>50,000	**>53,794**	>53,794	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	6.59	47.4	7,400	**7,961**	>7,547	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	7.31	47.4	14,600	**15,708**	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	7.46	47.4	8,600	9,253	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	8.17	47.4	>24,700	>26,574	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.25	23.2	6,170	**17,660**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.25	35	6,170	**10,056**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.29	83.6	7,670	**3,794**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.29	115.8	6,930	**2,194**	-	Gundersen et al. 1994
Oncorhynchus tshawytscha	Chinook salmon	S,M	$NaAlO_2$	7	28	>40,000	**>88,495**	>88,495	Peterson et al. 1974
Perca flavescens	Yellow perch	S,M	$AlCl_3$	7.55	47.4	>49,800	**>53,578**	>53,578	Call 1984
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.1	140	>59,100	>14,428	>5,869	Buhl 2002
Pimephales promelas	Fathead minnow	S,M	$Al_2(SO_4)_3$	7.34	220	35,000	**4,601**	-	Kimball manuscript
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.61	47.4	>48,200	>51,857	-	Call 1984
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.05	47.4	>49,800	>53,578	-	Call 1984
Pimephales promelas	Fathead minnow	S,U	$Al_2(SO_4)_3$	7.6	-	>18,900	**:**	-	Boyd 1979
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.8	28	1,160	**2,840**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.6	46	8,180	**9,170**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.1	96	20,300	**8,308**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.1	194	44,800	**6,996**	-	ENSR 1992b
Salmo salar	Atlantic salmon	S,M	$AlCl_3$	6.5	6.8	599	**9,2051**	9,205	Hamilton and Haines 1995
Salvelinus fontinalis	Brook trout	F,M	$Al_2(SO_4)_3$	6.5	-	3,600	**:**	-	Decker and Menendez 1974

* Bold, underlined values were used to calculate species mean acute values.

S = static, R = renewal, F = flow-through, U = unmeasured, M = measured

Table 1b: Results of covariance analysis of freshwater acute toxicity versus hardness.

Species	N	Slope	R^2 Value	95% Confidence Limits	Degrees of Freedom
Ceriodaphnia dubia	8	2.0674	0.751	0.8770, 3.2578	6
Daphnia magna	2	1.4439	-	-	0
Fathead minnow	5	1.5298	0.903	0.6082, 2.4514	3
All of the above	15	1.7125	0.805	1.2071, 2.2179	12

Table 1c: List of studies used to estimate acute aluminum hardness slope.

Species	Hardness (mg/L)	LC_{50} or EC_{50} (µg Al/L)	Reference
Ceriodaphnia dubia	26	720	ENSR 1992a
	46	1,880	ENSR 1992a
	50	1,500	McCauley et al. 1986
	50	1,900	McCauley et al. 1986
	50	2,560	McCauley et al. 1986
	96	2,450	ENSR 1992a
	98.5	2,880	Soucek et al. 2001
	194	>99,600	ENSR 1992a
Daphnia magna	45.3	3,900	Biesinger and Christensen 1972
	220	38,200	Kimball Manuscript
Fathead minnow	26	1,160	ENSR 1992b
	46	8,180	ENSR 1992b
	96	20,300	ENSR 1992b
	194	44,800	ENSR 1992b
	220	35,000	Kimball Manuscript

Table 2a: Chronic toxicity of aluminum to aquatic animals.

Species Latin Name	Species Common Name	Test	Chemical	pH	Hardness (mg/L as $CaCO_3$)	Limits (µg Al/L)	Chronic Value (µg Al/L)	Reference
Ceriodaphnia dubia	Cladoceran	LC	$AlCl_3$	7.15	50	1,400-2,600	1,908	McCauley et al. 1988
Ceriodaphnia dubia	Cladoceran	LC	$AlCl_3$	7.75	50	1,100-2,400	1,624	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	LC	$AlCl_3$	7.55	47.4	4,900-12,100	7,700	Call 1984
Daphnia magna	Cladoceran	LC	$Al_2(SO_4)_3$	8.30	220	540-1,020	742.2	Kimball manuscript
Daphnia magna	Cladoceran	LC	$AlCl_3$	6.5-7.5	45.3	-	320[a]	Biesinger and Christensen 1972
Pimephales promelas	Fathead minnow	ELS	$Al_2(SO_4)_3$	7.24-8.15	220	2,300-4,700	3,288	Kimball manuscript

[a] This value is an EC_{16} for reproductive effects. It was included in Table 6 ("Other Data") of USEPA (1988), presumably because Al concentrations were not measured. However, it was included in Table 2 of this updated criteria evaluation because it provides information on the chronic sensitivity of *D. magna* in water of a moderate hardness (45.3 mg/L) and the result seems reasonable in comparison to the chronic value of 742.2 µg/L at a hardness of 220 mg/L (Kimball manuscript).

Table 2b: Aluminum acute-chronic ratios.

Species Latin Name	Species Common Name	pH	Hardness (mg/L as CaCO3)	Acute Value (µg Al/L)	Chronic Value (µg Al/L)	Acute-Chronic Ratio	Species Mean Acute-Chronic Ratio
Ceriodaphnia dubia	Cladoceran	7.15	50	1,900	1,908	0.9958	0.9590
Ceriodaphnia dubia	Cladoceran	7.75	50	1,500	1,624	0.9236	-
Daphnia magna	Cladoceran	8.30	220	38,200	742.2	51.47	-
Daphnia magna	Cladoceran	6.5-7.5	45.3	3,900	320	12.19	12.19[a]
Pimephales promelas	Fathead minnow	7.24-8.15	220	35,000	3,288	10.64	10.64
						Final ACR:	**4.9923**

[a] The acute-chronic ratio of 51.47 for *D. magna* was excluded from the species mean acute-chronic ratio because it was approximately 50 times higher than that observed for *C. dubia* and the acute-chronic ratio of 12.19 is more consistent with that observed for *P. promelas*.

3.3 Other Data

Within the pH range 6.5 – 9.0, only two other studies have been published after the 1988 Al AWQC were released, but that were not already considered to be acceptable for use in deriving the updated FAV or FCV: (1) a rainbow trout study by Thomsen et al. (1988) and (2) an Atlantic salmon study by Hamilton and Haines (1995). These are discussed below.

Thomsen et al. (1988) exposed rainbow trout (*O. mykiss*) eggs to aqueous Al concentrations in water with calcium concentrations of either 1 or 150 mg/L and a pH level of 7. The Al exposure continued through 25 days post-hatch. The LC_{50} values (measured at day 25 post-hatch) were 3,800 and 71,000 µg Al/L in waters containing calcium concentrations of 1 and 150 mg/L, respectively. The increased mortality observed in the low calcium treatment may be explained more by the low calcium treatment than by increased toxicity of Al due to higher bioavailability. As Thomsen et al. (1988) noted, the greatest reduction in survival was observed in relation to the calcium ion concentrations in the test water (survival was reduced by 24 percent in the low calcium water compared to the high calcium water without the addition of Al). Hatching time was also increased from 1.2 days in high calcium water to 4.5 days in low calcium water. Overall, this study does not meet the requirements to be included as an acceptable acute test because the exposure duration ranged from approximately 26-30 days, or as an acceptable chronic test because the study was not sufficient long to meet the early life stage requirements for rainbow trout tests (60 days post-hatch). Further, much of the mortality observed in the low calcium treatment appears to be a result of the low calcium concentration itself.

Hamilton and Haines (1995) exposed Atlantic salmon (*S. salar*) alevins to aqueous Al concentrations of 0 or 200 µg/L for 30 days. The test water pH was 6.5 and the hardness was 6.8 mg/L. This study does not meet the USEPA's (1985) specific requirements for a chronic study because it does not meet the definitions of an early life stage or partial life cycle study, but it does provide useful data that the USEPA would typically categorize as "other data." The mean weight of alevins exposed to 200 µg Al/L was significantly reduced ($p<0.05$) relative to the control, which results in a lowest observed effect concentration (LOEC) of <200 µg/L.

3.4 Unused Data

In AWQC documents, studies are identified that were not used or considered for AWQC development because the study was scientifically flawed or limited, or otherwise inappropriate for derivation of AWQC. For example, studies are not used if control organisms did not respond adequately (e.g., unacceptably high mortality) or if the test water contained elevated levels of other contaminants. In addition, studies are not used if the test species is not resident to North America. All of the unused studies published since the current Al criteria were derived are not summarized here, except for a brook trout

(*S. fontinalis*) study that is briefly summarized below given the importance of brook trout to the derivation of the 1988 chronic Al criterion.

Cleveland et al. (1991) exposed brook trout to an aqueous Al concentration of 303.9 µg/L for 56 days at a pH of 7.2 (fish were also exposed to Al at pH levels of 5.0 and 6.0, but these tests are not discussed here because the pH levels were <6.5). This study did not include a control, although only 1 percent mortality was observed following 56 days. It is unknown whether growth was affected, which is important since Cleveland et al. (1989) observed that growth is a more sensitive endpoint than survival for brook trout exposed to Al. Given the lack of a growth endpoint and due to the absence of a control treatment, this study was not sufficiently robust to identify either an acceptable chronic value for Al (for inclusion in Table 2a) or as information to be evaluated as "other data."

4.0 Hardness-Toxicity Relationship

Under the USEPA (1985) guidelines for AWQC development, methods are provided for adjusting criteria if it can be demonstrated that toxicity varies as a function of a given water quality parameter. The most common example is the relationship between water hardness and toxicity for several divalent metals. For example, the current acute and chronic criteria for cadmium, lead, nickel, and zinc are all hardness-dependent (i.e., the criteria concentrations increase with increasing water hardness; USEPA 2006). For Al, the existing data also suggest that toxicity increases with increasing water hardness, or with other water quality parameters that covary with hardness. Therefore, expressing updated Al criteria on the basis of a hardness equation—rather than as a single fixed value—is now warranted.

The general approach for deriving hardness-dependent criteria entails use of an analysis of covariance to derive a log-linear slope that relates standard toxicity values (e.g., LC_{50}s) to water hardness (USEPA 1985). To evaluate whether there is a significant statistical relationship between hardness and toxicity, there must be definitive acute values (i.e., undefined "less than" or "greater than" toxicity values are not used) from Al toxicity studies that expose organisms over a range of water hardness values such that the highest hardness is at least three times higher than the lowest, and the highest hardness is also at least 100 mg/L higher than the lowest. There were three species that met this minimum requirement: (1) *C. dubia*; (2) *D. magna*; and (3) fathead minnow.

For *C. dubia*, acute LC_{50}s were available at hardness levels of 26, 46, 50, 96, 98.5, and 194 mg/L (as $CaCO_3$). The LC_{50} at a hardness of 194 mg/L was >99,600 µg/L, which should not be used to derive the hardness-toxicity relationship because it is not a definitive value. However, if this test is not included in the hardness-toxicity evaluation, the range in hardness for the remaining *C. dubia* toxicity studies is 26 to 98.5 mg/L, which does not meet the requirement that the range between the lowest and highest hardness must be >100 mg/L. Nevertheless, because the *C. dubia* data clearly demonstrate a relationship between hardness and toxicity over an acceptable range of hardness values, the *C. dubia* data were included in the pooled slope, but the LC_{50} of >99,600 µg/L was excluded because it was not a definitive value.

The slope relating aluminum toxicity to water hardness was significantly different from zero ($p<0.05$) for all three species. In addition, the slopes were similar for all three with overlapping 95 percent confidence intervals. Accordingly, a final pooled slope of 1.3695 was derived based on the data for these three species. The individual slopes for each species and the pooled slope for combined species, as well as the data used to derive the pooled slopes, are provided in Tables 1b and 1c. The raw data used to define the relationship between hardness and toxicity, as well as the pooled slope, are plotted in Figure 1.

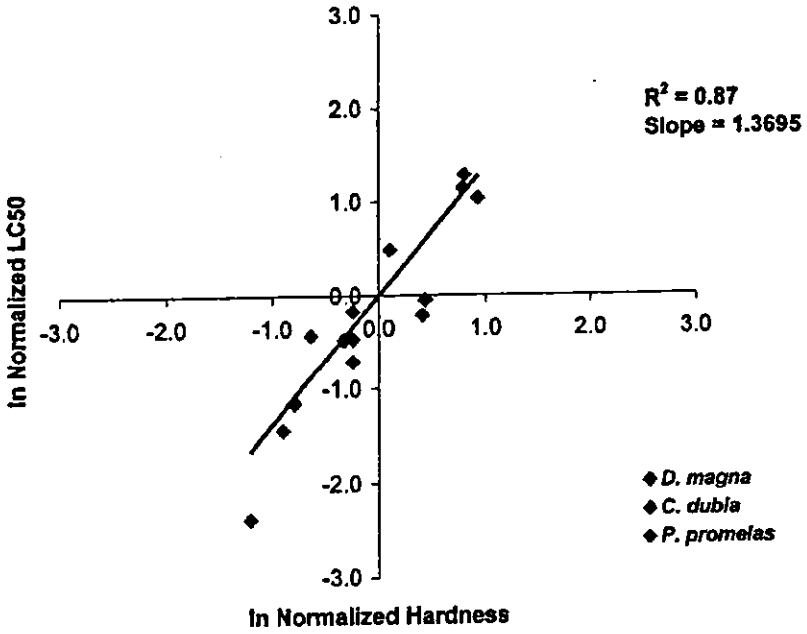

Figure 1: Relationship between hardness and acute aluminum toxicity.

5.0 Revised Aluminum Criteria

5.1 Acute Criterion

The pooled slope of 1.3695 was used to adjust the acute values in Table 1a to a hardness of 50 mg/L, except for cases where this was not possible because water hardness was not reported. Species mean acute values were calculated as the geometric mean of acceptable hardness-adjusted acute values for each species. To delineate cases in which not all toxicity values were appropriate for inclusion into a particular SMAV, the bold, underlined LC_{50} and EC_{50} values in Table 1a were ultimately used to derive the SMAVs. The SMAVs, adjusted to a hardness of 50 mg/L, ranged from >2,164 µg/L for the cladoceran *Ceriodaphnia dubia* to >338,321 µg/L for the midge *Tanytarsus dissimilis*. Genus mean acute values were calculated as the geometric mean of SMAVs and ranked from high to low (Table 3). The total number of GMAVs was 17 and the four lowest GMAVs were used to calculate the FAV following the USEPA (1985) guidelines. The FAV, at a hardness of 50 mg/L, was calculated to be 2,648 µg/L (Table 3). The FAV was then divided by two, resulting in a CMC, or acute criterion, of 1,324 µg/L at a hardness of 50 mg/L. The resulting equation for deriving the CMC over a range of hardness levels is:

$$CMC = e^{(1.3695[\ln(\text{hardness})]+1.8308)} \qquad \textbf{Eq. 1}$$

The hardness relationship was derived based on empirical data within a hardness range of 26 to 220 mg/L, so application of this equation to hardness levels outside of this range should be treated with caution.

5.2 Chronic Criterion

Chronic Al toxicity values did not meet the minimum data requirements for calculating the FCV as the 5th percentile of empirically derived chronic values. Accordingly, it was necessary to apply an ACR to the FAV (consistent with the calculation of the FCV for Al in USEPA [1988]). At a hardness of 50 mg/L, division of the FAV of 2,648 µg/L (see Section 5.1) by the final ACR of 4.9923 (see Section 3.2) results in a FCV of 530 µg/L (Table 3). The resulting equation for deriving the FCV over a range of hardness levels is:

$$FCV = e^{(1.3695[\ln(\text{hardness})]+0.9161)} \qquad \textbf{Eq. 2}$$

Similar to the acute hardness equation, because the hardness relationship was derived based on empirical data within a hardness range of 26 to 220 mg/L, application of this equation to hardness levels outside of this range should be treated with caution.

Table 3: Ranked genus mean acute values with species mean acute-chronic ratios

Rank	Genus Mean Acute Value (µg Al/L)	Species	Species Mean Acute Value (µg Al/L)	Species Mean Acute-Chronic Ratio
17	>338,321	*Tanytarsus dissimilis* (midge)	>338,321	-
16	>53,794	*Lepomis cyanellus* (green sunfish)	>53,794	-
15	>53,578	*Perca flavescens* (yellow perch)	>53,578	-
14	>51,534	*Ictalurus punctatus* (channel catfish)	>51,534	-
13	32,922	*Physa* sp. (snail)	32,922	-
12	>24,315	*Acroneuria* sp. (stonefly)	>24,315	-
11	23,669	*Gammarus pseudolimnaeus* (amphipod)	23,669	-
10	>18,189	*Dugesia tigrina* (flatworm)	>18,189	-
9	>14,428	*Hybognathus amarus* (Rio Grande silvery minnow)	>14,428	-
8	9,205	*Salmo salar* (Atlantic salmon)	9,205	-
7	9,190	*Crangonyx pseudogracilis* (amphipod)	9,190	-
6	>7,547	*Oncorhynchus mykiss* (rainbow trout)	>7,547	-
		Oncorhynchus tshawytscha (chinook salmon)	>88,495*	-
5	>5,869	*Pimephales promelas* (fathead minnow)	>5,869	10.64
4	5,698	*Tubifex tubifex* (worm)	5,698	-
3	4,735	*Daphnia magna* (cladoceran)	4,735	12.19
2	4,370	*Asellus aquaticus* (isopod)	4,370	-
1	>2,604	*Ceriodaphnia dubia* (cladoceran)	>2,164	0.9590
		Ceriodaphnia sp. (cladoceran)	3,134	-

* SMAV for chinook salmon excluded from the GMAV for *Oncorhynchus*. See text for details.

Acute Criterion:

Final Acute Value = 2,648 µg/L (calculated at a hardness of 50 mg/L from Genus Mean Acute Values)

Criterion Maximum Concentration = (2,648 µg/L) / 2 = 1,324 µg/L (at a hardness of 50 mg/L)

Pooled Slope = 1.3695 (see Table 4)

ln (Criterion Maximum Intercept) = ln (CMC) – [slope x ln(50)] = ln (1,324) – [1.3695 x ln(50)] = 1.8308

Criterion Maximum Concentration = e(1.3695[ln(hardness)] + 1.8308)

Final Acute-Chronic Ratio = 4.9923

Chronic Criterion:

Final Chronic Value = (2,648 µg/L) / 4.9923 = 530 µg/L (at a hardness of 50 mg/L)

Pooled Slope = 1.3695 (see Table 4)

ln (Final Chronic Intercept) = ln (FCV) – [slope x ln(50)] = ln (530) – [1.3695 x ln(50)] = 0.9161

Final Chronic Value = e(1.3695[ln(hardness)] + 0.9161)

5.3 Protectiveness of the Chronic Criterion to Brook Trout and Striped Bass

As discussed in Section 2, USEPA (1988) derived a FCV of 750 µg/L based on a FAV of 1,496 µg/L and an ACR of 2 (i.e., 1,496 µg/L / 2 = 750 µg/L). However, two chronic studies that did not meet strict acceptability criteria (USEPA 1985) for calculation of the FCV were ultimately considered to be important enough to warrant lowering of the FCV to ensure protection of the two species tested. Based on the Cleveland et al. and Buckler et al. manuscripts cited in the 1988 AWQC, the USEPA lowered the chronic criterion to 87 µg/L in order to ensure protection of brook trout (*Salvelinus fontinalis*) and striped bass (*Morone saxatilis*). The following briefly summarizes these studies, and evaluates the level of protection that the updated criteria equations 1 and 2 would provide for these species.

5.3.1 Brook Trout

USEPA (1988), citing an unpublished Cleveland et al. manuscript (and now published as Cleveland et al. 1989), reported that Al concentrations of 169 and 350 µg/L resulted in 3 percent and 48 percent larval brook trout mortality, respectively, after a 60 day exposure, and Al concentrations of 88 and 169 µg/L resulted in a 4 percent and 24 percent reduction in weight, respectively. Following the USEPA (1985) guidelines, the chronic value from this study would typically be defined as the geometric mean of the NOEC and LOEC for the most sensitive endpoint (growth), which is 88 and 169 µg/L, respectively. The chronic value for this test would, therefore, be 122 µg/L. It should be noted that this test was conducted in very soft water with a hardness of 12.3 mg/L. Based on the hardness-toxicity slope of 1.3695, this converts to an estimated chronic value of 833 µg/L at a hardness of 50 mg/L. Given that the FCV at a hardness of 50 mg/L is 530 µg/L, this suggests that brook trout would be adequately protected by the revised criterion[3].

In addition, the GMAV of 3,600 µg Al/L for brook trout reported in Table 1a is well above the FAV of 2,648 µg Al/L (Table 3), even though water hardness was not reported in this study (Decker and Menendez 1974) and so could not be included in the FAV derivation. Finally, an additional chronic brook trout study cited in Table 6 of the 1988 AWQC (Hunn et al. 1987) reports a chronic growth reduction at 283 µg Al/L, but in extremely soft waters (0.57 mg/L hardness). It would likely not be meaningful to apply a hardness slope to such a low water hardness, but given that the chronic value from Cleveland et al. (1989) conducted in harder water was lower than that of Hunn et al. (1987), a revised chronic criterion using Equation 2 would still be considered protective. Therefore, the available toxicity data suggest that the revised chronic criteria reported here would also be protective of both chronic and acute Al toxicity to brook trout, and so the calculated FCV does not need to be lowered to protect this species.

[3] Given that the very low hardness of 12.3 mg/L is below the range of hardness levels used to develop the pooled hardness slope, there is some uncertainty associated with this evaluation.

5.3.2 Striped Bass

USEPA (1988), citing the unpublished Buckler et al. manuscript (and now published as Buckler et al. 1987), reports that Al concentrations of 87.2 and 174.4 µg/L, at a pH of 6.5, resulted in 0 percent and 58 percent mortality of 160 day-old striped bass, respectively, after a 7 day exposure. USEPA (1988) also reported that Al concentration of 174.4 and 348.8 µg/L resulted in 2 percent and 100 percent mortality in 160 day-old striped bass at a pH of 7.2 (i.e., Al was more toxic at pH 6.5 than at pH 7.2). In addition, citing the Buckler et al. manuscript, USEPA (1988) reported that an Al concentration of 390 µg/L resulted in 0 percent mortality of 159 and 195 day-old striped bass at both a pH of 6.5 and 7.2 following a 7 day exposure. These values were identical to those in the published version of the study in Buckler et al. (1987). Additional 7 day toxicity tests of younger life stages were reported in Buckler et al. (1987). However, control survival in these other studies was marginal: (1) 72-78 percent and 79 percent for 11 day old fish at a pH of 7.2 and 6.5, respectively; and (2) 80 percent and 48 percent for 13 day old fish at a pH of 7.2 and 6.5, respectively. Conversely, control mortality was 0 percent in studies with 160 day old fish at pH levels of 6.5 and 7.2. However, if it is assumed that control mortality in the range of 20-28 percent is acceptable for younger life stages, a measured Al concentration of approximately 131 µg/L was associated with 75 percent mortality in 13 day old fish at a pH of 7.2, which was significantly greater ($p<0.05$) than in the respective control that had 20 percent mortality. In another study with 11 day old fish at a pH of 7.2, survival was not significantly reduced relative to the control up to a higher Al concentration of 179 µg/L, but was significantly reduced ($p<0.05$) at an Al concentration of 358 µg/L. At a pH of 6.5, control mortality was 21 percent (compared to 26 percent in the pH 7.2 control), but survival in Al treatments ≥22 µg/L was significantly reduced ($p<0.05$) compared to the pH 7.2 control (and presumably compared to the pH 6.5 control, but this was not reported).

Overall, Al toxicity to striped bass is highly variable depending on the age of the test organism and the pH of the water (6.5 vs. 7.2). Lowest observed effect concentrations range from 22 to <393 and NOECs range from 87 to >390 (in other words, the ranges of NOECs and LOECs from the various tests substantially overlap). Even within a similar age the NOECs and LOECs are highly variable, with NOECs for 159 day old fish being >390 µg/L and LOECs for 160 day old fish being 174 to 348 µg/L. Given this variability, we suggest that the striped bass toxicity data be excluded from consideration in updating the chronic Al criterion. Nevertheless, the chronic value reported in USEPA (1988) for striped bass in soft water[4] is 123 µg/L, which, assuming a water hardness of 14 mg/L, results in a chronic value of 703 µg/L at a hardness of 50 mg/L. Therefore, the available toxicity data suggest that the revised chronic criteria reported here (530 µg/L) would also be protective of chronic Al toxicity to striped bass, and so the calculated FCV does not need to be lowered to protect this species.

[4] Buckler et al. (1987) did not report the hardness of the test water, although the authors did note that hardness was monitored. They characterized the test water as soft. The test solution was created using well water passed through a water softener, which was then treated by reverse osmosis and passed through anionic, cationic, and mixed-bed exchange resins. The alkalinity and hardness of the well water were 237 and 272 mg/L, respectively. The alkalinity of the resulting test water was 12 mg/L. If we assume that the ratio of well water-to-test water alkalinity applies to hardness, we can estimate that the hardness of the test water was approximately 14 mg/L.

6.0 Criteria Statement

The available toxicity data, when evaluated using the procedures described in the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (USEPA 1985) indicate that, except possibly where a locally important species is unusually sensitive, freshwater aquatic life should be protected if the four-day average concentration (in µg/L) of Al does not exceed the numerical value given by $e^{(1.3695[\ln(\text{hardness})]+0.9161)}$ more than once every three years on the average, and if the 24-hour average concentration (in µg/L) does not exceed the numerical value given by $e^{(1.3695[\ln(\text{hardness})]+1.8308)}$ more than once every three years on the average. For example, at hardness levels of 50, 100, and 200 mg/L as $CaCO_3$, the four-day average Al concentrations are 530, 1,370, and 3,541 µg/L, respectively, and the 24-hour average Al concentrations are 1,324, 3,421, and 8,838 µg/L.

7.0 References

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Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:36 AM
To: Coyne, Kevin R
Subject: FW: Proposed Revision to water quality standards

From: RevDRHepler@aol.com [mailto:RevDRHepler@aol.com]
Sent: Wednesday, March 27, 2013 9:15 AM
To: DEP Comments
Subject: Proposed Revision to water quality standards

To whom it may concern:

I am opposed to the proposed revision of standards for aluminum toxicity to aquatic life. This proposed emergency rule does not protect the designated use of streams and rivers required by the Federal Clean Water Act. Furthermore, it does not protect the public from those who pollute with no fear of penalty.
I urge you not to make this change in the required standards.

Sincerely,

David Hepler
16 Scenic Woods Drive
Morgantown, WV 26508

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:36 AM
To: Coyne, Kevin R
Subject: FW: KVCTU Comments on Emergency Rule
Attachments: DEP Emergency Rule 3-26-13.doc

-----Original Message-----
From: Lee and Asley Orr [mailto:orrwhat4@frontier.com]
Sent: Wednesday, March 27, 2013 8:06 AM
To: DEP Comments
Subject: KVCTU Comments on Emergency Rule

Please find attached comments from Kanawha Valley Trout Unlimited concerning the proposed emergency rule to revise Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards."

Lee Orr
VP Environmental
Kanawha Valley Chapter of Trout Unlimited.

3/27/13

Water Quality Standards Program
WV Department of Environmental Protection
601 57th St., S.E.
Charleston, WV 25304

RE: Emergency rule to revise Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards":

The Kanawha Valley Chapter of Trout Unlimited (KVCTU) is submitting the following comments in regard to DEP's proposed emergency rule to revise Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards":

- KVCTU is opposed to any reduction of water quality standards that could potentially impact protections to B2 Trout Waters.

- KVCTU is concerned that the changes to the beryllium criteria are based on drinking water standards rather than those intended to protect aquatic health.

- KVCTU is concerned that the changes to the dissolved aluminum standard are based on pH and hardness levels. pH and hardness levels are not static on individual streams and can change dramatically. As an example, many of West Virginia's trout waters have dramatic pH swings resulting from seasonal run-off.

Thank you for your time and consideration.

The Kanawha Valley Chapter of Trout Unlimited.

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:38 AM
To: Coyne, Kevin R
Subject: FW: Water and Waste Management Emergency Rule regarding Aluminum

From: Rick Clark [mailto:riverducky@gmail.com]
Sent: Tuesday, March 26, 2013 9:45 PM
To: DEP Comments
Subject: Water and Waste Management Emergency Rule regarding Aluminum

I oppose any change in regulations that weakens the water quality standards. This "Emergency Rule" would certainly do so in an extreme way. The DEP should be doing everything in its power to uphold the highest standards for water quality, not bending to the will of parties whose goal is to dump their waste without paying the price.

I am an avid kayaker, and my family's drinking water would also be affected.

Sincerely,
Richard T. Clark
1911 Buttermilk Ridge Rd
Belington, WV 26250

--

"There are people in the world so hungry that God cannot appear to them except in the form of bread." Mahatma Gandhi

Click to give daily at The Hunger Site
End World Hunger - Cultivate Peace

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:38 AM
To: Coyne, Kevin R
Subject: FW: Emergency Rule

From: Donald Briggs [mailto:1donaldbriggs@gmail.com]
Sent: Tuesday, March 26, 2013 9:09 PM
To: DEP Comments
Subject: Emergency Rule

I am writing in opposition to the "emergency rule" that would weaken standards for West Virginia streams. We need to protect the "designated use" of WV streams as required under the federal Clean Water Act; protect the long-term public interest, and increase public participation in the rule-making process. The DEP should base decisions on sound science; the quality of our waters for fishing is more valuable than industry short term gains.

Donald E. Briggs
P.O. Box 733
Shepherdstown WV 26443

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:38 AM
To: Coyne, Kevin R
Subject: FW: Emergency Rule to Weaken Water Quality

From: xkatwalkx@aol.com [mailto:xkatwalkx@aol.com]
Sent: Tuesday, March 26, 2013 7:35 PM
To: DEP Comments
Subject: re: Emergency Rule to Weaken Water Quality

It is shocking that the DEP continues to take the side of industry instead of protecting the public. Water is the most precious commodity on the planet, yet time after time, the WV DEP fails to protect it. There is no emergency that justifies the promulgation of this rule. This rule fails to:

- **protect the 'designated use' of WV streams as required under the Clean Water Act**
- **protect the public interest; instead caters to the interests of a small number of polluters who do not wish to pay for waste treatment**
- **provide adequate public participation in the rule making process**

Sadly, we cannot trust the WVDEP to do its job - to protect our environment.

Kathryn A. Stone
26 Birch Tree Lane
Chas., WV 25314
Tel: (304) 342-1161

Oppose DEP's Emergency Rule That Weakens Water Quality Standards for Aluminum and Beryllium

The WV DEP's Division of Water and Waste Management has filed an Emergency Rule with the Office of the Secretary of State that would weaken the West Virginia water quality

standards in 47CSR2 for acute and chronic aluminum toxicity to aquatic life and the human health (Category A) criterion for beryllium.
The proposed revisions are drastic and equate to greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. Citing only minimal scientific justification for these proposed changes, the Emergency Rule fails to:

1. Protect the "designated use" of WV streams as required under the federal Clean Water Act.
2. Protect the public's interest, rather than the interests of a small number of polluters who do not wish to pay to treat their waste.
3. Provide adequate public participation in the rulemaking process.

In short, there is no emergency that justifies the promulgation of this rule. And there is no science showing that the changes protect designated stream use and public h

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:38 AM
To: Coyne, Kevin R
Subject: FW: DEP's Emergency Rule That Weakens Water Quality Standards for Aluminum and Beryllium

From: Sally Wilts [mailto:sallywilts@yahoo.com]
Sent: Tuesday, March 26, 2013 3:26 PM
To: DEP Comments
Subject: DEP's Emergency Rule That Weakens Water Quality Standards for Aluminum and Beryllium

The WV DEP's Division of Water and Waste Management has filed an Emergency Rule with the Office of the Secretary of State that would weaken the West Virginia water quality standards in 47CSR2 for acute and chronic aluminum toxicity to aquatic life and the human health (Category A) criterion for beryllium.
The proposed revisions are drastic and equate to greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. Citing only minimal scientific justification for these proposed changes, the Emergency Rule fails to:

1. Protect the "designated use" of WV streams as required under the federal Clean Water Act.
2. Protect the public's interest, rather than the interests of a small number of polluters who do not wish to pay to treat their waste.
3. Provide adequate public participation in the rulemaking process.

In short, there is no emergency that justifies the promulgation of this rule. And there is no science showing that the changes protect designated stream use and public health.

Other factors, especially pH, affect toxicity. And while DEP cites a similar equation in use in Colorado, that applies to total recoverable aluminum — both dissolved and suspended — and West Virginia's applies only to dissolved aluminum, so Colorado's is more stringent.

The Biotic Ligand Model that takes all of the important water chemistry into account is available for free for regulators to download and that California, Colorado and some other states have adopted its use as an alternative for some metals criteria.

I am definitely opposed to this rule change and especially to the effort to make it appear that it is an emergency!

Sara Wilts
PO Box 184
Bruceton Mills, WV 26525
304-379-7567

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:39 AM
To: Coyne, Kevin R
Subject: FW: 47CSR2 Aluminum & Category A Beryllium

From: marjorieclarkson@aol.com [mailto:marjorieclarkson@aol.com]
Sent: Tuesday, March 26, 2013 1:39 PM
To: DEP Comments
Subject: 47CSR2 Aluminum & Category A Beryllium

Dear Staff,

Please do not lower the water quality standards by altering 47CSR2 for aluminum toxicity and Category A for beryllium. We need to insure safe and clean water for aquatic life and human health. Thank you.

Marjorie A. Clarkson

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:39 AM
To: Coyne, Kevin R
Subject: FW: Emergency Rule with the Office of the Secretary of State

From: Macho Man [mailto:paulytheism@gmail.com]
Sent: Tuesday, March 26, 2013 12:45 PM
To: DEP Comments
Subject: Emergency Rule with the Office of the Secretary of State

As a life long resident of West Virginia I want to state that I am AGAINST easing pollution restrictions to West Virginia streams and rivers. Living here all my life I have seen places that kids could once go swimming closed down because of pollution. I've read and personally witnessed the adverse effects of pollution on the flora, fauna, and overall water quality while living next to the Potomac for 5+ years. Our water ways in WV should be protected and not dictated by cost effective measures of how companies treat their waste. I humbly submit my opinion as a frequent river traveler and a West Virginia citizen.

Thank You

Sincerely,
Scott Aylor
Wardensville WV

--
S

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:39 AM
To: Coyne, Kevin R
Subject: FW: Oppose Emergency Rule

From: John Kobak [mailto:keelhauler@yahoo.com]
Sent: Tuesday, March 26, 2013 12:42 PM
To: DEP Comments
Subject: Oppose Emergency Rule

To: Kevin R Coyne - Water Quality Standards Program

As a group of 31 property owners near Hazleton, WV we would like let you know we oppose the Emergency Rule relative to quality standards for aluminum toxicity to aquatic life.
There is no emergency that justifies the proposed revisions of this rule, and there is no science showing that the changes protect designated stream use and public health.

John Kobak
President - BCPOA
http://bcpoa.org

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:39 AM
To: Coyne, Kevin R
Subject: FW: Oppose Emergency Rule That Weakens Water Quality Standard

From: mfrondorf@verizon.net [mailto:mfrondorf@verizon.net]
Sent: Tuesday, March 26, 2013 12:16 PM
To: DEP Comments
Subject: Oppose Emergency Rule That Weakens Water Quality Standard

Mark J. Frondorf
4114 N. 21st Street
Arlington, VA 22207

March 26, 2013

Kevin R Coyne
Water Quality Standards Program
WV Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Dear Mr. Coyne,

I recognize that your Water Quality Standards Program is in a difficult situation as you try to balance the competing interests for water in a state where unemployment hovers right about the 7.5 percent mark. That puts West Virginia firmly in the middle of the states with respect to unemployment but that figure provides no justification to impose an emergency rule that weakens water quality standards.

As I write this letter, I find myself temporarily unemployed so I know first hand the impact that unemployment can have on a person and on a family. Nonetheless, I strongly oppose WV's DEP's Division of Water and Waste Management decision to file an Emergency Rule with the Office of the Secretary of State that would significantly weaken the West Virginia water quality standards for aluminum toxicity to aquatic life.

I have been a long-time proud owner of a non-resident WV fishing license and I spend 20-30 days a year fishing and hiking in WV's beautiful outdoors. But I am gravely concerned about the affect that increased aluminum would have on aquatic life and smallmouth bass. Please review this scientific publication that details the negative effects of aluminum and reduced pH on the early life stages of smallmouth bass and other aquatic life.

http://www.sciencedirect.com/science/article/pii/004313548790073X

Also, pls keep in mind that West Virginia outdoor recreation generates

- $7.6B in consumer spending
- $2.0B in wages/salaries

- $532M in state and local tax revenue, and
- 82,000 direct WV jobs.

source: http://www.outdoorindustry.org/images/ore_reports/WV-westvirginia-outdoorrecreationeconomy-oia.pdf

The Emergency Rule:

- Fails to protect WV streams as required under the federal Clean Water Act,
- Fails to protect the public's interests by protecting the commons, and it
- Fails to provide adequate public participation in the rulemaking process.

I am reminded of West Virginia's legendary Senator, Robert Byrd, when he wrote that saving West Virginia people, not its coal, are the state's greatest resource. He wrote that, "If the process of mining destroys wells and foundations, if blasting and digging and relocating streams unearths harmful elements and releases them into the environment causing illness and death that process should be halted and the resulting hazards to the community abated." He went on to add that mining is a privilege, not a right, and energy companies that operate safely and with minimal environment impact should be rewarded.

Please do the right thing and ensure that this Emergency Rule is not enacted.

Respectfully,

Mark J. Frondorf

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: Oppose Emergency Rule That Weakens Water Quality Standard

From: Shannon Holliday [mailto:snholliday@gmail.com]
Sent: Tuesday, March 26, 2013 11:58 AM
To: DEP Comments
Subject: Oppose Emergency Rule That Weakens Water Quality Standard

As a lifelong West Virginia resident, I wish to publicly comment that I oppose the ruling that would weaken WV water quality standards. I believe the WV Department of Environmental Protection has an obligation to protect the public's interest, rather than the interests of a small number of polluters who do not wish to pay to treat their waste. I live on the Potomac River and already avoid swimming and other recreational use of the river because I fear the level of pollution is dangerous to public health. Allow increased pollution in WV streams is a step in the absolute wrong direction. Please protect water quality, ecological balance, public health, and the beauty of our state by opposing such a weakening of quality standards.

Thank you,

Shannon Holliday
PO Box 1775
Shepherdstown, WV 25443

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: Oppose proposed DEP's Emergency Rule regaredm Aluminum and Beryllium

From: Reger-Nash, Bill [mailto:wreger@hsc.wvu.edu]
Sent: Tuesday, March 26, 2013 11:55 AM
To: DEP Comments
Cc: Reger-Nash, Bill
Subject: Oppose proposed DEP's Emergency Rule regaredm Aluminum and Beryllium

Dear Mr. Coyne:

Is WV not plagued with enough health problems?

As a public health professional, I Oppose DEP's Emergency Rule That Weakens Water Quality Standards for Aluminum and Beryllium. The proposed Emergency Rule change would weaken the West Virginia water quality standards in 47CSR2 for acute and chronic aluminum toxicity to aquatic life and the human health (Category A) criterion for beryllium.

The proposed revisions allow for a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. The Emergency Rule fails to:

1. **Protect the "designated use" of WV streams as required under the federal Clean Water Act.**
2. **Protect the public's interest, rather than the interests of a small number of polluters who do not wish to pay to treat their waste.**
3. **Provide adequate public participation in the rulemaking process.**

In short, there is no emergency that justifies the promulgation of this rule. And there is no science showing that the changes protect designated stream use and public health.

What must we do to survive in our state? This rule would further endanger our health.

Be well.

Bill Reger-Nash, EdD
Professor Emeritus

Walk 30 to 60 minutes daily.
Feel the Power of Half an Hour.

West Virginia University
School of Public Health
Room 3812 E, Health Sciences South
One Medical Center Drive
Morgantown, WV 26506-9190
Phones: Office - 304-293-0763; Cell - 304-685-6740

Email: wreger@hsc.wvu.edu
Home Page: http://publichealth.hsc.wvu.edu/BillRegerNash/
School of Public Health Home Page: http://publichealth.hsc.wvu.edu/pages/

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: Comments on emergency rule for water

From: Carl [mailto:carl@allgetout.com]
Sent: Tuesday, March 26, 2013 11:24 AM
To: DEP Comments
Subject: Comments on emergency rule for water

Kevin R Coyne:

I am a concerned resident of West Virginia, living in Randolph County full time. As a nurse and father, I have a vested interest in the public health. As an owner of a vacation rental business, I need clean water in my county and state - if I am to prosper as a business person in the largest growth sector of our states economy. I do not support water rules that favor extractive industry and compromise human health and the tourism sector in a state that has so great a need the way that West Virginia does.

I oppose the proposed emergency rule that would allow greater than a 13-fold and 46-fold increase over the current criteria for acute and chronic aluminum toxicity to aquatic life respectively. I find that this is not only ridiculous and rash as a decision but does nothing to look at our states need for true water quality and quantity standards. This proposed rule does not protect the "designated use" of WV streams as required under the federal Clean Water Act, which will only get our state in trouble, as we have seen before, with the EPA. The proposed rule does not protect the public's interest, but provides unfair concessions to industries that do not wish to pay to treat their waste and already pay inadequate "bond" to police their processes.

Further, this emergency rule does not provide adequate public participation in the rule making process. There is only one hearing, at the capitol, and this is being pushed through on a short time frame. The public needs and deserves an explanation on what this means and a through comment period in oder to evaluate the direction that this type of rule making would take us towards. I might expect a similar process or timeline from midnight legislation in the the house this time of year, but not from the department of environmental protection. (dep)

There is no emergency that justifies the promulgation of this rule. And there is no science showing that the changes protect designated stream use and public health. Stop this now, I oppose this in the strongest of ways and will be alerting other voters as well.
Thank you for the opportunity to comment.

Carl Bolyard
222 Elm Street
Elkins, WV. 26241
304.637.5290

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: Emergency Rule

-----Original Message-----
From: Steve [mailto:smalafy@gmail.com]
Sent: Tuesday, March 26, 2013 11:23 AM
To: DEP Comments
Subject: Emergency Rule

I am against the emergency rule that will weaken water quality standards to benefit a few companies and endanger aquatic wild life. the present standards should be upheld.
Sincerely,
Steve Malafy
French Creek,WV 26218

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: Water Quality Standards-Emergency Rule

From: hlblly@frontiernet.net [mailto:hlblly@frontiernet.net]
Sent: Tuesday, March 26, 2013 10:46 AM
To: DEP Comments
Subject: Water Quality Standards-Emergency Rule

Attention: Kevin R. Coyne

I am writing to oppose the proposed Emergency Rule which will weaken the water quality standards for West Virginia rivers and streams. This rule would harm acquadic life and human health by lowering standards for acute and chronic aluminum toxicity and beryllium. There is no emergency that justifies the promulgation of this rule and it appears to only serve the interests of those polluters who are trying to get out of paying to treat the waste their operations cause. Any changes should go through the normal rulemaking process.

Thank you for allowing me to comment.

Rita Lewis
65 Grannies Creek Road
Newton, WV 25266

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:40 AM
To: Coyne, Kevin R
Subject: FW: al rule

From: Paul Baker [mailto:paulfran3@gmail.com]
Sent: Tuesday, March 26, 2013 10:38 AM
To: DEP Comments
Subject: al rule

Mr. Coyne, DEP, et al,

The proposed emergency rule on the aluminum standard might very well be extremely bad for water quality. As I see it there is not sufficient scientific evidence to go through with this rule change. You might want to consider who you work for ,the people of West Virginia not the coal industry. Also recall that you work for the Department of Environmental Protection not the Department of Environmental Destruction!

Paul J Baker
438 Gristmill Road
Fairmont, WV 26554
304 363 7338

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:41 AM
To: Coyne, Kevin R
Subject: FW: Emergency Rule Affecting Water Quality Standards in 47CSR2

Importance: High

From: Barbara B Frierson [mailto:b03b13f@msn.com]
Sent: Tuesday, March 26, 2013 9:57 AM
To: DEP Comments
Subject: Emergency Rule Affecting Water Quality Standards in 47CSR2
Importance: High

WV DEP
Division of Water and Waste Management
RE: Emergency Rule Proposal on Aluminum and Beryllium

I am writing to strongly OPPOSE weakening the West Virginia water quality standards in any way! I OPPOSE weakening the rules for aluminum and beryllium, and especially doing so in this invalid and underhanded way through the "Emergency Rule" process.

It is my understanding that these proposed changes are not based on any recognizable "emergency," will allow a huge increase in the levels of these metals in our waters, and will affect both wildlife and public health if permitted.

The Department of Environmental Protection has a very regrettable history of bending to the will of the coal and chemical industries in this state, allowing severe damage to the environment rather than protecting it. That the agency is attempting to pass such a rule change through the emergency process without providing extensive public participation and comment is outrageous. You are in violation of your own department's mission.

I oppose this rule change, and demand that all such proposals at least go through the normal rulemaking process.

Sincerely,

Barbara Frierson
811 Dinden Drive
Saint Albans, WV 25177

304 722 4731
b03b13f@msn.com

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:41 AM
To: Coyne, Kevin R
Subject: FW: Oppose DEP's Emergency Rule on water quality standards for aluminum and beryllium

From: Marian Buckner [mailto:marianb3@frontiernet.net]
Sent: Tuesday, March 26, 2013 8:30 AM
To: DEP Comments
Subject: Oppose DEP's Emergency Rule on water quality standards for aluminum and beryllium

Dear Sir or Madam:

I am a resident of WV (104 Wildflower Lane, Shepherdstown. I strongly urge you to oppose DEP's Emergency Rule that weakens water quality standards for aluminum and veryllium. This Emergency Rule fails to protect the "designated use" of WV streams as required under the federal Clean Water Act.

Rather than protecting the public's interest, it protects the special interests of a small number of polluters who do not wish to pay to treat their waste.

Sincerely, Marian Buckner

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 9:41 AM
To: Coyne, Kevin R
Subject: FW: Aluminum Criteria Change

From: Carol Nix [mailto:almostnixie@cs.com]
Sent: Monday, March 25, 2013 11:00 PM
To: DEP Comments
Subject: Aluminum Criteria Change

This comment is in regard to the "emergency rule" on aluminum criteria change to 47CSR2. This rule change, in this manner ("emergency rule,") although approved as such by the Attorney General, undermines the credibility of the DEP when it circumvents normal procedures. The hard-working professionals at the DEP deserve to have their opinions evaluated fairly, and this method of proceeding undermines the public's trust in the department, and for this reason alone the changes should be abandoned. The standards have been in effect since 1988, but now it's an emergency?

The pH criteria 6.5-9.0 is a fairly large spread. Does the science support allowing increased aluminum at all pH levels? Upon what do you base your science? Are there citations somewhere that I missed? I read the proposed changes but didn't read where there were any rigorous field studies supporting your claims. Should we proceed with an untested standard and possibly further degrade water quality in a state whose water is already widely degraded? It is of more benefit to the state's citizens to insure clean water than to ensure profits to polluters who have historically taken their profits elsewhere and left us residents with their pollution. Thank you for considering my comments, and thanks for your service.-- Carol Nix, 624 Stony Run, Independence, WV 26374

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 11:03 AM
To: Coyne, Kevin R
Subject: FW: comments for public hearing today
Attachments: Dep Comments 3-27-13.pdf

From: Gary Zuckett [mailto:garyz@wvcag.org]
Sent: Wednesday, March 27, 2013 9:43 AM
To: DEP Comments
Cc: DSGJr@aol.com; Denise Poole
Subject: comments for public hearing today

HI,

I will not be able to attend, here are comments from our organization

Gary Zuckett

Kevin R Coyne
Water Quality Standards Program
WV Dept. of Environmental Protection
601 57th Street SE, Charleston, WV 25304

March 27th 2013

Dear Mr.Coyne,

West Virginia Citizen Action Group (WV-CAG) is a state wide consumer and environmental advocacy organization founded in 1974. WV-CAG has members in all 55 counties in the state. For nearly 40 years we have advocated for better public policy, the rights of individuals, a clean environment and a stronger democratic process.

Our organization over the years has played a key role in the evolution of the legislative review process. We believe that the WV DEP Division of Water and Waste Management's filing an emergency rule for aluminum and Beryllium would weaken State water quality standards for no plausible reason and significantly subverts the legislative intent of the emergency rule process.

The proposed revisions are draconian and equate to an exponential increase over current standards for acute and chronic aluminum toxicity to aquatic life as well as the human health criterion for beryllium. The DEP has failed justify the emergency rule filing that circumvents adequate public participation and scrutiny in the rule making process for this very important public policy issue.

In addition, after reading the comments circulated by Appalachian Mountain Advocates, et al, dated today, we feel it unnecessary to reiterate their detailed analysis and would indicate here that we agree wholeheartedly with the comments stated therein.

In summary, we urge the DEP to reject the special interests pushing the agency's action and withdraw the emergency rule request.

Sincerely,

Gary R Zuckett, Executive Director, WV Citizen Action Group
1500, Dixie St, Charleston, WV 25311

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 3:34 PM
To: Coyne, Kevin R
Subject: FW: emergency rule

From: Jean [mailto:chesbayretr@juno.com]
Sent: Wednesday, March 27, 2013 3:21 PM
To: DEP Comments
Subject: emergency rule

I am writing to express my opposition to the Emergency rule that would allow higher levels of aluminum in the water.

I think that it is very important to safe gueard the water in the streams and rivers of West Virginia. there are already much stress on aquatic life due to various pollutants including metals, phrmaceuticals and organic waste.

The rivers and streams provide drinking water for people. They also many recreational opportunities such as fishing, swimming, kayaking, rafting, etc. There are many tourist dollars spent in West Virginia by people who come to enjoy the recreation on the rivers and streams.

Jean McAulay
10315 Geranium Ave
Adelphi, Md. 20783

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 3:35 PM
To: Coyne, Kevin R
Subject: FW: Beryllium and aluminum toxicity rule change comment

From: Allen Johnson [mailto:allen@christiansforthemountains.org]
Sent: Wednesday, March 27, 2013 3:05 PM
To: DEP Comments
Subject: Beryllium and aluminum toxicity rule change comment

WVDEP, Division of Water and Waste Management,

It has come to my attention that your agency is proposing an Emergency Rule with the WV Secretary of State that would substantially weaken Aluminum toxicity standards for aquatic life and Beryllium human health criteria.

I have an undergraduate degree in Biology, with concentration in Limnology, and a Masters Degree in Theology with concentration on public policy. From a scientific standpoint, I feel obligated to question rulings that undercut established science in order to protect an extractive industry. From a theological standpoint, pollution that can be substantially detrimental to ecological health and human health is morally unacceptable and sinful.

It is common knowledge that the WVDEP is heavily influenced by the coal industry. I see this "Emergency" as yet another example. Examine your conscience, please.

Allen Johnson
Rt. 1 Box 119-B
Dunmore, West Virginia 24934

(304) 799-4137

Coyne, Kevin R

From: DEP Comments
Sent: Wednesday, March 27, 2013 3:35 PM
To: Coyne, Kevin R
Subject: FW: WV WQS Emergency Rule - Dominion Comments
Attachments: WVDEP WQS Emergency Rule Dominion Comments.pdf

From: Dennis A Slade [mailto:dennis.a.slade@dom.com]
Sent: Wednesday, March 27, 2013 1:53 PM
To: DEP Comments
Cc: Pamela Faggert; Paula A Hamel; Sarah Cosby
Subject: WV WQS Emergency Rule - Dominion Comments

Mr. Coyne,

Please find attached Dominion's comments on the West Virginia Department of Environmental Protection Emergency Rule Regarding Requirements Governing Water Quality Standards, 47CSR2.

We appreciate the opportunity to provide comments on this emergency rule.

Kind regards,

Dennis A. Slade
Environmental Consultant
Dominion - Environmental Policy
5000 Dominion Boulevard
Glen Allen, VA 23060
(804) 273-2658
(804) 317-7079 mobile
dennis.a.slade@dom.com
Please consider the environment before printing this email

of this information is prohibited and may be unlawful. If you have received this electronic transmission in error, please reply immediately to the sender that you have received the message in error, and delete it. Thank you.

BY ELECTRONIC DELIVERY
E-mail: dep.comments@wv.gov

March 27, 2013

Mr. Kevin Coyne
Water Quality Standards
West Virginia Department of Environmental Protection
601 57th Street, S.E.
Charleston, WV 25304

RE: Emergency Rule Regarding Requirements Governing Water Quality Standards, 47CSR2

Dear Mr. Coyne:

Dominion appreciates the opportunity to submit comments on the West Virginia Department of Environmental Protection's (WV DEP's) proposal for an Emergency Rule to revise the Requirements Governing Water Quality Standards at 47CSR2 (Emergency Rule). Dominion is the owner and operator of Mount Storm Power Station, a power generating facility located in Mount Storm, West Virginia. Wastewater discharges from the station are covered under a National Pollutant Discharge Elimination System (NPDES) permit and are discharged to receiving streams that are protected by the water quality standards which are the subject of the proposed Emergency Rule.

The proposed Emergency Rule will revise the dissolved aluminum criteria and the human health Category A beryllium criterion. Dominion supports passage of the Emergency Rule and agrees with the WV DEP that, without its passage, members of the regulated community may incur unnecessary treatment costs and subject some of the State's waters to inclusion on the U.S. Environmental protection Agency's (EPA's) list of impaired waters when such waters are not adversely impacted.

Specifically, Dominion concurs with the scientific studies referenced in DEP's Emergency Rule justification that dissolved aluminum toxicity has a direct relationship to hardness. In fact, the new hardness-based standards passed in Colorado and New Mexico and the EPA's subsequent approval of these approaches provides persuasive support for approval of the Emergency Rule. Additionally, the proposed hardness-based approach offers a water quality calculation that more appropriately relies on site-specific characteristics as opposed to the existing one-size-fits-all numeric criteria. By moving from the existing numeric criteria to a hardness-based approach, the standards proposed under the emergency rule will offer certain increased protections to the

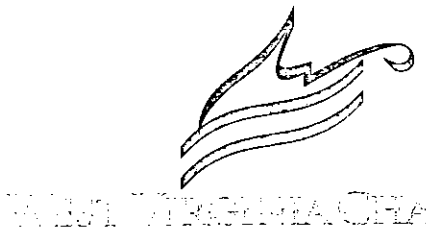
aquatic environment than provided under the existing standards with respect to low hardness environments.

The proposed Emergency Rule sets surface water quality standards that safeguard public health and the environment while fostering agricultural growth, a strong industrial sector, and the employment opportunities that result from both agriculture and industry in West Virginia.

For these reasons, Dominion respectfully requests approval of the Emergency Rule amending water quality standards under 47CSR2 regarding the criteria for dissolved aluminum and beryllium. Dominion also supports a permanent revision to the standards upon consideration as part of the 2014 Triennial Review for both legislative and EPA approval. Please feel free to call me at (804) 273-3467 or Sarah Cosby at (804) 273-3012 if you have any questions.

Sincerely,

Pamela F. Faggert



March 26, 2013

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

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

Re: Comments on Emergency Rule for Dissolved Aluminum and Beryllium Criteria

Dear Mr. Coyne:

Thank you for the opportunity to provide comments on the DEP's proposed revisions to the dissolved aluminum criteria and human health category A beryllium criterion. These comments are filed on behalf of the West Virginia Chamber of Commerce ("the Chamber"). The Chamber is West Virginia's largest, most influential general business organization, representing all business sectors in every region of the State. Members range from small business enterprises to mid-sizes manufacturers to tourism destinations to energy companies to Fortune 500 corporations. However, small businesses are the core of our membership - making up 85 percent of the Chamber's companies and firms.

The Chamber applauds the agency's work in developing these revised criteria. The revisions are scientifically justified and make West Virginia's regulatory approach to these criteria consistent with other areas of the country. The Chamber supports such common sense rulemaking. The Chamber urges the agency to continue to carefully examine other water quality standards and policies to ensure they are scientifically justified and strike an appropriate balance between environmental protection and fostering a healthy economy.

The Chamber appreciates the opportunity to offer these written comments. The Chamber reserves the right to present additional comments at future public hearings on this topic. If you have any questions, please feel free to contact me.

Sincerely,

Thomas M. Boggs
Vice President

1624 Kanawha Blvd. East • Charleston, WV 25311 wvchamber.com PHONE 304.342.1115 FAX 304.342.1130

Coyne, Kevin R

From: DEP Comments
Sent: Monday, April 01, 2013 2:05 PM
To: Coyne, Kevin R
Subject: FW: Materion Brush Inc. comments on West Virginia DEP's review of its Beryllium Water Quality Standard
Attachments: MBI comments on WV DEP Proposed Beryllium Water Quality Standard 3-27-2013.pdf

From: Marc.Kolanz@materion.com [mailto:Marc.Kolanz@materion.com]
Sent: Wednesday, March 27, 2013 4:03 PM
To: DEP Comments
Subject: Materion Brush Inc. comments on West Virginia DEP's review of its Beryllium Water Quality Standard

Mr. Kevin Coyne
Water Quality Standards
West Virginia DEP
601 57th Street, S E.
Charleston WV
25304

Re: Review of West Virginia Beryllium Water Quality Standard

Dear Mr. Coyne,

Materion Brush Inc. hereby submits the attached comments on West Virginia DEP's review of its Beryllium Water Quality Standard.

Please reply confirming receipt of this e-mail and feel free to contact me at (216) 383-6848 if there are any questions regarding these comments.

Very truly yours,

Marc E. Kolanz

Marc E. Kolanz
Vice President, Environmental Health & Safety
Marc.Kolanz@materion.com
p: 216.383.6848
m: 216.952.7623
f: 216.383.4091

Materion Brush Inc.
6070 Parkland Boulevard
Mayfield Heights, OH 44124
www.materion.com

COMMENTS OF MATERION BRUSH INC. ON WEST VIRGINIA DEP PROPOSED REVISION OF THE WATER QUALITY STANDARD FOR BERYLLIUM

March 27, 2013

Marc E. Kolanz
Vice President,
Environmental Health & Safety
Materion Brush Inc.
6070 Parkland Boulevard
Mayfield Heights, Ohio 44124
(216) 383-6848

SUMMARY

West Virginia DEP's proposal to revise the water quality standard for beryllium is a step in the right direction in that the current standard of 0.0077 ug/l is overly conservative and not derived from any currently promulgated drinking water standard. The proposed adoption of the current Maximum Contaminant Level Goal (MCLG), while based on a current drinking water standard, is overly protective and exceeds naturally occurring levels of beryllium reported in surface waters.

COMMENT

West Virginia's water quality standards are intended to be protective of both aquatic life and human health based on the designated use of the surface water. The proposed revision of the water quality standard is limited to those waters designated as public water supplies for which standards necessarily should be protective of human health. It is clear that the current standard to be applied to waters designated for use as a public water supply is overly conservative in that it is over 500 times lower than EPA's current MCLG for beryllium. For this reason alone, it is appropriate to revise the beryllium standard for waters designated for use as a public water supply.

Materion Brush's (Materion) interest in water quality standards for beryllium is not surprising. Materion is the only fully integrated supplier of beryllium, beryllium alloys and beryllia ceramic in the world. Since its founding in 1931, Materion has concentrated its operations on advancing the unique performance capabilities and applications of beryllium-based materials. Beryllium is a unique material exhibiting physical and mechanical properties unmatched by any other metal. It is one of the lightest structural materials known, yet has specific stiffness six times greater than steel. It possesses high heat absorbing capability and has dimensional stability over a wide range of temperatures. Equipment used in fields such as medicine, aerospace, national defense, computers and telecommunications all rely on beryllium-containing materials. Materion's research efforts are a testament to its belief that standards for exposure to beryllium should be protective of human health and the environment. However, being heavily engaged in such research, Materion is sensitive to the adverse consequences of risk-based standards that are set well below levels necessary for such protection. Materion believes that the current water quality standard for waters designated for use as public water supplies for beryllium falls into this category and should be raised. While Materion supports the proposed revision, it is compelled to point out that, as explained below, because it is based on the MCLG and RfD for beryllium, even the proposed new standard is more conservative than necessary. Accordingly, there should be no hesitation in adopting the proposed revision.

The stringency of the drinking water standard for beryllium being relied on by West Virginia DEP is startling in light of this statement in the 1998 IRIS beryllium health assessment: "No human information on the oral toxicity of this compound was located." There is, of course,

an adequate amount of data on human oral exposure to beryllium, as beryllium is commonly found in foods and water supplies. See, e.g., ATSDR Toxicological Profile for Beryllium pp. 97-93 (beryllium concentrations in water, soil and food). Indeed, such exposure has occurred since the origin of the human species. Against this exposure data, the lack of oral toxicity evidence in humans speaks volumes, yet this point is ignored in computing both the IRIS RfD and the drinking water standards for beryllium. This approach is not only scientifically near-sighted but perverse, as the resulting drinking water standard leads to trivial reductions in water supplies at significant costs. The standard is lower than necessary to protect the public from beryllium toxicity and is lower than the naturally occurring level of beryllium in many water sources. See Draft ASTDR Toxicological Profile for Beryllium 170 (Sept. 2000) (citing concentrations of dissolved beryllium in groundwater at 352 of 504 sites in the United States at an average concentration of 13.6 ug/l and in 85 of 504 surface water sites in the United States at an average concentration of 23.8 ug/l).

The stringency of the drinking water standard and RfD for beryllium arises solely from EPA's selective use of animal data and application of ultra-conservative assumptions. In the case of the drinking water standard, it was chiefly the use of the Morgareidge[i] study and the application of the largest possible safety factor "for possible carcinogenic potential of this contaminant via ingestion" despite the fact that all animal ingestion carcinogenicity studies were negative. In the RfD, it was chiefly the extrapolation and multiplier effect of a series of safety or uncertainty factors. In computing the drinking water standard, EPA used an uncertainty factor of 100. In computing the RfD, EPA has increased the uncertainty factor to 300. In other words, as EPA has obtained more and better scientific data, it has increased the uncertainty factor used in computing the reference dose. This increase is counter-intuitive and unwarranted.

The assigning of arbitrary uncertainty factors is simply not science and it is important to remember that the word "extrapolation" means "beyond the evidence." In fact, on September 12, 2011, a scientific peer review panel convened by the USEPA to evaluate the draft, *Guidance for Applying Quantitative Data to Develop Data-Derived Extrapolation Factors for Interspecies Extrapolation*, recommended that the USEPA continue its efforts to encourage risk assessors to use scientific data rather than automatic presumptions as they estimate the level of a chemical that is not likely to harm health.[ii]

In conclusion, there is no legitimate reason not to revise upward the water quality standard for beryllium as applicable to waters designated as public water supplies. The proposed overly protective standard of 4 ug/l is at least a start in eliminating adverse consequences to both the regulated community and the agency while adequately protecting human health and the environment.

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[i] Morgareidge K. Chronic Feeding Studies with Beryllium in Dogs. Food and Drug Research Laboratories, Inc. (1976).

[ii] Rizzuto, P., BNA Daily Environment Report 09/13/2011

Coyne, Kevin R

From: Petra&John Wood <pbjmwood@gmail.com>
Sent: Sunday, March 31, 2013 1:41 PM
To: Coyne, Kevin R
Subject: Fwd: proposed emergency rule change to the dissolved aluminum water quality standard (WQS) criteria
Attachments: Wood-47CSR2-emergency rule change-dissolved aluminum.pdf

Hello Mr. Coyne,

I was not sure if "dep.comments" would forward a copy of the attached comments to you because they were emailed about seven hours after the public hearing started (see below). I believe our comments contain important supplemental information that should be included in the public record. Please take the time to read our comments if you haven't already.

Thanks,
John Wood

---------- Forwarded message ----------
From: **Petra&John Wood** <pbjmwood@gmail.com>
Date: Thu, Mar 28, 2013 at 12:20 AM
Subject: proposed emergency rule change to the dissolved aluminum water quality standard (WQS) criteria
To: dep.comments@wv.gov

Please accept the following public comments regarding West Virginia's proposed emergency rule change to the dissolved aluminum water quality standard (WQS) criteria.

Thank You,
John M. Wood and Petra B. Wood

John M. and Petra B. Wood
P.O. Box 271
Cassville, WV 26527

27 March 2013

Kevin Coyne
Water Quality Standards
WV DEP
601 57th Street, S.E.
Charleston, WV 25304
dep.comments@wv.gov

Mr. Coyne:

Please accept the following public comments regarding West Virginia's proposed emergency rule change to the dissolved aluminum water quality standard (WQS) criteria.

An emergency rule has been proposed to change the dissolved aluminum Acute Aquatic Life Criterion[1] (currently 0.750 mg/l) and the Chronic Aquatic Life Criterion[2] (currently 0.750 mg/l for warm waters and 0.087 mg/l for cold waters) to a sliding scale based on hardness and pH values in the range of 6.5 to 9.0 standard units. WVDEP's justification states *with particularity* those facts and circumstances which make the emergency rule necessary to prevent substantial harm to the public interest to be "Unnecessary treatment costs for a portion of the regulated community and the inclusion of many waters on the DEP's 303(d) list that are not impaired...". We emphatically disagree with this justification because it is not in the public interest; rather, it is in the private interest of industry polluters. Its sole purpose is to externalize the costs of pollution control, kicking the can down the road for future West Virginia taxpayers to assume.

It *is* in the public interest that any proposed changes to 47 CSR §2 explicitly define how and when those changes apply to WSQ criteria. "Because 304(a) aquatic life criteria are national guidance, they are intended to be protective of the vast majority of the aquatic communities in the United States."[3] The national WQS criteria for aluminum are expressed in terms of **total recoverable** metal in the water column: 0.750 mg/l Criteria Maximum Concentration (CMC), and 0.087 mg/l Criterion Continuous Concentration (CCC). With regards to the CCC for total recoverable aluminum, the national criteria have a footnote indicating that:

> "There are three major reasons why the use of **Water-Effect Ratios** might be appropriate. (1) The value of 87 µg/l is based on a toxicity test with the striped bass in water with pH= 6.5-6.6 and hardness <10 mg/L. Data in "Aluminum Water-Effect Ratio for the 3M Plant Effluent Discharge, Middleway, West Virginia" (May 1994) indicate that aluminum is substantially less toxic at higher pH and hardness, but the effects of pH and hardness are not well quantified at this time. (2) In tests

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[3] http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

with the brook trout at low pH and hardness, effects increased with increasing concentrations of total aluminum even though the concentration of dissolved aluminum was constant, indicating that total recoverable is a more appropriate measurement than dissolved, at least when particulate aluminum is primarily aluminum hydroxide particles. In surface waters, however, the total recoverable procedure might measure aluminum associated with clay particles, which might be less toxic than aluminum associated with aluminum hydroxide. (3) EPA is aware of field data indicating that many high quality waters in the U.S. contain more than 87 µg aluminum/L, when either total recoverable or dissolved is measured."[4] (**emphasis added**).

Simply basing a dissolved aluminum Aquatic Life Criterion on an equation derived from the hardness level of the water is not the same as applying a Water-Effects Ratio (see USEPA 1997). In the public interest, any proposed changes to the dissolved aluminum criteria would need to clearly state in 47 CSR §2 how and when Water-Effect Ratios would be applied to the proposed dissolved aluminum WQS criteria.

As scientific justification for this emergency rule change, WVDEP states that "...numerous scientific studies have validated the impact of hardness as it relates to the aquatic community. These studies were recently utilized to update and justify new hardness based approaches to dissolved aluminum criteria in Colorado and New Mexico, and subsequently these approaches have been approved by both the respective EPA regions and EPA headquarters. These same studies can be used to validate a relationship between the hardness concentration of West Virginia's waters and the toxicity of dissolved aluminum in waters within a pH range of greater-than or equal to 6.5 to less-than or equal to 9.0." WVDEP's justification is misleading, if not erroneous, because the majority of studies on the biological toxicity of dissolved aluminum have been confined to trout and/or salmon species in streams with a pH <6.5. Included below is peer-reviewed scientific evidence that Appalachian streams with pH >6.5 exhibit biological impairment due to dissolved aluminum concentrations that are much lower than the proposed, hardness-based WQS criteria.

Soucek et al (2002) observed the virtual elimination of the perlid stonefly, *Acroneuria*, downstream of an AMD impacted tributary in the North Fork of the Powell River in southwestern Virginia, where average values for pH, conductivity, alkalinity, and hardness were consistent throughout the system with average values of 7.9 ± 0.1, 486 ± 56 µS/cm, 75 ± 22 mg/L as CaCO3, and 165 ± 5 mg/L as CaCO3, respectively. According to their analyses, "the factor most strongly correlated with variation in *Acroneuria* sp. numbers from site to site during both sampling seasons was total Al in the water column. While Al generally is not thought to be a toxic influence in neutral pH surface waters because of its low solubility, studies suggesting otherwise are accumulating. These include laboratory studies with *Daphnia magna* (Havas 1985), and mixing zone studies with fish (Rosseland *et al.* 1992). In addition, recent work (Campbell *et al.* 2000) indicates that snail behavior is significantly altered by grazing upon extracellular mucopolysaccharides that have bound polyhydroxy-Al at neutral pH. Furthermore, we have observed acute toxicity to *Ceriodaphnia dubia* at pH > 7.0 when organisms were exposed to ~1.3 to 2.8 mg Al/L shortly after acidic solutions were diluted and neutralized (Soucek *et al.* 2001). The Criterion Continuous Concentration (CCC) for Al (the estimate of the highest concentration to which aquatic communities can be exposed indefinitely without unacceptable effects) is 87 µg/L at pH 6.5 to 9.0 (U.S. EPA 1999). While the average Al concentration downstream of Stone/Straight Creek was only 50 µg/L, individual

[4] http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

measurements at this site were as high as 89.9 µg/L. Chronic continuous exposure to these concentrations of Al may be toxic to perlid stoneflies."

MacCausland and McTammany (2007) found that density and number of macroinvertebrate families, genera, and Ephemeropteran, Plecopteran, and Trichopteran (EPT) families were significantly lower downstream of mined areas than at upstream reference sites, where the dissolved aluminum concentrations averaged 0.05-0.1 mg/l at reference sites, 0.1-1.4 mg/l at "episodic" AMD sites, and 0.2-0.5 mg/l at "chronic" AMD sites even though the stream pH was lower at two of the three reference sites (4.91, 6.01, and 7.07) than at the at the "episodic" (5.04, 6.24) and "chronic" (6.34, 6.53) AMD sites. They speculated that aluminum concentrations were relatively low at upstream reference sites — even though the pH was low — "...due to high dissolved organic carbon, which makes aluminum less toxic (Dangles et al., 2004)" and that this "...provided us with an idea of what the invertebrate community could look like in a stream with low pH but low metal contamination." MacCausland and McTammany (2007) also noted that "In many mine drainage streams with relatively high pH, precipitated iron and aluminum may coat the stream substrate and cause unstable habitat for macroinvertebrates (Warner, 1971; Koryak et al., 1972; Hoehn and Sizemore, 1977; Moon and Lucostic, 1979; McKnight and Feder, 1984; Earle and Callaghan, 1998)."

Freund and Petty (2007) noted that streams began exhibiting ecological impairment—based on WVSCI scores—with dissolved aluminum, iron, manganese, and nickel concentrations as low as 0.16, 0.22, 0.34, and 0.020 mg/L, respectively; and at sulfate concentrations as low as 50 mg/L and at specific conductance levels of 144 µS/cm. They also noted that "All indications from this study and previous studies (Maret and MacCoy 2002; Clements 2004; Merovich and Petty, 2007) suggest that the combination of many dilute stressors can interact to produce biological impairment even in streams where no single chemical constituent exceeds water quality criteria. This is an important water quality management issue that must be addressed if we are to ever be successful restoring and protecting biological life uses of streams in mined watersheds".

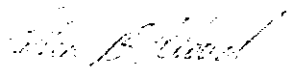
Gerritsen et al (2010) identified dissolved aluminum toxicity stress-response threshold effects based on a statistical analysis of state-wide West Virginia data with a "plausible threshold" at median concentrations >0.2 mg/l, "substantial effects" at median concentrations >0.4 mg/l, and "sustained effects" at minimum concentrations >0.4 mg/l. They also calculated 95% change-point confidence-interval estimates for dissolved aluminum concentrations at which genus-level macroinvertebrate metrics began to decline. The lower 95% confidence limits of those confidence intervals, listed in the table below (from their table A-1), ranged from 0.04 to 0.135 mg/l dissolved aluminum. With the exception of Percent EPT, all of the upper 95% confidence limits within the entire pH range examined (pH 6.0-9.0) were ≤ 0.545 mg/l of dissolved aluminum.

Metric	**95% CI of Dissolved aluminum (mg/l)**	
	Entire pH range	**pH ≤ 6**
Percent Ephemeroptera	0.040—0.452	0.051—6.31
Number of Ephemeroptera genera	0.043—0.310	0.061—3.775
Percent EPT	0.505—9.825	0.5—9.925
Total number of genera	0.135—0.535	0.11—9.251
Number of EPT genera	0.0622—0.545	0.095—6.31

Moreover, aluminum may be adversely affecting bottom feeders. For example, Cravotta (2005) observed that "Elevated concentrations of iron, manganese, aluminum, strontium, copper, nickel, and zinc in whole white sucker sampled from Mahanoy Creek near Gowen City indicate potential for sediment-derived metals to accumulate in aquatic organisms."

All of the above-cited studies suggest that biological impairment due to dissolved aluminum concentrations can occur in neutral to basic streams (pH 6.5—9.0). However, even if the proposed standards were to be approved by EPA, the proposed dissolved aluminum WQS criteria cannot apply to existing NPDES permits with existing effluent limits for aluminum. To do so would violate the anti-backsliding provision of the Clean Water Act which precludes any permit modification to "contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit." 33 U.S.C. § 1342(o). For all of these reasons, we believe that the proposed amendments to West Virginia's dissolved aluminum WQS criteria *may* avoid substantial economic harm to both the regulated community and the agency, but they *will not* maintain the level of protection necessary for its aquatic life. We believe that the public interest will be best served if WVDEP withdraws the dissolved aluminum amendments from 47 CSR §2.

Sincerely,



John M. and Petra B. Wood

Literature Cited

Cravotta CA, III (2005) Effects of Abandoned Coal-Mine Drainage on Streamflow and Water Quality in the Mahanoy Creek Basin, Schuylkill, Columbia, and Northumberland Counties, Pennsylvania, 2001. USGS Scientific Investigations Report 2004-5291. 66pp.

Freund JG and Petty JT (2007) Response of fish and macroinvertebrate bioassessment indices to water chemistry in a mined Appalachian watershed. Environ. Manage. 39:707-720.

Gerritsen J., L. Zheng, J. Burton, C. Boschen, S. Wilkes, J. Ludwig, and S. Cormier. (2010) Inferring causes of biological impairment in the Clear Fork Watershed, West Virginia. U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment,Cincinnati, OH. EPA/600/R-08/146. 108pp.

MacCausland A, McTammany ME (2007) The impact of episodic coal mine drainage pollution on benthic macroinvertebrates in streams in the Anthracite region of Pennsylvania. Environ. Pollution 149:216-226.

Soucek DJ, Denson, BC, Schmidt TC, Cherry DS, Zipper CE (2002) Impaired *Acroneuria* sp. (Plecoptera, Perlidae) populations associated with aluminum contamination in neutral pH surface waters. Arch. Environ. Contam. Toxicol. 42:416-422.

USEPA (1997) Modifications to guidance site-specific criteria: Use of the WER procedure with hardness equations; A change in the recalculation procedure; and Optional considerations of life stage when a recalculation procedure is used. 21pp.
<http://water.epa.gov/scitech/swguidance/standards/upload/2003_08_06_standards_modif-int-wer.pdf>

Coyne, Kevin R

From: DEP Comments
Sent: Monday, April 01, 2013 2:04 PM
To: Coyne, Kevin R
Subject: FW: New aluminum levels

From: megan raddant [mailto:megusja@yahoo.com]
Sent: Thursday, March 28, 2013 1:53 PM
To: DEP Comments
Subject: New aluminum levels

Hi - I am writing on behalf of the Greenbrier Watershed Assoc. constituents in both Greenbrier and Pocahontas counties.

We are of course opposed to raising allowable aluminum levels.

- Protect the "designated use" of WV streams as required under the federal Clean Water Act.
- Protect the public's interest, rather than the interests of a small number of polluters who do not wish to pay to treat their waste.
- Provide adequate public participation in the rulemaking process.

We as always are concerned with the effects on water quality and the repercussions of higher levels as it relates to the food chain.

Please oppose the higher levels.

Megan Raddant
Greenbrier River Watershed Association
info@greenbrier.org

Coyne, Kevin R

From: DEP Comments
Sent: Monday, April 01, 2013 2:05 PM
To: Coyne, Kevin R
Subject: FW: 47CSR2

From: Liz Goertz [mailto:lizgoertz@yahoo.com]
Sent: Thursday, March 28, 2013 1:15 PM
To: DEP Comments
Subject: 47CSR2

In reference to 47CSR2, I am apposed to any weakening of the existing environmental safe guards to our water, or to circumventing the process already in place for reviewing such matters.

Coyne, Kevin R

From: DEP Comments
Sent: Monday, April 01, 2013 2:05 PM
To: Coyne, Kevin R
Subject: FW: Emergency Rule 47CSR2 Revision
Attachments: DEP Emergency Rule 3-26-13.doc

From: shy1wv [mailto:shy1wv@gmail.com]
Sent: Wednesday, March 27, 2013 7:00 PM
To: DEP Comments
Subject: Emergency Rule 47CSR2 Revision

Attached please find a comment letter expression concerns on the proposed revision to Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards.

UNLIMITED

March 27, 2013

Water Quality Standards Program
WV Department of Environmental Protection
601 57th St., S.E.
Charleston, WV 25304

RE: Emergency rule to revise Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards":

The Kanawha Valley Chapter of Trout Unlimited (KVCTU) is submitting the following comments in regard to DEP's proposed emergency rule to revise Legislative Rule 47CSR2, "Requirements Governing Water Quality Standards":

- KVCTU is opposed to any reduction of water quality standards that could potentially impact protections to B2 Trout Waters.

- KVCTU is concerned that the changes to the beryllium criteria are based on drinking water standards rather than those intended to protect aquatic health.

- KVCTU is concerned that the changes to the dissolved aluminum standard are based on pH and hardness levels. pH and hardness levels are not static on individual streams and can change dramatically. As an example, many of West Virginia's trout waters have dramatic pH swings resulting from seasonal run-off.

Thank you for your time and consideration.

Sincerely,

Steve Young, President KVCTU
P. O. 3914
Charleston, West Virginia 25339