

Cooper, Laura K

From: Jason Bostic <JBostic@wvcoal.com>
Sent: Thursday, July 30, 2015 5:14 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WVCA Comments on Proposed Changes to 47 CSR 2- State Water Quality Standards Rule, July 30, 2015
Attachments: WVCA Comments 47 CSR 2 WQStds Rule, July 30, 2015.pdf

July 30, 2015

**Laura Cooper, Assistant Director
West Virginia Department of Environmental Protection
Division of Water & Waste Management
601 57th Street
Charleston, WV 25304
Via Electronic Mail: Laura.K.Cooper@wv.gov**

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

Dear Ms. Cooper:

Pursuant to the public notice published by the West Virginia Department of Environmental Protection, attached please find the comments of the West Virginia Coal Association regarding the emergency and draft Legislative rule revisions to the state's water quality standards for aluminum and selenium.

Respectfully Submitted,

**Jason D. Bostic
Vice-President**



West Virginia Coal Association

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July 30, 2015

**Laura Cooper, Assistant Director
West Virginia Department of Environmental Protection
Division of Water & Waste Management
601 57th Street
Charleston, WV 25304
Via Electronic Mail: Laura.K.Cooper@wv.gov**

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

Dear Ms. Cooper:

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 and draft Legislative rule revisions to the state's water quality standards for aluminum and selenium.

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

West Virginia Coal Association

Comments on Revisions to Aluminum and Selenium Criteria

July 30, 2015

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 its scientific efforts to meet the Legislative mandates to develop Legislative and emergency rules for selenium and aluminum. WVCA believes the revisions to the aluminum and selenium criteria further advance 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, 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 toxicity to aquatic life decreases as the water hardness increases. The federal Environmental Protection Agency (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 aluminum standard that was approved by EPA in April 2012.¹ The State of Colorado received EPA approval of its hardness-based aluminum standard in August 2011.²

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.

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.

Selenium Criteria

WVCA completely supports WV DEP's efforts in the emergency and draft Legislative rule to adopt revised selenium criteria based on concentrations in fish tissue.

The procedure for preparing water quality criteria is set forth in EPA's 1985 *Guidelines for Deriving Numeric National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*. (1985 Guidelines) The 1985 Guidelines provide two options for preparation of numeric criteria. Both processes begin with the compilation of a database of all available, qualifying aquatic life toxicity studies. The adopted criteria can be based on two primary methodologies:

- Calculation of acute and chronic criteria through a multi-step process following a statistical methodology based on qualifying toxicity tests for all available aquatic life species; or
- In certain circumstances, if the calculated value for a commercially or recreationally important species is lower than the calculated acute and/or chronic criteria, the criteria may be lowered to protect the commercially or recreationally important species. (1985 Guideline, pp. 26, 42).

States have the responsibility for developing numeric water quality criteria. 40 CFR § 131.4(a).

While national recommended criteria are available for use by the States, the "Water Quality Standards Regulation allows States to develop numerical criteria or

modify EPA's recommended criteria to account for site-specific or other scientifically defensible factors." (EPA Water Quality Standards Handbook, Section 3.1.2.

In its external peer-reviewed draft selenium criteria, published in 2014, EPA specifically recognized the ability of States to modify national recommended criteria: "All four elements of the selenium criterion can be modified to reflect site-specific conditions where scientific evidence indicates that different values will be protective of aquatic life and provide for attainment of the designated uses." (EPA 2014 Draft Criteria, p. 100).

The beginning point for the derivation of the criteria for the State is the development of the database for the calculation of criteria. Typically, the process begins with the use of the EPA-approved database for the parameter of concern, in this case selenium. However, the current EPA national recommended criteria for selenium were published in 1999, and the database has not been officially revised since that date.

In 2013, Kentucky developed and adopted numeric criteria for selenium based on work done by GEI Consultants, Inc. The criteria developed by Kentucky were based upon an updated version of the EPA database for the 2004 draft selenium criteria. On November 15, 2013, EPA Region 4 approved Kentucky's chronic selenium criteria, which were developed following EPA's 1985 Guidelines.

In 2014, EPA prepared new pre-draft selenium criteria for scientific comment. GEI, along with many others, reviewed and offered scientific comments regarding studies utilized in EPA's 2014 database.

In 2015, GEI prepared chronic criteria for West Virginia following the 1985 Guidelines. GEI based its criteria calculations on EPA's draft 2014 database, with revisions related to GEI's review of the EPA database. In the 2015 criteria document, GEI states (p. 7):

Prior to proposing an updated chronic water quality standard using tissue-based criteria for West Virginia, EPA's 2014 draft criteria were evaluated. We reviewed the available chronic toxicity Se tissue data at the family level specific to the families of fish that occur (or would be expected to occur) in West Virginia waters (WV DEP 2015).

GEI only made three departures from EPA's 2014 database in its 2015 draft criteria:

- (1) The exclusion of Hermanutz (1992) for bluegills due to serious issues with the scientific validity of the test. Multiple commenters raised these concerns with EPA regarding this bluegill study in response to EPA's 2014 draft criteria.
- (2) The handling of fish that accidentally were lost from toxicity testing of brown trout due to a laboratory accident causing overflow from the test chambers. EPA assumed these fish had died and were deformed due to selenium exposure. GEI excluded these fish (324 lost of 11,130 fish) from the results of the toxicity testing.
- (3) GEI included an additional 2008 study for fathead minnows. This study does not affect the calculated criteria.

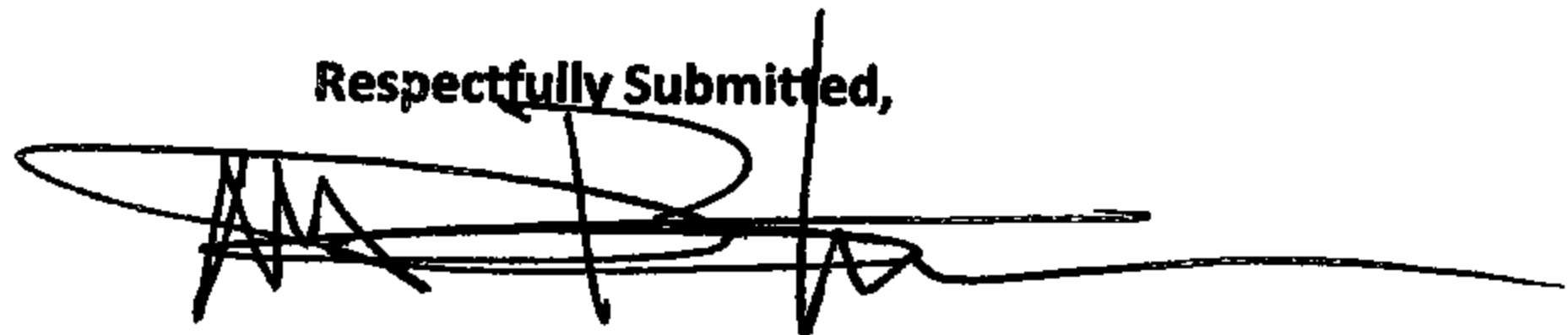
Out of the thousands of studies that are reviewed, this is a very minor amount of disagreement, and is to be expected. WV DEP reviewed the draft GEI criteria and made adjustments based on its own review of the 2014 EPA draft criteria and the GEI report. These criteria are presented in the emergency and draft Legislative rules. WVCA fully

supports the adjustments made by WV DEP and believes they accurately represent a reasonable, scientific approach to revising the State's selenium criteria.

Notably, EPA published draft national recommended selenium water quality criteria on Monday, July 27, 2015, near the end of the comment period for West Virginia's revised selenium criteria. WVCA fully anticipates knee-jerk responses for those who oppose revisions to the West Virginia criteria encouraging WV DEP to abandon or delay its selenium revisions in response to the EPA draft. However, West Virginia's emergency and draft Legislative selenium criteria are the result of a lengthy scientific process wherein all available selenium studies were reviewed and considered. WV DEP's criteria are scientifically defensible, and follow EPA's protocol for development of numeric aquatic life criteria. The EPA publication does not change this effort or the results thereof.

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

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Jason D. Bostic', is written over a horizontal line.

Jason D. Bostic
Vice-President



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE
DALLAS, TX 75201
APR 30 2



West Virginia Coal Association
Comments on Emergency Rule Revisions to 47 CSR 2
July 30, 2015
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.

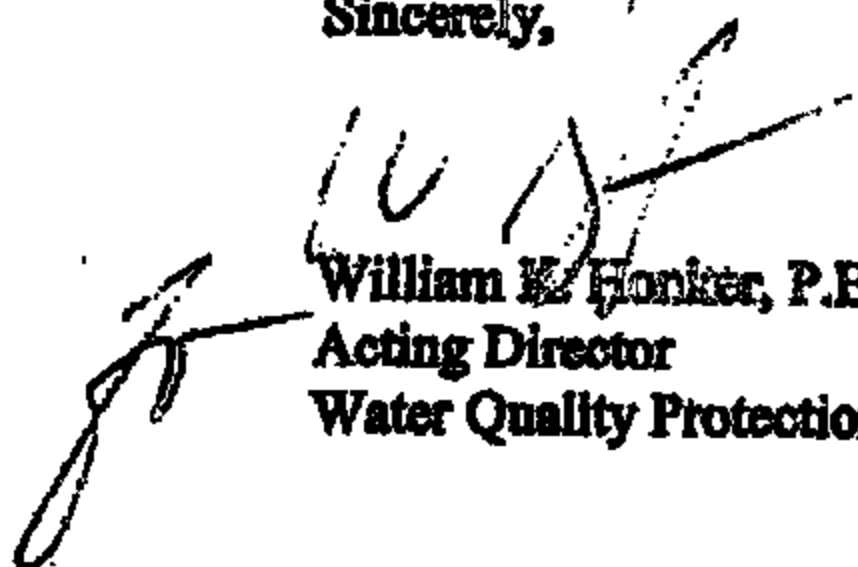
EPA previously took no action on the new or revised criteria for aluminum, cadmium, and zinc contained in section 20.6.4.900 L. (1) Acute and (2) Chronic Hardness-based Metals Criteria. Based on an extensive review of the supporting documentation, we are approving the application of the hardness-dependent 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 E. 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



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West Virginia Coal Association
Comments on Emergency Rule Revisions to 47 CSR 2
July 30, 2015
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 designations¹ 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
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

PO Box 3823, Charleston, WV 25388 • (304) 786-1111
info@wvcoal.com



West Virginia Coal Association
 Comments on Emergency Rule Revisions to 47 CSR 2
 July 30, 2015

Attachment "C"

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:

Numeric Criterion	Chemical Criterion
$\text{CMC} = e^{1.3695 \ln(\text{hardness}) + 1.8308} \times \text{XCF}$	$\text{FCV} = e^{1.3695 \ln(\text{hardness}) + 0.9161} \times \text{XCF}$

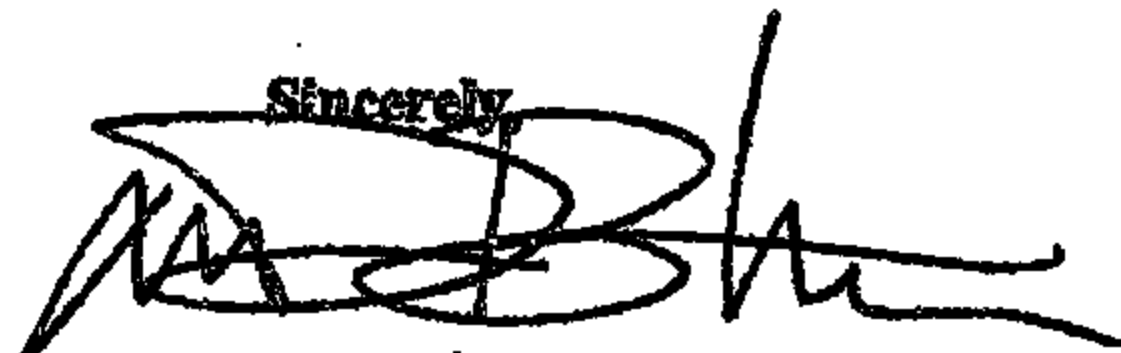
The toxicity of some metals is inversely related to water hardness. In other words, the metal's toxicity to aquatic life decreases as the water hardness increases. The United States Environmental Protection Agency ("EPA") has developed hardness-dependent equations for a number of metals to reflect this 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,

A handwritten signature in black ink, appearing to read 'J. Bostic', with a stylized flourish extending to the right.

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



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)
EC₅₀	median effect concentration --point estimate for 50% effect
FACR	final ACR
FAV	final acute value
FCV	final chronic value
GMAVs	genus mean acute values
LC₅₀	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 LC₅₀ 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 LC₅₀ 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 LC₅₀ and EC₅₀ 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 AUL)	LC ₅₀ or EC ₅₀ Adjusted to Hardness of 50 mg/L (µg AUL)	Species Mean Acute Value at Hardness of 50 mg/L (µg AUL)	Reference
<i>Acanthurus</i> sp.	Storiedly	S,M	AlCl ₃	7.46	47.4	>22,800	>24,315	>24,315	Call 1984
<i>Aesopus aquatilis</i>	Isopod	S,U	Al ₂ (SO ₄) ₃	6.76	50	4,370	4,370	4,370	Martin and Holdich 1986
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	7.42	50	1,900	1,900	>2,184	McCauley et al. 1986
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	7.86	50	1,500	1,500	-	McCauley et al. 1986
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	8.13	50	2,580	2,580	-	McCauley et al. 1986
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	7.5	26	720	1,762	-	ENSR 1982a
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	7.5	48	1,880	2,107	-	ENSR 1982a
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	7.8	96	2,450	1,002	-	ENSR 1982a
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	AlCl ₃	8.1	184	>99,600	>15,554	-	ENSR 1982a
<i>Ceriodaphnia dubia</i>	Cladoceran	S,M	-	7.6	98.5	2,880	1,132	-	Boucek et al. 2001
<i>Ceriodaphnia</i> sp.	Cladoceran	S,M	AlCl ₃	7.33	47.4	2,300	2,475	3,134	Call 1984
<i>Ceriodaphnia</i> sp.	Cladoceran	S,M	AlCl ₃	7.53	47.4	3,690	3,970	-	Call 1984
<i>Crangonyx pseudogracilis</i>	Amphipod	S,U	Al ₂ (SO ₄) ₃	6.75	50	9,180	9,180	9,190	Martin and Holdich 1986
<i>Cyclops vernalis</i>	Copepod	S,U	Al ₂ O ₃	6.9	-	>27,000	-	-	Storey et al. 1982
<i>Daphnia magna</i>	Cladoceran	S,M	Al ₂ (SO ₄) ₃	7.05	220	38,200	9,022	4,735	Kimball manuscript
<i>Daphnia magna</i>	Cladoceran	S,M	AlCl ₃	7.61	45.4	>25,300	>28,575	-	Brooke et al. 1985
<i>Daphnia magna</i>	Cladoceran	S,U	AlCl ₃	7	45.3	3,900	3,885	-	Elesinger and Christensen 1972
<i>Dugesia tigrina</i>	Flatworm	S,M	AlCl ₃	7.48	47.4	>16,800	>17,852	>17,859	Brooke et al. 1985
<i>Gammarus pulex</i>	Amphipod	S,M	Al ₂ O ₃	6.9	-	>2,700	-	-	Storey et al. 1992
<i>Gammarus pseudolimnensis</i>	Amphipod	S,M	AlCl ₃	7.53	47.4	22,000	23,862	23,860	Call 1984
<i>Physa</i> sp.	Snail	S,M	AlCl ₃	7.48	47.4	55,800	59,711	32,922	Call 1984
<i>Physa</i> sp.	Snail	S,M	AlCl ₃	6.69	47.4	>23,400	>26,176	-	Call 1984
<i>Physa</i> sp.	Snail	S,M	AlCl ₃	7.55	47.4	30,800	32,922	-	Call 1984
<i>Physa</i> sp.	Snail	S,M	AlCl ₃	8.17	47.4	>24,700	>26,574	-	Call 1984
<i>Tanytarsus disjunctus</i>	Midge	S,U	Al ₂ (SO ₄) ₃	6.85-7.71	17.43	>79,900	>338,321	>338,321	Lamb and Bailey 1961
<i>Tubifex tubifex</i>	Worm	R,U	Al(NH ₄ SO ₄) ₃	7.6	245	50,230	5,698	5,698	Khangarot 1991
<i>Hydrogobius amarus</i>	Rio Grande silvery minnow	S,M	AlCl ₃	8.1	140	>59,100	>14,428	>14,428	Buhl 2002

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Species Latin Name	Species Common Name	Method	Chemical	pH	Hardness (mg/L as CaCO ₃)	LC ₅₀ or EC ₅₀ (µg A/L)	LC ₅₀ or EC ₅₀ Adjusted to Hardness of 50 mg/L (µg A/L)	Species Mean Acute Values at Hardness of 50 mg/L (µg A/L)	Reference
<i>Ichthyophaga punctatus</i>	Channel catfish	S, M	AlCl ₃	7.94	47.4	>47,900	>51,534	>51,534	Call 1984
<i>Lepomis cyanellus</i>	Green sunfish	S, M	AlCl ₃	7.53	47.4	>50,000	>53,734	>53,734	Call 1984
<i>Oncorhynchus mykiss</i>	Rainbow trout	S, M	AlCl ₃	6.59	47.4	7,400	7,881	>7,547	Call 1984
<i>Oncorhynchus mykiss</i>	Rainbow trout	S, M	AlCl ₃	7.31	47.4	14,600	15,708	-	Call 1984
<i>Oncorhynchus mykiss</i>	Rainbow trout	S, M	AlCl ₃	7.46	47.4	8,600	9,253	-	Call 1984
<i>Oncorhynchus mykiss</i>	Rainbow trout	S, M	AlCl ₃	8.17	47.4	>24,700	>26,574	-	Call 1984
<i>Oncorhynchus mykiss</i>	Rainbow trout	F, M	AlCl ₃	8.25	23.2	9,170	17,880	-	Gundersen et al. 1994
<i>Oncorhynchus mykiss</i>	Rainbow trout	F, M	AlCl ₃	8.25	35	9,170	10,082	-	Gundersen et al. 1994
<i>Oncorhynchus mykiss</i>	Rainbow trout	F, M	AlCl ₃	8.29	83.5	7,670	2,784	-	Gundersen et al. 1994
<i>Oncorhynchus mykiss</i>	Rainbow trout	F, M	AlCl ₃	8.29	115.8	6,930	2,184	-	Gundersen et al. 1994
<i>Oncorhynchus tshawytscha</i>	Chinook salmon	S, M	NaAlO ₂	7	28	>40,000	>58,495	>58,495	Peterson et al. 1974
<i>Perca flavescens</i>	Yellow perch	S, M	AlCl ₃	7.55	47.4	>49,800	>53,578	>53,578	Call 1984
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	8.1	140	>59,100	>14,428	>5,869	Bull 2002
<i>Pimephales promelas</i>	Fathead minnow	S, M	Al ₂ (SO ₄) ₃	7.34	220	35,000	4,801	-	Kimbrell manuscript
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	7.51	47.4	>48,200	>51,357	-	Call 1984
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	8.05	47.4	>49,800	>53,578	-	Call 1984
<i>Pimephales promelas</i>	Fathead minnow	S, U	Al ₂ (SO ₄) ₃	7.9	-	>18,900	-	-	Boyd 1979
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	7.8	28	1,160	2,840	-	ENSR 1982b
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	7.8	46	8,180	8,170	-	ENSR 1982b
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	8.1	98	20,300	8,382	-	ENSR 1982b
<i>Pimephales promelas</i>	Fathead minnow	S, M	AlCl ₃	8.1	194	44,800	8,382	-	ENSR 1982b
<i>Salmo salar</i>	Atlantic salmon	S, M	AlCl ₃	6.5	6.8	599	9,205	9,205	Hamilton and Haines 1986
<i>Salvelinus fontinalis</i>	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
<i>Ceriodaphnia dubia</i>	8	2.0674	0.751	0.6770, 3.2578	6
<i>Daphnia magna</i>	2	1.4439	-	-	0
Fathead minnow	5	1.5298	0.903	0.6082, 2.4514	3
All of the above	15	1.7125	0.806	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
<i>Ceriodaphnia dubia</i>	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
	93	2,450	ENSR 1992a
	98.5	2,880	Soucek et al. 2001
	194	>99,600	ENSR 1992a
	45.3	3,900	Steeinger and Christensen 1972
	220	38,200	Kimball Manuscript
<i>Daphnia magna</i>	26	1,160	ENSR 1992b
	46	8,180	ENSR 1992b
Fathead minnow	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)	References
<i>Ceriodaphnia dubia</i>	Cladoceran	LC	AlCl ₃	7.15	50	1,400-2,800	1,908	McCauley et al. 1988
<i>Ceriodaphnia dubia</i>	Cladoceran	LC	AlCl ₃	7.75	50	1,100-2,400	1,624	McCauley et al. 1988
<i>Ceriodaphnia dubia</i>	Cladoceran	LC	AlCl ₃	7.55	47.4	4,900-12,100	7,700	Call 1984
<i>Daphnia magna</i>	Cladoceran	LC	Al ₂ (SO ₄) ₃	8.30	220	540-1,020	742.2	Kimbali manuscript
<i>Daphnia magna</i>	Cladoceran	LC	AlCl ₃	6.5-7.5	45.3	-	320 ^a	Blesinger and Christensen 1972
<i>Pimephales promelas</i>	Fathead minnow	ELS	Al ₂ (SO ₄) ₃	7.24-8.15	220	2,300-4,700	3,288	Kimbali manuscript

^a This value is an EC₁₀ 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 (Kimbali manuscript).

Table 2b: Aluminum acute-chronic ratios.

Species Latin Name	Species Common Name	pH	Hardness (mg/L as CaCO ₃)	Acute Value (µg Al/L)	Chronic Value (µg Al/L)	Acute-Chronic Ratio	Species Mean Acute-Chronic Ratio
<i>Ceriodaphnia dubia</i>	Cladoceran	7.15	50	1,900	1,908	0.9959	0.9990
<i>Ceriodaphnia dubia</i>	Cladoceran	7.75	50	1,500	1,624	0.9236	-
<i>Daphnia magna</i>	Cladoceran	8.30	220	38,200	742.2	51.47	-
<i>Daphnia magna</i>	Cladoceran	6.5-7.5	45.3	3,900	320	12.19	12.19 ^a
<i>Pimephales promelas</i>	Fathead minnow	7.24-8.16	220	35,000	3,288	10.64	10.64
						Final ACR:	4.9923

^a The acute-chronic ratio of 61.47 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 LC₅₀ 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 μ g/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 μ g/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.

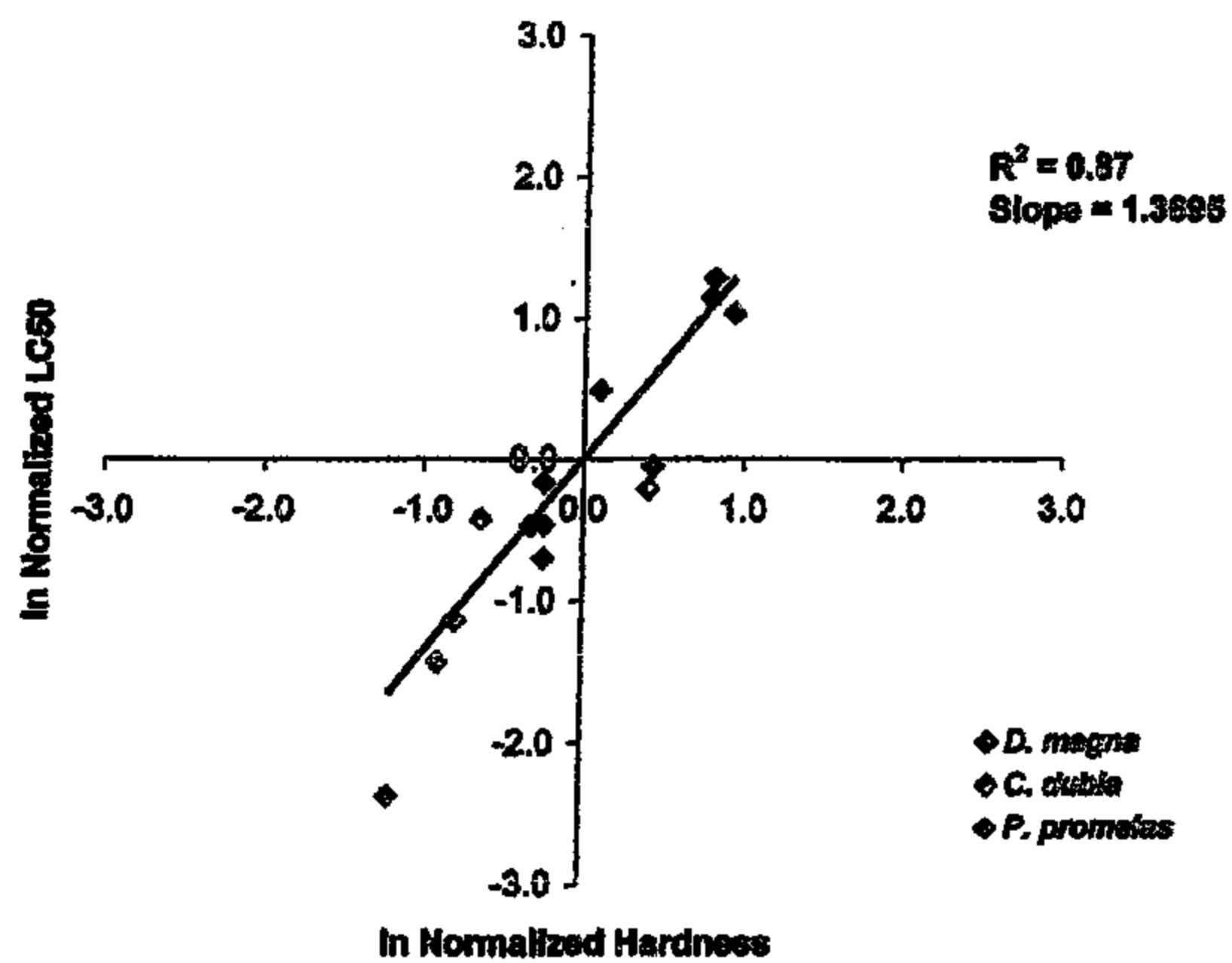


Figure 1: Relationship between hardness and acute aluminum toxicity.

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 LC₅₀ and EC₅₀ 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:

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

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:

$$\text{FCV} = e^{(1.3695[\ln(\text{hardness})] + 0.9161)} \quad \text{Eq. 2}$$

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 A/L)	Species	Species Mean Acute Value (µg A/L)	Species Mean Acute-Chronic Ratio
17	>338,321	<i>Tanytarsus dissimilis</i> (midge)	>338,321	-
16	>53,794	<i>Lepomis cyanellus</i> (green sunfish)	>53,794	-
15	>53,578	<i>Perca flavescens</i> (yellow perch)	>53,578	-
14	>51,534	<i>Ictalurus punctatus</i> (channel catfish)	>51,534	-
13	32,922	<i>Physa</i> sp. (snail)	32,922	-
12	>24,315	<i>Acronuria</i> sp. (stonefly)	>24,315	-
11	23,869	<i>Gammarus pseudolimnacus</i> (amphipod)	23,869	-
10	>18,189	<i>Dugesia tigrina</i> (flatworm)	>18,189	-
9	>14,428	<i>Hypognathus emerus</i> (Rio Grande silvery minnow)	>14,428	-
8	9,205	<i>Salmo salar</i> (Atlantic salmon)	9,205	-
7	9,190	<i>Crangonyx pseudogracilis</i> (amphipod)	9,190	-
6	>7,547	<i>Oncorhynchus mykiss</i> (rainbow trout)	>7,547	-
		<i>Oncorhynchus tshawytscha</i> (chinook salmon)	>88,495*	-
5	>5,869	<i>Pimephales promelas</i> (fathead minnow)	>5,869	10.64
4	5,698	<i>Tubifex tubifex</i> (worm)	5,698	-
3	4,735	<i>Daphnia magna</i> (cladoceran)	4,735	12.19
2	4,370	<i>Asellus aquaticus</i> (isopod)	4,370	-
1	>2,604	<i>Ceriodaphnia dubia</i> (cladoceran)	>2,164	0.9590
		<i>Ceriodaphnia</i> 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., $1,496 \mu\text{g/L} / 2 = 750 \mu\text{g/L}$). 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 criterion³.

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 water⁴ 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 $\mu\text{g/L}$) 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 $\mu\text{g/L}$) 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 $\mu\text{g/L}$, respectively, and the 24-hour average Al concentrations are 1,324, 3,421, and 8,838 $\mu\text{g/L}$.

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1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

- 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
- 3.2. All Bids are rejected by Owner, or
- 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses, based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

C. J. Hughes Construction Company, Inc.
75 West 3rd Avenue
Huntington WV 25776

SURETY (Name and Address of Principal Place of Business):

Philadelphia Indemnity Insurance Company
One Bala Plaza, Suite 100
Bala Cynwyd, PA 19004

OWNER (Name and Address):

City of Williamstown
100 West Fifth Street
Williamstown, WV 26187-1597

BID

Bid Due Date: 07/23/15

Project (Brief Description Including Location):

Contract No. 1. WV Route 14 Collector

BOND

Bond Number: Bid Bond

Date (Not later than Bid due date): 07/23/15

Penal sum Five percent of amount bid

5%

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER**SURETY**

C. J. Hughes Construction Company, Inc. (Seal)

Philadelphia Indemnity Insurance Company (Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: [Signature] Vice President
Signature and Title

By: [Signature]
Signature and Title Andrew K. Teeter
(Attach Power of Attorney) Attorney-in-fact
Licensed WV Resident Agent

Attest: [Signature]
Signature and Title Witness to Bidder

Attest: [Signature]
Signature and Title Kimberly L. Miles, Witness

Note: Above addresses are to be used for giving required notice.

BB-1

Cooper, Laura K

From: cindy rank <clrank2@gmail.com>
Sent: Friday, July 31, 2015 8:41 AM
To: Cooper, Laura K
Subject: Comments - Variance requests
Attachments: VARIANCE REQUEST WQS REGS 07 31 2015 WVHC FINAL.doc; Appalmad Final WVDEP Variance Comments 2015 (1).pdf

Laura,

Attached are two sets of comments from WV Highlands Conservancy pertaining the the Variance requests in the proposed WQS Rules.

Cindy Rank, Chair
WVHC Mining Committee
4401 Eden Road
Rock Cave, WV 26234

304-924-5802



JULY 31, 2015

TO: WV Department of Environmental Protection

Via email to: Laura.K.Cooper@wv.gov

Comments re:

VARIANCE REQUESTS IN PROPOSED WVDEP WQS RULE

47 CSR 2-7.2.d.8.2 Cheat, and 47 CSR 2-7.2.d.11.1 Tygart

In matters pertaining to the proposed selenium and aluminum standards the West Virginia Highlands Conservancy is signatory to comments submitted on our behalf by Appalachian Mountain Advocates and the West Virginia Rivers Coalition.

In matters pertaining to the two variances proposed for Martin/Muddy Creek of the Cheat River and Sandy Creek of the Tygart River we refer to the additional set of comments submitted on our behalf by Appalachian Mountain Advocates address the basic questions of policy, regulation, and law and set forth most clearly the reasons why we believe these variances are neither appropriate nor legal.

Other general concerns about these variances were briefly mentioned at the public hearing July 21st and some are restated below.

General concerns

-- While we appreciate the willingness of Mike Sheehan of the Office of Special Reclamation to spend his time explaining the practical on the ground implementation of the plans described in the applications, we regret the agency's decision to cancel of the public meeting scheduled for Tunnelton where discussion and further explanation of the applications may have answered many questions and alleviated many concerns for WVHC as well as local residents and watershed groups. Missing that opportunity we are left with more questions than answers leaving us no choice but to oppose the variance requests.

-- The variances represent a willingness to give up on major portions of streams as they are left polluted upstream of the proposed location of the dosers and portions downstream of the dosers are subjected to additional pollution -- "once a sewer, always a sewer" was never an acceptable mantra for WVHC, nor is it an implied or explicit intent of the Clean Water Act.

-- The potential for long stretches of Sandy Creek and the Cheat River (possibly including portions of Cheat Canyon) to be discolored and further degraded by limestone deposition and metal participates downstream of the dosers as well as potential crusting/embedding of important stream bed habitat is not acceptable especially where major on-site treatment systems have not yet been installed nor their positive impact in

the watersheds assessed. This is particularly true in the case of the planned major installations at T&T in Muddy Creek and at F&M in Sandy Creek.

- The proposed variances basically allow for giant experiments which will be hard to reverse or even adjust once investments are made, and difficult to evaluate even in the proposed three year cycle as part of the Triennial Review.

- More questions than answers are forthcoming about NPDES discharge and monitoring points, criteria and set timeframes for measuring success and impact, etc.

Precedent

- This sets a terrible precedent.

- The limits proposed are extreme --- [In Muddy a pH of 2.1-9.0, Fe of 179 mg and Al of 48, and in Sandy Creek pH of 2.5-9.0, Fe at 21 mg, and Al at 34]. We understand these are worst case scenarios intended to allow experimenting with the dosers ... with the hope that the discharges from the dosers will, at least at some point downstream, result in improved water quality and stream conditions for the rest of the watershed. But in final accounting this is basically a license to pollute, a license to pollute while experimenting without well defined assessment and outcome goals and without adequate prior evaluation of positive impacts that can be expected from legally required on-site treatment at a number of forfeited sites addressing some major discharges (F&M, T&T).

- Although the variance limits proposed are meant to be temporary/interim, the investment of time and money will encourage great latitude as to when and how to determine "success", with little likelihood of ever reversing or amending course for anything short of total failure. By then it will be too little too late and the problems get kicked on down the road – or, in this instance, propelled on downstream.

Logistics

- The supporting applications themselves are unrealistic, especially when taking into account time that is required for completing the Legislative process, EPA approval, etc.

- The applications are also unrealistic in terms of the time required for practical preparation and installation of dosers, etc. As we understand it, additional surveying and acquiring necessary ROWs are still to be done, removal and upgrade of dosers currently being used at other sites for use in different locations will all take much more time than anticipated after and IF final approval of the variances is acquired.

- If the alternative restoration plans are truly worthwhile pursuing, discussion with plaintiffs about possible extension of certain deadlines established in the Consent Decree with WVDEP is called for. And further contact and discussion with other interested parties, Friends of the Cheat in particular, is essential.

Money/Finances

- Assuming stream cleanup to be the underlying well-intentioned motive for the proposed alternative restoration measures and enabling variances, the effort may be praiseworthy. But incomplete planning and unsupported variance requests is the wrong way to go especially as it appears that money is the real driving force behind the effort.

- The proposed use of Laurel Mountain/Fellowsville Trust Fund, dedicated to remediation at the forfeited F&M mine site, is a prime example. Monies for the Trust

Fund, won years ago as a result of legal actions, are now invested and accumulating interest. Though admittedly not growing at a great rate, these funds are dedicated for treatment at F&M. Whenever they are used they will assist Special Reclamation efforts at F&M thus helping WVDEP which is now responsible for the quality of water discharged from the F&M forfeiture site. I sympathize with Save the Tygart and the Laurel Mountain folks' desire to help improve the entire Sandy Creek watershed. However, it appears that investing that money for an experimental use of two dosers downstream in Left Fork of Sandy rather than operation and maintenance costs at a required on-site treatment facility at F&M is being suggested for the sole purpose of freeing up Special Reclamation Fund monies for use elsewhere, i.e. the approximately \$1.6 million cost to come from WV DEP/Special Reclamation Funds for capitol cost to establish centralized treatment at F&M. With all due respect and admiration for the Fellowsville and Save the Tygart groups this is a mistaken and potentially wasteful use of those funds.

- More appropriate sources of funds do exist and should be utilized to address the combination of Forfeited and AML discharges in these and other watersheds:

- Special Reclamation Fund – admittedly underfunded even at current levels, but specifically earmarked for on-site treatment at bond forfeiture sites like F&M, etc.

- Water treatment Fund – established by the Legislature the fund is accumulating interest and will be available by 2017, in plenty of time for adequate consideration of valid proposals for alternative watershed restoration measures by all interested parties.

- AML Fund – always in jeopardy of being discontinued (or tapped for unrelated activities, or to fulfill commitments to workers for health and retirement benefits often reneged on by industry as companies file for bankruptcy and/or reorganize, etc.) but available and appropriate nonetheless (accelerated under Power Plus plan ???)

- In Lieu Stream Mitigation Fund – With some \$32.6+ million in this fund, it should be considered as another possible source for valid watershed restoration.

CONCLUSION: We oppose these variance requests and ask that they be withdrawn from the proposed rule before being sent to the Secretary of State Office in the next step in the Legislative Rulemaking Review process.

Thank you for the opportunity to add these general concerns to our more specific legal and regulatory reasons for objecting to these variances.

Cindy Rank, Chair
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July 31, 2015

Scott Mandirola
WVDEP
601 57th Street S.E.
Charleston WV 25403
dep.comments@wv.gov

Dear Mr. Mandirola,

Please accept these comments on behalf of Appalachian Mountain Advocates, the West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition, in regards to the proposed site specific water quality variances on Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries, as well as Maple Run, Left Fork of Little Sandy Creek, Left Fork Sandy Creek and their unnamed tributaries. WVDEP is moving too fast, answering too few questions, in proposing the variances for these streams in the Cheat and Tygart watersheds. The background work and legal justification has not been provided to support the variances and too many questions remain for WVDEP to move forward at this point.

1. There has been No Showing the Designated Uses Cannot Be Achieved

A variance from numeric water quality criteria may only be granted if certain conditions, outlined in 47 CSR 2-6.1.b, limit the attainment of specific water quality criteria. 47 CSR 2-8.4. The Office of Special Reclamation is applying for both variances under the provision, "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." 47 CSR 2-6.1.b.4; 46 CSR 6-4.1.d. The regulations require that "it can be demonstrated that attaining the designated use is not feasible because" of such a condition. OSR has not made such a showing.

2. The Office of Special reclamation has Not Shown that Pollution Entering the Streams from its Facilities Cannot Be Remedied or that a Remedy Would Cause More Environmental Damage

There has been no demonstration that either the discharges from OSR's facilities or the AML pollution entering the streams "cannot be remedied or would cause more environmental damage to correct than to leave in place." The variance applications do not even identify the locations, flows, and chemical compositions of the OSR or AML sources. The maps attached to the applications do little to substitute for the missing information. They simply indicate that OSR has more information than it is making available to the public. The applications include no description of possible treatment options for the OSR or AML sources and their limitations. While a seven-year remediation effort is referenced in the application for a variance on Martin Creek, it does not describe what treatment methodologies were used.

3. The Office of Special Reclamation has Not Demonstrated the Discharger Will Be Unable to Meet Water Quality Criteria.

In addition, OSR has conflated the OSR discharges and the instream water quality. An application for a variance must include, "Identification of the specific circumstances which render the discharger unable to meet the existing water quality criteria which apply to the stream." 46 CSR 6-5.3.d (emphasis added). In the each

application, to meet that requirement OSR describes the AMD problem from abandoned mine lands. Pre-law mining pollution has no impact on OSR's ability to meet existing numeric water quality criteria. In fact, OSR does not require a variance for its own discharges. At no point has OSR indicated that it cannot meet water quality standards at the "end-of-pipe." OSR has not made the showing required under the law for a complete application for a variance. A variance only applies to the discharger requesting the variance, 46 CSR 6-5.2; 47 CSR 2-8.4, yet the discharger in this case does not require a variance. In addition, the variances are phrased as if they apply to waterbodies, rather than OSR's discharges in those waterbodies, as required by the regulations. The use of instream dosers cannot be covered by this variance, but also should not require a variance.

4. The Proposed Variance Does Not Describe Alternative Restoration Measures.

The proposed variances reference, "Alternative restoration measures, as described in the variance application." The variance applications do not describe alternative restoration measures. The closest they come is the vague statement, "OSR is proposing the strategic placement of in-stream lime doser's in order to enhance overall stream quality," which appears in the introduction to each application. The maps attached to the applications include locations for the dosers. The applications lacks any description of what the dosers will do, what chemicals and concentrations will be used, how they will be monitored, or what impact they will have downstream.

5. The Proposed Variance Will Result in Sections of Martin Creek and Sandy Creek Being Used Only for Waste Transport

The proposed variances will result in the suspension or removal of all designated uses in certain sections of Martin Creek and its tributaries and Sandy Creek and its tributaries. These sections of stream will, in effect, be used only for waste transport, a use strictly prohibited by federal regulations. 40 C.F.R. § 131.10(a) ("In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.")

6. The Office of Special Reclamation has not Conducted the Necessary Use Attainability Analysis to Remove Fishable/Swimmable Uses

The removal of designated uses will necessarily include the removal of aquatic life and human contact recreation uses described in 47 C.S.R. § 2-6. In other words these waterways will no longer be designated to attain the "fishable/swimmable" uses that are at the heart of the Clean Water Act. *See* 33 U.S.C. § 1251(a)(2) (establishing the national goal of fishable/swimmable waters). The fishable/swimmable designated uses have special protection under the Clean Water Act. 40 C.F.R. § 131.10(j). To remove them a state must conduct a use attainability analysis pursuant to 40 C.F.R. § 131.3(g). This is a "structured scientific assessment of the factors affecting the attainment of the use. . ." 40 C.F.R. § 131.3(g). According to EPA, "the most significant misperception about designated uses and UAAs is that UAAs need only address the current condition of a waterbody: that a designated use may be removed simply by documenting that protective criteria are exceeded. However, it is the prospective analysis of future attainability of designated uses that provides the demonstration necessary to support a use change."

See <http://water.epa.gov/scitech/swguidance/standards/uses/uaa/info.cfm>. While the Office of Special Reclamation has shown that the waters to be subject to the proposed variance are not currently meeting designated uses, the OSR has performed no analysis to demonstrate the impossibility of achieving those uses in the future. Importantly, the proposed variances are not an incremental step to achieve the current designated uses of the Martin Creek and Sandy Creek watersheds. Rather, they will allow OSR to avoid treating sources to current water quality standards—even though the office has both the financial ability and legal obligation to do so.

Respectfully submitted,

/s/ J. Michael Becher

J. Michael Becher

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Cooper, Laura K

From: DEP Comments
Sent: Friday, July 31, 2015 8:57 AM
To: Cooper, Laura K
Subject: FW: Comments on WQS Rule
Attachments: WVRC 47CSR2 Comments 7.30.15.pdf

From: Angie Rosser [mailto:arosser@wvrivers.org]
Sent: Friday, July 31, 2015 8:55 AM
To: DEP Comments <DEP.Comments@wv.gov>
Subject: Comments on WQS Rule

Please accept the attached comments on the proposed revisions to 47CSR2 – Requirements Governing Water Quality Standards, thank you.

Angie Rosser

Executive Director
West Virginia Rivers Coalition
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WVRivers.org [Sign up for e-news](#)



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July 30, 2015

Laura Cooper
Water Quality Standards, DWWIM, DEP
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Submitted electronically to dep.comments@wv.gov

RE: Comments on Proposed Revisions to 47CSR2 – Requirements Governing Water Quality Standards

Thank you for providing the public the opportunity to comment on the 2016 proposed revisions to Requirements Governing Water Quality Standards (47CSR2). West Virginia Rivers Coalition submits these comments in collaboration with the organizations listed on the signatory page of this document. Each signatory has a vested interest in the quality of West Virginia's waters, and believes that strong water quality standards are critical to the future health and safety of our water resources.

Site-specific variance for specified streams in the Cheat and Tygart watersheds

We support the comments submitted by Appalachian Mountain Advocates appended to these comments.

Selenium fish tissue-based standards

We support the comments submitted by Appalachian Mountain Advocates appended to these comments.

Aluminum hardness-based standard

We support the comments submitted by Dr. James Van Gundy to West Virginia Department of Environmental Protection's ("WVDEP's") Environmental Protection Advisory Council appended to these comments and offer the additional comments below.

We oppose WVDEP's proposed revisions to the aluminum water quality criteria.

The revisions are drastic. For high-hardness streams, the proposed chronic criterion is more than 40 times weaker for trout streams, and almost five times weaker for warm water streams. The proposed

acute criterion is almost 12 times weaker. 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, in a rush to provide regulatory relief to dischargers, the proposed revision fails to comply with this mandate.

There is no emergency that justifies the promulgation of this rule.

WVDEP originally proposed this change as an emergency rule in 2013.¹ WVDEP’s proposed rule weakening the aluminum water quality standard does not meet the requirements for promulgation as an emergency rule. 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.

In 2013, WVDEP claimed that the emergency rule was necessary to prevent “substantial harm to the public’s interest in economical and meaningful expenditures of resources in environmental regulation.” WVDEP claimed that the existing standards needed to be changed because they subjected certain members of the “regulated community” to “unnecessary treatment costs.” In the emergency rule, and in the rule proposed now, 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.

The true public interest lies not in WVDEP’s short-term protection of polluters, but in protecting West Virginia’s waters. 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 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.

When the 2013 emergency rule was up for approval before the Legislature in 2014, the Legislature withdrew the rule after the Freedom Industries chemical leak. Legislative leaders asserted that just after the chemical leak was not an appropriate time to weaken water standards. The same holds true today.

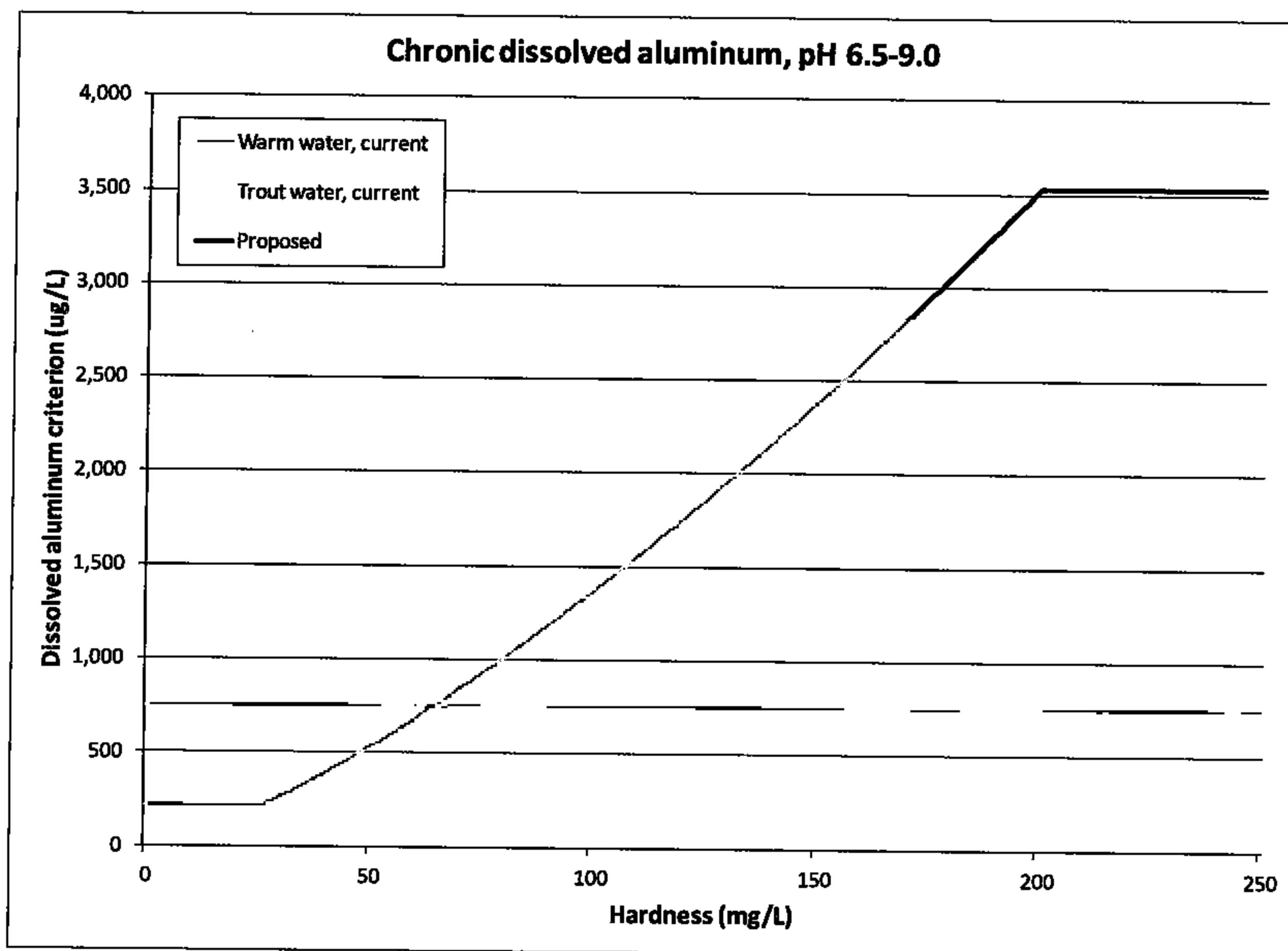
The proposed rule change will significantly weaken the Aluminum criteria.

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.

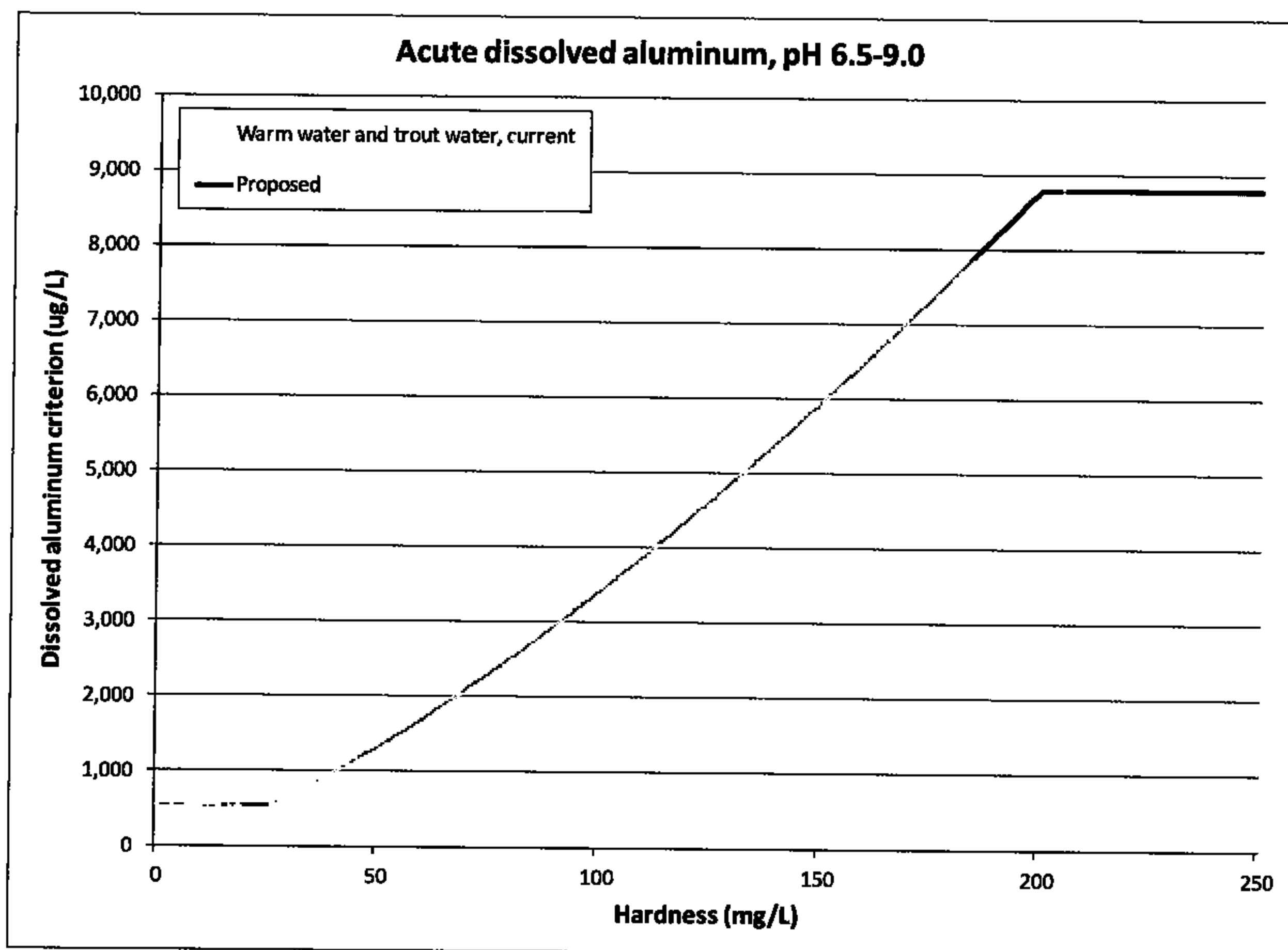
¹ The proposed change was exactly the same as what is being proposed now, except that the maximum hardness concentration was changed from 220 to 200 mg/L.

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 200 mg/L, the proposed criterion is more than 40 times more permissive 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 200 mg/L, the proposed criterion is nearly 5 times more permissive than the current chronic 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 200 mg/L, the proposed criterion is nearly 12 times more permissive than the current acute 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 40 times more permissive for the chronic trout water criterion and more than 12 times more permissive 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.”² 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:

² See WVDEP Secretary of State filing.

“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.”³

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.”⁴

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.

Dr. James Van Gundy, aquatic ecologist and member of WVDEP’s Environmental Protection Advisory Council, also points out the limitations of the report WVDEP relies on as the basis for the revision:

“the GEI Report upon which WVDEP bases its case for a hardness-based Aluminum WQ rule, relies upon mostly static and mostly short-term bioassays of relatively few species, only a few of which actually occur in West Virginia waters. The US EPA recommends the use of indigenous species in developing criteria intended to apply statewide (as opposed to nationwide or federal standards.”⁵

Van Gundy goes further in pointing out the scarcity of available studies examining biological implications of the proposed change:

“The specific biological activity of the various Aluminum species is almost entirely unknown as most published studies have dealt with a very limited list of test organisms under often poorly controlled or characterized experimental conditions.

³ Mitchelmore at 2.

⁴ Id.

⁵ Van Gundy comments to EPAC.

It would be useful if the WV DEP could produce data that shows that the currently permissible levels of Aluminum are truly protective of a range of aquatic life broader than just salmonid fishes and daphnids. Unfortunately, the requisite laboratory studies have apparently not been done and the evaluation of Aluminum toxicity from field data is difficult at best due to the presence of multiple confounding factors. We have seen no evidence that the discharge of Aluminum even at currently permissible levels is protective of all of the species of aquatic life that are important in West Virginia's aquatic ecosystems. Because there is such a paucity of relevant scientific information regarding both the effects of Aluminum on aquatic organisms and the role that water hardness plays in ameliorating such effects, it would be irresponsible to drastically increase the amount of Aluminum that can be legally discharged until such time as a better understanding of the possible effects of such a change is at hand."⁶

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 the amount of dissolved organic material (DOM) in the water. The solubility, speciation and/or complexation of aluminum is highly dependent upon multiple ambient water quality characteristics that ultimately determine bioavailability and toxicity.⁷ WVDEP has not appeared to fully consider the complex interactions affecting aluminum toxicity.

Dr. Van Gundy's comments go on to explain:

"It is reasonably well understood that different chemical species of Aluminum have different levels of toxicity. As water moves through a stream system, pH, temperature, and other factors change and may affect the chemical species of Aluminum present. Such changes are especially likely to occur in zones where two streams of varied chemical and physical quality meet and mix, and there is some field evidence to support the assertion that the toxicity of aluminum may increase in such mixing zones. Also, the reliance on a single parameter, hardness, to calculate safe levels of Aluminum disregards the scientific evidence that pH (within the range of 6.5 - 9.0), temperature, and the presence of dissolved organic matter (DOM) may have equal or greater influence on Aluminum toxicity. For instance, Lydersen (1990) showed that a decrease in temperature of about 15°C has the same effect on Aluminum speciation and solubility as does a decrease in pH by one unit; thus temperature is important to consider when calculating Aluminum toxicity. The formation of complexes with fluoride, sulfate, phosphate, and silicate ions may also alter the toxic action of Aluminum."⁸

⁶ Van Gundy comments to EPAC

⁷ Mitchelmore at 3.

⁸ Van Gundy comments to EPAC

The proposed rule is flawed in that it only considers dissolved Aluminum.

The proposed rule is the only hardness-based Aluminum criteria the nation that only considers dissolved Aluminum, and WVDEP has provided no scientific justification for not also considering total recoverable Aluminum in its proposed standard. Even the New Mexico and Colorado criteria, which have been touted as examples of similar hardness-based criteria, do not apply hardness-based equations to dissolved aluminum (See details later in this comment letter).

Dr. Van Gundy's comments point out:

"The reliance on a standard that considers only dissolved Aluminum is particularly problematic. Insoluble forms of Aluminum may well have significant biological effects. For example, precipitated $\text{Al}(\text{OH})_3$ may coat and clog respiratory structures or surfaces and interfere with the ability of aquatic organisms to exchange respiratory gasses. It is also likely that insoluble Aluminum hydroxides are converted to soluble and more toxic forms when ingested. None of the bioassay studies referenced in the GEI Report (GEI, 2011) examined routes of Aluminum exposure other than absorption across external body membranes.

More significantly, the standard 96 hour short-term bioassay procedure requires that the test animals not be fed during the test period. As a consequence of this, dietary sources of Aluminum are not considered in evaluating its potential toxicity towards aquatic organisms. For some organisms in nature however, dietary exposure may be the major mode of entry of toxins (Poteat and Buchwalter, 2011). These authors state that in every study comparing dietary vs. dissolved exposure of which they are aware, diet is the predominant route of exposure of aquatic insects to toxic metals and they conclude that dietary acquisition strongly drives the bioaccumulation of metals in aquatic insects.

One study (Cain *et al*, 2011) suggests that as much as 95% of the toxic metal body burden of aquatic insects may come from dietary sources. Another study (Xie and Buchwalter, 2011) suggests that diet derived metals may be more physiologically active than those acquired in dissolved form through gills or other external body surfaces.

While many laboratory studies have indicated that aquatic insects are relatively insensitive to metals, a number of field studies conducted in natural aquatic systems have suggested that it is the aquatic insects that are among the first members of the aquatic community to disappear at metals contaminated sites (Brix *et al*, 2011). This disconnect makes sense if the primary route of exposure is via the digestive tract rather than passage of dissolved metals through respiratory or other body surfaces since only the later is generally considered in laboratory studies."⁹

⁹ Van Gundy comments to EPAC.

Additionally, Van Gundy points to the significance of insoluble Aluminum exposure through dietary pathways:

“Over the usual pH range of natural waters, any aluminum that enters a stream in soluble form is likely to be rapidly converted to insoluble Aluminum hydroxide, $\text{Al}(\text{OH})_3$, which may be incorporated into bottom sediments or may coat the surfaces of submerged objects. In either location it is probable that it will be ingested by stream animals that make their living by scraping algae off of rocks, or shredding leaves, or filtering small particles of organic material out of the water, or by simply passing bottom sediment through their digestive tracts, extracting anything digestible that happens to be included in it. All of these represent feeding styles of aquatic insects or other macroinvertebrates that inhabit West Virginia’s streams. Detritus is a low quality food material and therefore detritus feeders must consume large quantities of it to meet their nutritional needs. If the material is coated with Aluminum hydroxide or otherwise contains Aluminum in particulate form, detritivores will potentially ingest a great deal of Aluminum in the course of their normal feeding activities. Corbi *et al* (2010) found that Iron and Aluminum in sediments were “highly bioaccumulated” by aquatic insects and that metals levels in aquatic insect larvae varied directly with the concentration of those metals in the sediments of the streams in which they lived.

In a survey of Swedish streams of different acidities and Al concentrations Herrmann and Frick,(1995) found that a predacious stonefly (*Isoperla grammica*) consistently had aluminum tissue levels only about a third as high as the detritus-feeding organisms upon which it fed. This is consistent with Aluminum’s apparently modest potential for biological magnification, but since both stonefly and prey were exposed to the same levels of dissolved Aluminum in the external medium, they would be expected to contain similar Al tissue levels if absorption via body surfaces was the only route of entry. This observation supports the notion that detritivores acquire Aluminum from other sources, presumably dietary ones, since in natural systems, that is the only other possible route of exposure.

The chemical environment in an animal’s digestive tract is far different from that of the external environment and would be expected to influence the uptake and perhaps the chemical speciation of ingested metals. Dow (1992) found that members of at least four Orders of Insects (Coleoptera, Diptera, Lepidoptera, and Isoptera) have midgut pHs in excess of 12 - the highest pH known in any biological system. There is some evidence that these high pH values represent an adaptation to a tannin-rich diet such as plant detritus (Berenbaum,1980). Since terrestrial plant detritus is a major food source for many members of the aquatic insect communities of forested upland stream systems, these animals might be expected to have a similar type of digestive physiology.

As pH varies, changes in inorganic Aluminum speciation are nearly instantaneous (Gensemer & Playle, 1999). At the high pH of the insect midgut., ingested particulate Aluminum compounds

would be expected to be rapidly converted from the insoluble and relatively non-toxic forms such as the $\text{Al}(\text{OH})_3$ prevalent at normal stream pHs into more soluble (and more toxic) forms such as the Aluminate ion, $\text{Al}(\text{OH})_4^-$. Such effects were of course not accounted for by the standard 96 hour bioassays used in support of the hardness-based Aluminum model. Detritus-feeding macroinvertebrates are keystone species in woodland stream ecosystems, and as such, a water quality rule that is not protective of them is not protective of aquatic life in general.”¹⁰

The Colorado and New Mexico criteria are less permissive than WVDEP’s proposal because they apply to total aluminum, not dissolved aluminum.

WVDEP says that new studies (i.e., the 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.¹¹ 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.¹² 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 $0.45\ \mu\text{m}$.¹³ 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).¹⁴ A study done by the New Mexico Environment Department concluded that a $10\ \mu\text{m}$ 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.¹⁵

Thirty NTU equates to approximately 46 mg/L total suspended solids (“TSS”).¹⁶ 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

¹⁰ Van Gundy comments to EPAC.

¹¹ Colorado Regulation #31 at 56.

¹² See attached spreadsheet Aluminum_pH analysis. Data obtained through FOIA request.

¹³ See <http://testamericalabs.blogspot.com/2011/01/what-is-difference-between-toal-metals.html>

¹⁴ New Mexico Aluminum Filtration Study. August 24, 2012 at 2.

¹⁵ Id.

¹⁶ A log-linear model showed strong positive correlation between TSS and turbidity ($R^2 = 0.96$) with a regression equation of $\ln(\text{TSS}) = 1.32 \ln(\text{NTU}) + C$, with C not significantly different than zero for eight of the nine sampled streams. See www.depts.washington.edu/cuwrm/research/tssturb.pdf.

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 than what WVDEP is proposing.

Conclusion

There is not enough scientific data at this time to support the proposed hardness-based criteria. We need to know a lot more about how Aluminum behaves in varying stream chemistry and its biological effects. We support the summary points listed in Dr. Van Gundy's comments in finalizing a revised Aluminum standard:¹⁷

1. The scientific support for the assertion that increased levels of hardness are protective against Aluminum toxicity is considerably weaker than it is for the protective effects of hardness against divalent metals.
2. Only a few of the scientific studies that were used to support this assertion were specifically designed to examine the relationship between hardness and Aluminum's toxicity towards aquatic organisms.
3. In many of the published studies cited by the GEI Report, the experimental conditions were poorly controlled or poorly characterized.
4. There is some evidence that the toxicity of Aluminum increases at the higher end of the pH range 6.5 to 9.0.
5. The organisms used to derive the slope of the aluminum-hardness relationship: *Ceriodaphnia dubia*, *Daphnia magna*, and *Pimephales promelas* are either not found or are uncommon in the vast majority of the West Virginia streams to which this rule would apply. In addition, these organisms are relatively tolerant of a wide range of polluted conditions.
6. WVDEP's stated belief that only the Aluminum that is dissolved in a stream is bioavailable is almost certainly not true for many species of stream benthic macro-invertebrates.
7. The assumption that insoluble Aluminum will stay insoluble as it moves through the chemically and physically variable stream environment is probably not valid in many cases.
8. While the equations used to derive allowable levels of discharged Aluminum under this rule are similar to those used by the states of Colorado and New Mexico, they are not identical and no scientific rationale has been provided for these differences.

¹⁷ Van Gundy comments to EPAC.

9. There is no scientific rationale offered for the use of an Aluminum-hardness relationship (the equation) that was developed for total recoverable Aluminum to be applied to a rule based only upon dissolved Aluminum values. Such rationale needs to be made explicit to the interested public.
10. Any hardness-based rule that is adopted by the state of West Virginia should employ total recoverable aluminum as a basis of calculation rather than dissolved Aluminum alone.
11. USEPA recommends the use of indigenous species in developing criteria intended to apply statewide (as opposed to nationwide or federal standards.) As far as we can determine, this was not the case in the scientific studies that are cited to support the proposed Aluminum rule.

Thank you for your consideration of these comments.

Signed,

Angie Rosser, Executive Director
West Virginia Rivers Coalition

Dianne Bady
Ohio Valley Environmental Coalition

Conni Gratop Lewis, Legislative Coordinator
West Virginia Environmental Council

Gary Zuckett
West Virginia Citizen Action Group

Cynthia Ellis, President
West Virginia Highlands Conservancy

Julie Archer
West Virginia Surface Owners Rights Organization

Appendices:

1. Dr. Carys Mitchelmore Opinion Report
2. Dr. James Van Gundy EPAC Comments
3. Aluminum pH analysis spreadsheet
4. AppalMAD Comments

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

By

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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 $\text{Al}(\text{OH})_4^-$, which predominates at pH 7, is very poorly understood" (Gensemer 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 CaCO₃ mg/L LC50 was 7670 µg/L aluminum but at the higher 115.8 CaCO₃ 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.

Comments regarding the proposed Emergency Aluminum rule (J. Van Gundy)

I ask the WVDEP to proceed with caution in employing a hardness-based approach to setting a new and significantly more permissive Aluminum water quality standard. The few studies that are available do not make nearly as strong a case for the protective effects of hardness against Aluminum toxicity as has been made for divalent metals such as Cadmium, Copper, and Zinc. In addition, very little is known about the fate and biological effects of Aluminum in natural aquatic systems.

It is reasonably well understood that different chemical species of Aluminum have different levels of toxicity. As water moves through a stream system, pH, temperature, and other factors change and may affect the chemical species of Aluminum present. Such changes are especially likely to occur in zones where two streams of varied chemical and physical quality meet and mix, and there is some field evidence to support the assertion that the toxicity of aluminum may increase in such mixing zones. Also, the reliance on a single parameter, hardness, to calculate safe levels of Aluminum disregards the scientific evidence that pH (within the range of 6.5 - 9.0), temperature, and the presence of other dissolved constituents may have equal or greater influence on Aluminum toxicity. For instance, Lydersen (1990) showed that a decrease in temperature of about 15°C has the same effect on Aluminum speciation and solubility as does a decrease in pH by one unit; thus temperature is important to consider when calculating Aluminum toxicity.

The specific biological activity of the various Aluminum species is almost entirely unknown as most published studies have dealt with a very limited list of test organisms under often poorly controlled or poorly characterized experimental conditions.

The reliance on a standard that considers only dissolved Aluminum is particularly problematic. Insoluble forms of Aluminum may well have significant biological effects. For example, precipitated $\text{Al}(\text{OH})_3$ may coat and clog respiratory structures or surfaces and interfere with the ability of aquatic organisms to exchange respiratory gasses. It is also likely that insoluble Aluminum hydroxides are converted to soluble and therefore more toxic forms when ingested. None of the bioassay studies referenced in the GEI Report (GEI, 2011) examined routes of Aluminum exposure other than absorption across external body surfaces.

The GEI Report upon which WV DEP bases its case for a hardness-based Aluminum WQ rule, relies upon mostly static and mostly short-term bioassays involving relatively few species, and only a few of which actually occur in West Virginia waters. The US EPA recommends the use of indigenous species in developing criteria intended to apply statewide (as opposed to nationwide or federal standards.)

More significantly, the standard 96 hour short-term bioassay procedure requires that the test animals not be fed during the test period. As a consequence of this, dietary sources of Aluminum are not considered in evaluating its potential toxicity towards aquatic organisms. For some organisms in nature however, dietary exposure may be the major mode of entry of toxins (Poteat and Buchwalter, 2011). These authors state that in every study comparing dietary vs. dissolved exposure of which they are aware, diet is the predominant route of exposure of aquatic insects to toxic metals and they conclude that dietary acquisition strongly drives the bioaccumulation of metals in aquatic insects. One study (Cain *et al*, 2011) suggests that as much as 95% of the toxic metal body burden of aquatic insects may come from dietary sources. Another study (Xie and Buchwalter, 2011) suggests that diet-derived metals may be more physiologically active than those acquired in dissolved form through gills or other external body surfaces.

While many laboratory studies have indicated that aquatic insects are relatively insensitive to metals, a number of field studies conducted in natural aquatic systems have suggested that it is the aquatic insects that are among the first members of the aquatic community to disappear at metals-

contaminated sites (Brix et al, 2011). This disconnect makes sense if the primary route of exposure is via the digestive tract rather than passage of dissolved metals through respiratory or other body surfaces since only the later is generally considered in laboratory studies.

Many of the stream insects of West Virginia feed upon detritus, i.e. dead particulate organic material transported by streamflow. In fact, such materials often represent the base of the food webs of forested upland stream systems. Much of this material originates in the terrestrial ecosystem that surrounds the stream rather than in the stream itself. Seasonally-shed tree leaves and flowers constitute the bulk of this detrital material which may consist of particles as large as a whole leaf or as small as a grain of pollen. The bulk of a leaf's dry weight consists of cellulose which cannot be digested by stream insects. What detritus-feeding insects actually feed upon is a thin surface layer of aquatic bacteria and fungi that are actually digesting the cellulose of the leaf. For the aquatic macro-invertebrate there is relatively little nutritional value in the detritus itself.

Over the usual pH range of natural waters, any aluminum that enters a stream in soluble form is likely to be rapidly converted to insoluble Aluminum hydroxide, $\text{Al}(\text{OH})_3$, which may be incorporated into bottom sediments or may coat the surfaces of submerged objects. In either location it is probable that it will be ingested by stream animals that make their living by scraping algae off of rocks, or shredding leaves, or filtering small particles of organic material out of the water, or by simply passing bottom sediment through their digestive tracts, extracting anything digestible that happens to be included in it. All of these represent feeding styles of aquatic insects or other macro-invertebrates that inhabit West Virginia's streams. Detritus is a low quality food material and therefore detritus feeders must consume large quantities of it to meet their nutritional needs. If the material is coated with Aluminum hydroxide or otherwise contains Aluminum in particulate form, detritivores will potentially ingest a great deal of Aluminum in the course of their normal feeding activities. Corbi *et al* (2010) found that Iron and Aluminum in sediments were "highly bioaccumulated" by aquatic insects and that metals levels in aquatic insect larvae varied directly with the concentration of those metals in the sediments of the streams in which they lived.

In a survey of Swedish streams of different acidities and Aluminum concentrations Herrmann and Frick, (1995) found that a predacious stonefly (*Isoperla grammica*) consistently had aluminum tissue levels only about a third as high as the detritus-feeding organisms upon which it fed. This is consistent with Aluminum's apparently modest potential for biological magnification, but since both stonefly and prey were exposed to the same levels of dissolved Aluminum in the external medium, they would be expected to contain similar Al tissue levels if absorption via body surfaces was the only route of entry. This observation supports the notion that detritivores acquire Aluminum from other sources, presumably dietary ones, since in natural systems, that is the only other possible route of exposure.

The chemical environment in an animal's digestive tract is far different from that of the external environment and would be expected to influence the uptake and perhaps the chemical speciation of ingested metals. Dow (1992) found that members of at least four Orders of Insects (Coleoptera, Diptera, Lepidoptera, and Isoptera) have midgut pHs in excess of 12 - the highest pH known in any biological system. There is some evidence that these high pH values represent an adaptation to a tannin-rich diet such as plant detritus (Berenbaum, 1980). Since terrestrial plant detritus is a major food source for many members of the aquatic insect communities of forested upland stream systems, these animals might be expected to have a similar type of digestive physiology.

As pH varies, changes in inorganic Aluminum speciation are nearly instantaneous (Gensemer & Playle, 1999). At the high pH of the insect midgut, ingested particulate Aluminum compounds would be expected to be rapidly converted from the insoluble and relatively non-toxic forms such as the $\text{Al}(\text{OH})_3$ prevalent at normal stream pHs into more soluble (and more toxic) forms such as the Aluminate ion, $\text{Al}(\text{OH})_4^-$. Such effects are of course not accounted for by the standard 96 hour bioassays used in support of the hardness-based Aluminum model. Detritus-feeding macro-

invertebrates are keystone species in woodland stream ecosystems, and as such, a water quality rule that is not protective of them is not protective of aquatic life in general.

It would be useful if the WV DEP could produce data that shows that the currently permissible levels of Aluminum are truly protective of a range of aquatic life broader than just salmonid fishes and daphnids. Unfortunately, the requisite laboratory studies have apparently not been done and the evaluation of Aluminum toxicity from field data is difficult at best due to the presence of multiple confounding factors. We have seen no evidence that the discharge of Aluminum even at currently permissible levels is protective of all of the species of aquatic life that are important in West Virginia's aquatic ecosystems. Because there is such a paucity of relevant scientific information regarding both the effects of Aluminum on aquatic organisms and the role that water hardness plays in ameliorating such effects, I feel that it is irresponsible to drastically increase the amount of Aluminum that can be legally discharged until such time as a better understanding of the possible effects of such a change is at hand. It may well be that discharging Aluminum at the levels that this proposed rule would permit will still be protective of West Virginia's aquatic life, but right now no one can say with any authority that this is the case.

Much, if not most of the data relied upon by the GEI report was generated by studies that were not designed to demonstrate that a hardness-based Aluminum standard such as the one proposed by the WV DEP will be protective of aquatic life. The studies cited in the GEI Report show a good deal of scatter of LC50 figures for similar values of hardness and pH. Such scatter of values for the same organism, and the same investigator(s), and for similar hardness and pH values suggest that factors other than hardness were likely important in determining the Aluminum toxicity in the test situations. In addition, because of the sensitivity of Aluminum chemistry to pH (and other factors), it is not at all clear in these data which species of Aluminum were actually being evaluated.

According to the GEI Report, at the pHs employed in the cited toxicity studies, the dosed Aluminum should rapidly be converted to poorly soluble polymeric hydroxides. In the study of McCauley et al. (1986) there is considerable variation in LC50 values while pH varies somewhat and hardness is constant. There is also some evidence in these data (see data from Gundersen et al. 1994) that flow-through bioassays yield lower LC50 (i.e. higher toxicity) values than do static tests under otherwise comparable conditions. This possibility was also mentioned in EPA's 1988 Aluminum Water Quality Criteria document. It is possible that the high LC50 values produced by some of the static testing is due to conversion of Aluminum to less soluble and therefore less toxic forms over the duration of the bioassay. Although still within the pH 6.5 to pH 9 range, the pH values employed in the Gundersen studies were higher than those of most of the other studies used in this data set. This may have resulted in more toxic forms of Aluminum [eg. $\text{Al}(\text{OH})_4^-$] being produced. Gensemer and Playle (1999) point out that the prediction of Aluminum toxicity at $\text{pH} > 7$ is not a simple matter and is limited by a poor understanding of the bioavailability of Aluminum under alkaline conditions.

So little is known of the fate and biological effects of Aluminum in natural aquatic systems that it seems prudent to take a conservative approach to revising the Aluminum standard at this time. A great deal more sound science is needed before it can confidently be determined what levels of Aluminum are protective of the aquatic life of West Virginia's waters. Until that science is available, it is irresponsible to permit the significantly greater aquatic loading of Aluminum that this emergency rule would allow. I therefore respectfully ask that the WV DEP take the following points into consideration as it finalizes a revised Aluminum standard.

1. The scientific support for the assertion that increased levels of hardness are protective against Aluminum toxicity is considerably weaker than it is for the protective effects of hardness against divalent metals such as Copper or Cadmium..
2. Only a few of the scientific studies that were used to support this assertion were specifically designed to examine the relationship between hardness and Aluminum's toxicity towards aquatic organisms.
3. In many of the published studies cited by the GEI Report, the experimental conditions were poorly controlled or poorly characterized.
4. There is some evidence that the toxicity of Aluminum increases at the higher end of the pH range 6.5 to 9.0.
5. The organisms used to derive the slope of the aluminum-hardness relationship: *Ceriodaphnia dubia*, *Daphnia magna*, and *Pimephales promelas* are either not found or are uncommon in the vast majority of the West Virginia streams to which this rule would apply. In addition, these organisms are relatively tolerant of a wide range of polluted conditions.
6. USEPA recommends the use of indigenous species in developing criteria intended to apply statewide (as opposed to nationwide or federal standards.) As far as I can determine, this was not the case in the scientific studies that are cited to support the proposed Aluminum rule.
7. The assumption that insoluble Aluminum will remain insoluble as it moves through chemically and physically variable stream environments, and through the digestive tracts of organisms themselves, will almost certainly not be valid in many cases.
8. While the equations used to derive allowable levels of discharged Aluminum under this rule are similar to those used by the states of Colorado and New Mexico, they are not identical and the WV DEP should provide a scientific rationale for these differences.
9. WV DEP should provide scientific justification for the use of an Aluminum-hardness relationship (the equation) that was developed for total recoverable Aluminum to be applied to a rule based upon dissolved Aluminum alone.
10. Any hardness-based rule that is adopted by the state of West Virginia should employ total recoverable aluminum as a basis of calculation rather than dissolved Aluminum alone.

Submitted by:

James J. Van Gundy, Ph.D.
Member, Environmental Protection Advisory Council

References:

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Aluminum pH_Analysis

Footnote 12

date	tss	tot	dis	fd	pH	Dataset	Permit
1/30/07	2	0.22	0.104	0.473	6.89	1	WV1014597(1)
2/6/07	4	0.3	0.115	0.383	6.88	1	WV1014597(1)
2/18/07	1	0.21	0.155	0.738	7.2	1	WV1014597(1)
3/6/07	10	0.31	0.148	0.477	7.02	1	WV1014597(1)
3/22/07	1	0.21	0.11	0.524	6.83	1	WV1014597(1)
4/10/07	1	0.13	0.064	0.492	7.09	1	WV1014597(1)
4/23/07	1	0.21	0.091	0.433	6.9	1	WV1014597(1)
5/8/07	1	0.16	0.099	0.619	6.97	1	WV1014597(1)
5/24/07	1	0.19	0.121	0.637	6.97	1	WV1014597(1)
6/13/07	1	0.15	0.114	0.76	6.91	1	WV1014597(1)
6/23/07	1	0.13	0.096	0.738	6.95	1	WV1014597(1)
7/10/07	1	0.1	0.098	0.98	7.09	1	WV1014597(1)
7/17/07	13	0.12	0.0015	0.013	7.02	1	WV1014597(1)
1/8/08	1	0.22	0.111	0.505	7.1	1	WV1014597(1)
1/16/08	1	0.2	0.085	0.425	6.93	1	WV1014597(1)
1/24/08	1	0.3	0.075	0.25	7.05	1	WV1014597(1)
2/1/08	32	0.98	0.136	0.139	6.68	1	WV1014597(1)
2/9/08	1	0.28	0.116	0.414	7.57	1	WV1014597(1)
2/25/08	2	0.31	0.122	0.394	7.31	1	WV1014597(1)
3/4/08	6	0.34	0.1	0.294	7.02	1	WV1014597(1)
3/12/08	1	0.41	0.096	0.234	7.26	1	WV1014597(1)
3/20/08	2	0.01	0.0015	0.15	7.25	1	WV1014597(1)
5/7/08	1	0.07	0.008	0.114	6.83	1	WV1014597(1)
5/15/08	4	0.45	0.135	0.3	6.83	1	WV1014597(1)
5/23/08	1	0.37	0.079	0.214	7.83	1	WV1014597(1)
5/31/08	1	0.27	0.126	0.467	7.04	1	WV1014597(1)
6/8/08	1	0.16	0.117	0.731	7.28	1	WV1014597(1)
6/16/08	2	0.15	0.118	0.787	7.64	1	WV1014597(1)
1/8/08	1	0.08	0.02	0.25	6.25	2	WV1014597(2)
1/16/08	1	0.05	0.0015	0.03	6.56	2	WV1014597(2)
1/29/08	33	0.81	0.063	0.078	7.01	2	WV1014597(2)
2/1/08	16	0.71	0.06	0.085	5.12	2	WV1014597(2)
2/9/08	1	0.05	0.018	0.36	6.12	2	WV1014597(2)
2/18/08	1	0.06	0.031	0.517	5.14	2	WV1014597(2)
2/25/08	1	0.03	0.005	0.167	6.54	2	WV1014597(2)
3/4/08	1	0.02	0.004	0.2	6.85	2	WV1014597(2)
3/12/08	1	0.01	0.0015	0.15	6.19	2	WV1014597(2)
3/20/08	1	0.08	0.022	0.275	6.31	2	WV1014597(2)
3/28/08	7	0.14	0.028	0.2	6.85	2	WV1014597(2)
4/9/08	1	0.07	0.009	0.129	6.5	2	WV1014597(2)
4/13/08	1	0.06	0.017	0.283	6.48	2	WV1014597(2)
4/21/08	1	0.08	0.01	0.125	6.28	2	WV1014597(2)
4/29/08	12	0.09	0.02	0.222	6.77	2	WV1014597(2)
5/7/08	9	0.06	0.029	0.483	6.22	2	WV1014597(2)
5/15/08	4	0.05	0.018	0.36	7.49	2	WV1014597(2)
5/31/08	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

Aluminum pH_Analysis

Footnote 12

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



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Dear Mr. Mandirola,

Please accept these comments on behalf of Appalachian Mountain Advocates, West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition. We are greatly concerned about West Virginia's triennial review of water quality standards and revisions to the water quality criteria for the toxic pollutant selenium proposed by the West Virginia Department of Environmental Quality ("DEP"). DEP's proposed fish tissue-based criteria would allow total extirpation of sensitive fish species from West Virginia's waters and should be rejected as scientifically indefensible and practically unenforceable. Additionally, the criteria fail to protect threatened and endangered species and cannot be approved in compliance with the Endangered Species Act.

1. The proposed chronic fish tissue criteria will not protect sensitive and recreationally important species in West Virginia's waters.

DEP proposed the use of 8.3 µg/g dw as a final chronic value (FCV) for whole body fish tissue and 20.0 µg/g dw as a FCV for egg/ovary tissue. Both criteria are less protective than those recommended by US EPA in its 2014 "External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium" ("2014 Draft Criterion"). DEP's calculation of the FCVs for both whole body and egg/ovary is inappropriately lax because it is not derived to protect the most sensitive recreationally-important species in West Virginia's waterways. To calculate FCVs, DEP included the GMCVs from fourteen separate genera. Even if the GMCVs derived for each of these taxa were accurate (and they are not), the consideration of fourteen genera, rather than the most sensitive species, is inappropriate.

EPA's *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) explain that water quality criteria should fully protect sensitive species that are "commercially or recreationally important." Although DEP's Scientific Justification provides very little detail on the methods used to its egg/ovary element, which forms the basis for its whole tissue element, it appears DEP averaged the genus mean chronic values for fourteen different genera. The resulting fish tissue elements are not adequate to protect certain sensitive species that are commercially and recreationally important, such as species of bluegill and catfish.

In a letter to EPA expressing concern over the egg/ovary criterion in EPA's 2010 draft proposal, selenium expert Dr. Dennis Lemly of the USDA Forest Service concluded that EPA's inclusion of more tolerant species in the criterion evaluation and development resulted in a proposed criterion that would have allowed mortality to exceed allowable limits in more sensitive species. Dr. Lemly stated that scientific studies show:

quite clearly that a criterion of 17.07 mg/kg for fish eggs/ovaries will jeopardize two of the most important freshwater fish families in North America: Centrarchidae and Ictaluridae. For example, (1) An EPA field study published in the peer reviewed journal *Environmental Toxicology and Chemistry* (Hermanutz et al 1992) found that ovary selenium concentrations of 9 mg/kg dw or greater resulted in 40% higher mortality and 80% more edema in larval bluegill

sunfish that controls for an EC40-80 (converted from wet weight using 80% moisture, based on mean wet weight $\pm$ one standard deviation).¹ The results of this study are not included in EPA's draft criterion calculation, and (2) A laboratory study at the University of California (Doroshov et al. 1992) found that the EC50 for larval mortality of channel catfish and bluegill sunfish occurred at egg selenium concentrations of 7.2 and 15.0 mg/kg dw respectively (lower limit of 95% confidence intervals). These mortality data were not included in the data used to derive the FCV.

...

Extensive field data from the Belews Lake case example, which includes reproductive analysis from young-of-the-year stock assessment, clearly show that catfish are very sensitive selenium poisoning in a real-world setting. . .equal to or greater than sunfish (Cumbie 1978, Cumbie and Van Haron 1978, Holland 1979, Garrett and Inman 1984, Lemly 1985). . . .

The FCV needs to be lower than 10 mg/kg dw in order to protect sunfish and catfish at an EC10 level, which is the level of protection afforded to trout by the 17.07 draft criterion value.

Letter to Mr. Joseph Beaman, Chief, USEPA, Office of Water, Ecological Risk Assessment Branch, Washington, DC from A. Dennis Lemly, Ph.D., Research Fish Biologist, USDA Forest Service, Southern Research Station, Piedmont Aquatic Research Laboratory, July 6, 2010 at 1-3 (emphasis added). Clearly, DEP's proposed egg/ovary element of 20.0 mg/kg would not protect those species at the EC10 level.

In addition to improperly averaging values across genera, DEP failed to adequately account for "winter stress" in sensitive bluegill species. As EPA recognized in its Draft Criterion document, a study by Dr. Lemly found the protective chronic selenium whole body concentration for juvenile bluegill to be 5.85 mg/kg prior to winter stress. Instead of using this protective value for the bluegill's genus mean chronic value, DEP apparently adopted EPA's approach in its 2014 criterion and averaged that value with the values from McIntyre et al.'s 2008 study, which also purported to account for winter stress, but arrived at a much less protective concentration of over 9 mg/kg. See EPA Draft Criterion at 122-23. Reliance on the McIntyre study to account for selenium is misplaced, however, because that study failed to actually induce winter stress, in part, because it did not control photoperiod or discuss the impacts that the lack of photoperiod controls may have on the interpretation of study results. EPA must fully account for winter stress, using studies that actually induce such stress by recreating realistic winter conditions including reduced photoperiod, when revising its fish tissue concentrations to ensure protection of sensitive aquatic species.

Protection of sensitive species could be further undermined as a result of implementation issues. If DEP allows "species composite" sampling to suffice for enforcement and assessment purposes, impacts to sensitive species could go unnoticed. Thus, if DEP adopts fish-tissue criteria, it must require compliance with those criteria are determined on a species-by-species basis. Even that approach is flawed, however, because it fails to account for variation among individuals and various life stages.

Finally, reliance on fish tissue criteria fails to protect sensitive species that have already been extirpated from a site due to selenium or other mining related pollution. Nor will it allow sensitive fish to recolonize those streams. If sensitive species are missing, for whatever reason, that will greatly distort evaluation of whether discharges are complying with water quality standards including protection of stream uses. It will mean that high selenium inputs could be authorized despite pollution that has already led to the elimination of sensitive species. If a stream contains only species that process selenium from the environment into their tissue at much slower rates, serious impairment as a result of depletion of species-richness would be missed by the proposed tissue criteria. The U.S. Fish and Wildlife Service critiqued this same "survivor bias" in its comments on EPA's 2014 Draft Criterion:

¹ DEP wrongly omits the results of this study based on "unexplained irregularities" while relying on studies with equal or greater flaws that resulted in higher, less-protective tissue values. Especially given the general paucity of selenium toxicity data, the 1992 Hermanutz studies provides valuable information that DEP should have considered.

For water bodies that are substantively over the water-based chronic criteria, how would we know that results of tissue sampling weren't biased low due to the susceptibility of nearly all fish sampling techniques to survivor bias? The changes in fish assemblages following selenium pollution from mountaintop removal-valley fill mining in Appalachia reported by Hitt and Chambers (In Press), and the differential extirpations of select species of fish at Belews Lake, in the San Luis Drain, California, and in the Swedish Lakes study (all these examples summarized in Skorupa 1998) suggest that implementation of tissue-based criteria for fish could face impediments related to sampling designs that don't have a means for detecting and protecting against the invalidating effects of survivor bias.

July 28, 2014 Comments of US FWS to Gina McCarthy, Administrator US EPA at 21–22. DEP's criteria thus do not protect streams already impaired by selenium or where other pollutants have already eliminated sensitive fish species. If a species such as bluegill were present in a stream at the time the Clean Water Act was passed, protecting the use of that stream as a bluegill fishery is mandated now. DOW criteria thus impermissibly fails to guarantee protection of stream uses.

2. The proposed chronic fish tissue criteria are effectively unenforceable and are not compatible with meaningful development of effluent limitations in WV/NPDES permits.

Because fish tissue criteria are not compatible with clear and efficient implementation, DEP should express its criteria as practically enforceable water column elements. In passing the CWA, Congress recognized the fact that water quality standards – which existed prior to 1972 – would not, of themselves, protect and improve water quality. Accordingly, Congress established the National Pollutant Discharge Elimination System (NPDES), providing a mechanism for clear application and enforcement of water quality standards. Further frustrated with a lack of progress in realizing the promise of narrative water quality goals, Congress again amended the Act in 1987, at that time requiring the development and application of numeric criteria for waterways affected by toxic pollutants. These revisions clearly illustrate Congress' intent to assure that water quality standards and goals are specific and translated into enforceable limitations on pollution sources.

Water quality criteria thus not only measure whether water bodies are meeting the uses mandated by the CWA, but also form the basis for establishing effective controls on water pollution to further the CWA's goal of "restor[ing] and maintain[ing] the chemical, physical and biological integrity of the nation's waters." See 33 U.S.C. § 1251(a). As EPA has recognized, water quality criteria must "serve the dual function of establishing water quality goals for a specific waterbody and providing the basis for regulatory controls." *EPA Water Quality Standards Handbook* at 4.6 (emphasis added). See also 40 C.F.R. § 130.3 (noting that water quality standards "serve the dual purposes of establishing the water quality goals for a specific water body and serving as the regulatory basis for establishment of water quality-based treatment controls and strategies"). Although a fish tissue-based criterion may be an accurate way to measure the threat posed by selenium in a waterbody (if the criterion is set at the appropriate level), it fails to provide the basis for effective regulatory action.

Indeed, in 2005, the USEPA/U.S. Department of Interior Tissue-based Criteria Subcommittee issued a draft report summarizing its opinions on aquatic life water quality standard guidelines. The report cautioned that fish tissue criteria alone would be insufficient to address "both scientific and regulatory needs concerning the relationship between chemical loadings and accumulated chemical residues in the tissues (i.e. bioaccumulation)." Science Advisory Board Consultation Document, Proposed Revisions to Aquatic Life Guidelines, Tissue-Based Criteria for "Bioaccumulative" Chemicals at 10.² In the Subcommittee's opinion, there was a "need to develop guidelines for translating tissue-based aquatic life...criteria into corresponding concentrations in environmental media (e.g. water)..." *Id.* at 13. The Subcommittee subsequently listed "implementability" as a reason to develop fish-tissue-to-water-column translations, noting that "monitoring and

² Available at http://www.epa.gov/scipoly/sap/meetings/2008/october/aquatic_life_criteria_guidelines_tissue_08_26_05.pdf

enforcing pollutant discharge limits on the basis of measured chemical concentrations in tissues of organisms may not be practical or desirable..." Id.

DEP has not explained how it will incorporate the proposed fish-tissue elements into enforceable measures needed for NPDES permit limits, TMDLs, and other pollution control decisions required by the Clean Water Act. DEP's proposal leaves unanswered fundamental questions about how the fish-tissue elements are to be used when issuing NPDES permits. For instance, how are regulators to determine the "reasonable potential" for a proposed new discharge to cause or contribute to violations of the fish tissue elements? How will appropriate "end of pipe" effluent limits be determined? If there is a "reasonable potential," when must treatment start? Without clear guidance from DEP, we fear that the agency will not be practically able to set necessary water quality-based permit limits. A recommended criterion that does not explicitly establish when permit limits must be imposed but instead injects considerable uncertainty into the reasonable potential analysis invites acquiescence to industry pressure to impose no limits or limits that are effectively meaningless.

Likewise, DEP's proposal lacks necessary information regarding how compliance with the fish-tissue elements should be determined for the purpose of enforcing WV/NPDES permit limits, evaluating waters for impairment, and developing and enforcing TMDLs. For instance, if a permittee receives a fish tissue-based NPDES permit limit, where must sampling of fish occur in relation to the discharge? How many fish must be collected to provide a representative sample? How often and at what stages of life must sampling take place? What fish taxa will be used to determine compliance? How will regulators account for variation and individual differences and toxicity within taxa depending on, among other things, age, individual diet, areas of forage, and duration of stay in polluted waters? If adequate numbers of fish are indeed collected, what impact will this have on fish populations that may already be pressured by selenium and other pollution? How will regulators ensure that endangered species are protected by sampling protocols such that illegal "take" of threatened or endangered species is avoided? How will impairment be detected in waters where sensitive species that rapidly accumulate selenium have already been extirpated?

DEP has not shown that compliance with the fish tissue elements can accurately be determined in most circumstances. This is particularly problematic in small headwater streams that directly receive much of the selenium pollution from coal mines in Appalachia. These streams often lack sufficient fish populations for a truly representative sample to be collected, and downstream reaches with larger fish populations often receive discharges from many different sources such that responsibility for violations of the standard will be extremely difficult to assign. Moreover, if a "species-composite" method is used to determine compliance with a fish-tissue element, wherein the tissue of all fish collected is combined for analysis, it is likely to miss impairment of sensitive species that accumulate selenium more rapidly.

Instead of relying on fish tissue standards that present critical implementation problems, DEP should adopt clearly enforceable water column criteria. EPA's 2014 Draft Criterion document recognizes that the dietary pathway of selenium accumulation can still be accounted for in water column criteria. Using the methods developed by the EPA and the United States Geological Survey, protective fish tissue concentrations can be translated to practically enforceable water column criteria. Draft Criterion at 62. The model developed by USGS recognizes that diet is the primary pathway of exposure for selenium and creates a simple, direct linkage between dissolved selenium in the water column and selenium toxicity to aquatic life. EPA's Draft Criterion document explains that the expected and measured relationships between egg-ovary concentrations and water column concentrations are "highly correlated."³ Draft Criterion at 134. An inviolable water column

³ DEP could create an even more robust water column criterion by collecting additional data correlating fish-tissue concentrations to water column concentrations. See 2014 Draft Criterion at 135 (explaining that minor variability in correlation could be due in part to small sample size). Regardless, the uncertainty in translating protective fish tissue values to water column numbers is likely far outweighed by the uncertainty in determining compliance with the fish tissue elements in the absence of robust tissue sampling protocols.

criterion that is based on fish tissue concentrations is therefore scientifically defensible because it recognizes and accounts for the fact that diet is the primary pathway for selenium uptake.

DEP's retention of its previous water column criterion in no way corrects this fundamental flaw. DEP's proposal explicitly states that the fish tissue elements should be given primacy over the water column elements. That statement largely eliminates any implementation benefits of including water column elements. The better approach would be to adopt only a translated water column criterion and to eliminate the fish tissue elements.

Not only is a translated water column criterion scientifically defensible, it is also vastly more useful as a regulatory tool. West Virginia has specific, federally-approved procedures for how to convert water column criteria to enforceable restrictions on wastewater discharges, in addition to the technical guidance, training and other materials on scientifically valid models, necessary background data, sampling protocols, and acceptable laboratory techniques for the implementation of traditional water column criteria that EPA has provided. Water column criteria also can be more easily enforced by citizens with limited resources. Enforcing the proposed fish-tissue elements, in contrast, will require a case-by-case analysis of the local ecosystem, including collection, processing, and testing of fish tissue, all of which will require significant resources and inject considerable uncertainty. Thus, in order to achieve the dual purposes of water quality criteria, DEP should adopt a set of water column criteria that are translated from protective fish-tissue concentrations.⁴

3. The proposed water column criteria is inadequate because instream selenium levels of 5 µg/l can lead to significant impacts on aquatic life.

DEP proposes to retain its existing water column criteria of 5 µg/L as one element of its tiered criteria, but does not provide a scientific justification for maintain that value. Commenters believe that a water column value must be an element of any approvable standard and that a stand-alone water column value translated from a fish tissue threshold represents the best, most easily implementable selenium criterion. However, as DEP revises its selenium criteria, it should revisit using the 5 µg/L value in light of data not available or considered when that criterion was developed. A number of leading experts promote reducing the existing national water column criterion to a level lower than 5 µg/l. Swift recommends a criterion of 2µg/l. Lemly and Skorupa criticized the existing 5 µg/l, stating that:

The USEPA last promulgated an updated national chronic criterion for selenium in 1987, some 20 years ago, setting the criterion at 5 µg Se/L on an acid-soluble basis (USEPA 1987). Since that time, serious weaknesses in the national criterion have been revealed. For example, several reviewers of more recent selenium literature suggested that the criterion should be 2 µg/L or less (DuBowy 1989; Peterson and Nebeker 1992; Swift 2002).

United States Environmental Protection Agency ("EPA") researchers found significant effects in bluegill progeny with instream selenium concentrations of 2.5 µg/l. "Mean ranks of % edema, % lordosis, and % hemorrhaging in egg cup samples were significantly affected by selenium streams from which they came ($p < 0.01$, $p < 0.01$, $p < 0.05$). Mean ranks were significantly higher for the 2.5 and 10 µg/L treatments than for the control ($p < 0.05$)."⁵ They concluded that the EPA criterion of 5 µg/l might be too high considering their findings.⁶ EPA recently recognized the inadequacy of the 5 µg/L standard in their 2014 Draft Criterion, where the agency proposed water column elements of 4.8 µg/L in lotic systems and 1.3 µg/L in lentic systems. DEP's proposed retention of the 5 µg/l does not, therefore, appear to be protective and does not comply with the Clean Water Act.

⁴ As explained above, the fish tissue elements of EPA's Draft Criterion are too high to protect sensitive aquatic life and should be revised downward significantly. The water column criteria should be based on fish tissue concentrations that are revised to ensure protection of such species.

⁵ Hermanutz, R.O., K.N. Allen, N.E. Detenbeck, and C.E. Stephan. 1996. Exposure of bluegill (*Lepomis macrochirus*) to selenium in outdoor experimental streams. U.S. EPA Report. Mid-Continent Ecology Division. Duluth, MN at 17.

⁶ Hermanutz 1996 at 19, 20, 23

4. The proposed criteria will not protect wildlife dependent on aquatic habitat for survival

The Clean Water Act mandates that water quality standards protect not only fish, but all aquatic organisms and other wildlife that depend on healthy streams. Section 303(c) governs state revisions to water quality standards and requires that such standards “shall be established taking into consideration their use and value for . . . propagation of fish *and wildlife*,” among other things. 33 U.S.C. § 1313(c)(2)(A) (emphasis added); *see also* 33 U.S.C. § 1252(a) (directing states to develop comprehensive programs for controlling water pollution giving due regard to improvements necessary to “conserve such waters for the protection and propagation of fish and aquatic life and wildlife”). EPA’s regulations require states to develop standards that will “[s]erve the purposes of the Act,” meaning that they will “provide water quality for the protection and propagation of fish, shellfish *and wildlife*,” among other things. 40 C.F.R. § 130.3 (emphasis added). West Virginia does not have a wildlife-specific selenium water quality standard. In the absence of any standards that address wildlife, an approach that focusses solely on aquatic life does not satisfy the requirements of the CWA because it leaves such wildlife without any protection under the Act from selenium pollution.

Although DEP did not analyze the impacts of its criteria on aquatic-dependent wildlife, existing evidence makes clear that the concentrations of the proposed fish tissue elements are not protective of aquatic dependent wildlife. As US FWS explained in its comments on EPA’s 2014 Draft Criterion:

As the ecosystem-scale modelling approach makes clear, when EPA sets its primary criterion, which is the chronic criterion for fish E/O tissue, the effects will cascade throughout the aquatic ecosystem and therefore indirectly set the limits for selenium concentrations that can be expected to be observed in every compartment of the ecosystem. So, for example, if translation of the E/O chronic criterion leads EPA to set a fish whole body criterion of 8.1 mg Se/kg, then using EPA’s median TTF of 1.27 for transfer of selenium from aquatic invertebrates to fish (from Table 10, p. 77), we can expect that the median limit for aquatic invertebrates has now been set at about 6.4 mg Se/kg (i.e., 8.1/1.27). Ovulating female water birds rely almost exclusively on an animal diet due to the high protein demands of egg formation, and like the species of fish studied by Conley et al. (2014) and Penglase et al. (2014), water birds move selenium into their eggs directly from their diets, not from internal tissue stores of selenium (Chapman et al. 2010). Thus, using the dietary exposure-response curve developed for mallards and reported in Ohlendorf (2003) we can directly estimate the toxic risk to mallards posed by a whole body fish tissue criterion of 8.1 mg Se/kg. Based on a table of exposure-response values provided by Dr. Ohlendorf for his 2003 publication, a mallard dietary exposure to 6.4 mg Se/kg would correspond to 27% reduction in egg hatchability (EC-27) and the 10th percentile rTF of 0.901 calculated from the data presented in Table 10 (p. 77). The corresponding value of 8.99 mg Se/kg in aquatic invertebrates would lead to a 62% reduction in mallard egg hatchability.

At the median TTF of 1.27, a whole body fish tissue criterion of about 4 mg Se/kg would be required to have a safe dietary exposure of about 3 mg Se/kg for mallards. The Service notes that this is similar to the conclusion we presented in our comment package on EPA’s 2004 proposed selenium criteria (that a fish whole body tissue criterion in the range of 4-5 mg Se/kg would be required to adequately protect both fish and aquatic-dependent wildlife), which we incorporate here by reference and which is still available for viewing in the current Docket (EPA-HQ-OW-2004-0019). Furthermore, a value of 4 mg Se/kg in whole body fish tissue is the guideline value recently published by the British Columbia Ministry of Environment, in part, explicitly to provide sufficient protection for aquatic-dependent wildlife (BC MoE 2014).

FWS 2014 Comments at 20.

US FWS’s comments are very similar to criticism levied at EPA’s 2004 recommended whole-body fish tissue criterion of 7.91 µg/l that was proposed but not adopted. See Notice of Draft Aquatic Life Criteria for Selenium and Request for Scientific Information, Data, and Views, 69 Fed. Reg. 75, 541 (December 17, 2004).

A group of the nation's leading selenium scientists wrote a white paper vigorously criticizing that criterion as not protective and too high. The authors explained the history of the EPA's flawed number:

During the past 17 years numerous researchers including those funded by EPA have estimated that the toxicity threshold for selenium lies below the current chronic aquatic life criterion of 5 µg/L. Recently, corporate interests have claimed that 5 µg/L is overly restrictive. Because of an endangered species issue in California, EPA agreed to re-evaluate their CWA criteria guidance for selenium by 2002. This was problematic because:

- EPA's normal procedure for setting Aquatic Life Criteria does not directly consider toxicity data for aquatic-dependent wildlife.
- EPA has promulgated no separate wildlife criteria for selenium.
- EPA's normal procedure for setting criteria is better suited to non-bioaccumulative pollutants – selenium is bioaccumulative.
- ESA-listed species every individual of a population "counts" and therefore criteria guidance would need to be fully protective at an individual-effects level.

EPA contracted with the Great Lakes Environmental Center (GLEC) to derive the new selenium criteria. GLEC was instructed to derive the chronic criterion on a fish-tissue basis rather than on a water concentration basis. The GLEC derived criterion was released in March 2002. The draft tissue-based chronic criterion, of 7.9 µg/g, dry weight basis, assumed 20% of the target population would die. The USFWS asked EPA to not promulgate the criterion because it wasn't protective of endangered species.

Joseph P. Skorupa, USFWS, Theresa S. Presser, USGS, Steven J. Hamilton, USGS, A. Dennis Lemly, USFS, Brad E. Sample, CH2M HILL, EPA's Draft Tissue-Based Selenium Criterion: A Technical Review. Spring 2004. at 2-3.

The authors noted significant additional flaws in EPA's proposed criterion that would lead to harm to wildlife, including threatened and endangered species:

GLEC's assessment of risk to aquatic-dependent wildlife was based on an erroneous draft wildlife toxicology report. The draft tissue-based chronic criterion for selenium of 7.9 µg/g would leave a substantive proportion of aquatic-dependent wildlife species unprotected; on the order of half the species. Aquatic life criteria are considered by EPA to be separate and distinct from wildlife criteria. Nonetheless, in the absence of promulgated wildlife criteria (as is the case for selenium), if the aquatic life criteria do not protect wildlife the purposes of the CWA are not being met. More critically, for waters of the United States supporting ESA-listed aquatic-dependent wildlife, the criteria would not be approvable for incorporation into state or tribal water quality standards.

Id. Those experts estimated that EPA's previously proposed criterion would have caused reproductive impairment in, conservatively, 40% and possibly as high as 95% of exposed mallard ducks. See Lemly, A. Dennis, Assessing the toxic threat of selenium to fish and aquatic birds, Environmental Monitoring and Assessment 43: 19-35 (1996). Reproductive impairment occurs if ducks are exposed through a contaminated diet during the development of their chicks. Mallard ducks are ubiquitous, breeding near and relying on aquatic resources throughout the US. They are primarily vegetarians eating seeds of grasses and sedges and the leaves, stems and seeds of aquatic plants. They occasionally eat insects, crustaceans and mollusks, especially when they are young. See <http://www.nhptv.org/natureworks/mallard.htm>. While the ducks do not eat fish, "allowing fish tissue to reach 7.9 ug/g would allow a level of contamination in the other parts of the aquatic ecosystem sufficient to cause nearly total reproductive failure among mallard ducks." Skorupa et al. at 22.

Both of the fish tissue values that leading scientists determined would have unacceptable impacts on aquatic-dependent wildlife are more protective than the criteria proposed by DEP. DEP thus must either revise its fish tissue criteria to ensure that they protect aquatic-dependent wildlife or else adopt a concurrent wildlife criterion along with the aquatic life criteria.

5. The Criterion Must Protect All Threatened or Endangered Species

Although, DEP does not have obligations under the Endangered Species Act related to its revision of water quality standards, EPA's approval of those standards, required by 40 C.F.R. § 131.21, does trigger the requirements of the ESA. USEPA, USFWS, and the National Marine Fisheries Service have a Memorandum of Agreement (MOA) that governs protection of endangered and threatened species under Section 7 of the Endangered Species Act, 16 U.S.C. § 1536, in regard to, among other things, revisions to water quality standards.⁷ EPA has stated that "where approval of new or revised standards may have an effect on a listed species or designated critical habitat, consultation under section 7(a)(2) [of the ESA] is required. . . . [W]ater-dependent endangered and threatened species are an important component of the aquatic environment that the CWA is designed to protect, and steps to ensure the protection of those species are well within the scope of the CWA."⁸

Water quality standards must protect all existing uses in a waterbody, which uses often include supporting species that are listed as threatened or endangered pursuant to the Endangered Species Act. See 33 U.S.C. § 1313. Additionally, Section 7 of the Endangered Species Act and its implementing regulations require each federal agency, in consultation with the appropriate wildlife agency, to insure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species or (2) result in the destruction or adverse modification of the critical habitat of such species. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). EPA thus must ensure that any criteria that it approves will be fully protective of listed species.

USFWS records show that West Virginia waters support numerous species that have been listed as threatened or endangered pursuant to the Endangered Species Act, including 10 species of freshwater mussels and one crustacean. See WV DNR, Federally Threatened and Endangered Species in West Virginia.⁹ Additionally, both the Diamond Darter and the Big Sandy Crayfish are proposed for listing. Id. In the absence of specific toxicity data for those species, DEP cannot safely assume that the species it considered in setting its fish tissue criteria are good proxies. Indeed, EPA recognizes in its 2014 Draft Criterion document that "because other threatened or endangered species might be more sensitive, if relevant new information becomes available in the future, it should be considered in state- or site-specific criteria calculations." Draft Criterion at 139–40. Instead of putting off protection of sensitive endangered species to later state or site-specific standard setting, DEP must revise its criterion to ensure protection of all endangered species. It is not sufficient to say that the agency lacks information. Rather, in the absence of additional data regarding selenium-sensitive listed species, DEP must apply a substantial safety factor to its criterion to ensure protection of such species.

Moreover, as USFWS has noted to EPA, use of the EC10 effect is inappropriate for water quality criteria that apply to listed species. When dealing with listed species, every individual is important. An EC10 effects level assumes that one out of every ten individuals will suffer adverse effects. That is unacceptable for listed species. As the USFWS stated to EPA in comments on its 2014 Draft Criterion:

[I]t is still unclear how an EC-10 standard for fish-tissue criteria relates to threatened and endangered species conservation. A large majority (>90%) of all species of freshwater fish listed under the Endangered Species Act (ESA) have not been tested for sensitivity to selenium

⁷ 66 Fed. Reg. 11,202 (Feb. 22, 2001).

⁸ *Id.* at 11,206.

⁹ Available at <http://www.wvdnr.gov/Wildlife/RareSpecList.shtm>.

toxicity. Assuming that ESA-listed species exhibit a distribution of sensitivities comparable to non-listed species (as several EPA-funded studies have indicated), it can be expected that in waters achieving EPA's newly proposed fish-tissue criteria about 5% of ESA-listed species would experience a 10% or greater level of reproductive toxicity. Also, it can be expected that some unknown additional percentage of ESA-listed species would experience a level of reproductive toxicity greater than 0% but less than 10%.

FWS Comments at 3. It is thus clear that DEP's proposed criteria will not adequately protect federally-listed species and this will not be approvable as a result of the required consultation with US FWS pursuant to Section 7 of the ESA.

CONCLUSION

For the foregoing reasons, DEP must significantly reduce the concentrations allowed under its fish tissue elements to ensure they are protective of sensitive species, aquatic-dependent wildlife, and threatened and endangered species. DEP must then translate those revised tissue concentrations to enforceable water column criteria that can be practically implemented to achieve the regulatory requirements of the Clean Water Act.

Respectfully submitted,

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July 31, 2015

Scott Mandirola
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601 57th Street S.E.
Charleston WV 25403
dep.comments@wv.gov

Dear Mr. Mandirola,

Please accept these comments on behalf of Appalachian Mountain Advocates, the West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition, in regards to the proposed site specific water quality variances on Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries, as well as Maple Run, Left Fork of Little Sandy Creek, Left Fork Sandy Creek and their unnamed tributaries. WVDEP is moving too fast, answering too few questions, in proposing the variances for these streams in the Cheat and Tygart watersheds. The background work and legal justification has not been provided to support the variances and too many questions remain for WVDEP to move forward at this point.

1. There has been No Showing the Designated Uses Cannot Be Achieved

A variance from numeric water quality criteria may only be granted if certain conditions, outlined in 47 CSR 2-6.1.b, limit the attainment of specific water quality criteria. 47 CSR 2-8.4. The Office of Special Reclamation is applying for both variances under the provision, "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." 47 CSR 2-6.1.b.4; 46 CSR 6-4.1.d. The regulations require that "it can be demonstrated that attaining the designated use is not feasible because" of such a condition. OSR has not made such a showing.

2. The Office of Special reclamation has Not Shown that Pollution Entering the Streams from its Facilities Cannot Be Remedied or that a Remedy Would Cause More Environmental Damage

There has been no demonstration that either the discharges from OSR's facilities or the AML pollution entering the streams "cannot be remedied or would cause more environmental damage to correct than to leave in place." The variance applications do not even identify the locations, flows, and chemical compositions of the OSR or AML sources. The maps attached to the applications do little to substitute for the missing information. They simply indicate that OSR has more information than it is making available to the public. The applications include no description of possible treatment options for the OSR or AML sources and their limitations. While a seven-year remediation effort is referenced in the application for a variance on Martin Creek, it does not describe what treatment methodologies were used.

3. The Office of Special Reclamation has Not Demonstrated the Discharger Will Be Unable to Meet Water Quality Criteria.

In addition, OSR has conflated the OSR discharges and the instream water quality. An application for a variance must include, "Identification of the specific circumstances which render the discharger unable to meet the existing water quality criteria which apply to the stream." 46 CSR 6-5.3.d (emphasis added). In the each

application, to meet that requirement OSR describes the AMD problem from abandoned mine lands. Pre-law mining pollution has no impact on OSR's ability to meet existing numeric water quality criteria. In fact, OSR does not require a variance for its own discharges. At no point has OSR indicated that it cannot meet water quality standards at the "end-of-pipe." OSR has not made the showing required under the law for a complete application for a variance. A variance only applies to the discharger requesting the variance, 46 CSR 6-5.2; 47 CSR 2-8.4, yet the discharger in this case does not require a variance. In addition, the variances are phrased as if they apply to waterbodies, rather than OSR's discharges in those waterbodies, as required by the regulations. The use of instream dosers cannot be covered by this variance, but also should not require a variance.

4. The Proposed Variance Does Not Describe Alternative Restoration Measures.

The proposed variances reference, "Alternative restoration measures, as described in the variance application." The variance applications do not describe alternative restoration measures. The closest they come is the vague statement, "OSR is proposing the strategic placement of in-stream lime doser's in order to enhance overall stream quality," which appears in the introduction to each application. The maps attached to the applications include locations for the dosers. The applications lacks any description of what the dosers will do, what chemicals and concentrations will be used, how they will be monitored, or what impact they will have downstream.

5. The Proposed Variance Will Result in Sections of Martin Creek and Sandy Creek Being Used Only for Waste Transport

The proposed variances will result in the suspension or removal of all designated uses in certain sections of Martin Creek and its tributaries and Sandy Creek and its tributaries. These sections of stream will, in effect, be used only for waste transport, a use strictly prohibited by federal regulations. 40 C.F.R. § 131.10(a) ("In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.")

6. The Office of Special Reclamation has not Conducted the Necessary Use Attainability Analysis to Remove Fishable/Swimmable Uses

The removal of designated uses will necessarily include the removal of aquatic life and human contact recreation uses described in 47 C.S.R. § 2-6. In other words these waterways will no longer be designated to attain the "fishable/swimmable" uses that are at the heart of the Clean Water Act. *See* 33 U.S.C. § 1251(a)(2) (establishing the national goal of fishable/swimmable waters). The fishable/swimmable designated uses have special protection under the Clean Water Act. 40 C.F.R. § 131.10(j). To remove them a state must conduct a use attainability analysis pursuant to 40 C.F.R. § 131.3(g). This is a "structured scientific assessment of the factors affecting the attainment of the use. . ." 40 C.F.R. § 131.3(g). According to EPA, "the most significant misperception about designated uses and UAAs is that UAAs need only address the current condition of a waterbody: that a designated use may be removed simply by documenting that protective criteria are exceeded. However, it is the prospective analysis of future attainability of designated uses that provides the demonstration necessary to support a use change."

See <http://water.epa.gov/scitech/swguidance/standards/uses/uaa/info.cfm>. While the Office of Special Reclamation has shown that the waters to be subject to the proposed variance are not currently meeting designated uses, the OSR has performed no analysis to demonstrate the impossibility of achieving those uses in the future. Importantly, the proposed variances are not an incremental step to achieve the current designated uses of the Martin Creek and Sandy Creek watersheds. Rather, they will allow OSR to avoid treating sources to current water quality standards—even though the office has both the financial ability and legal obligation to do so.

Respectfully submitted,

/s/ J. Michael Becher

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Cooper, Laura K

From: Mike Becher <mbecher@appalmad.org>
Sent: Friday, July 31, 2015 6:37 AM
To: DEP Comments
Subject: Comments on Proposed Legislative Rules
Attachments: Final WVDEP Variance Comments 2015.pdf; Final WVDEP Selenium Comments 2015.pdf

Greetings,

Please find attached comments on behalf of Appalachian Mountain Advocates, the West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition on the proposed legislative rules.

Mike Becher



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/s/ Cynthia Rank

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Dear Mr. Mandirola,

Please accept these comments on behalf of Appalachian Mountain Advocates, West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition. We are greatly concerned about West Virginia's triennial review of water quality standards and revisions to the water quality criteria for the toxic pollutant selenium proposed by the West Virginia Department of Environmental Quality ("DEP"). DEP's proposed fish tissue-based criteria would allow total extirpation of sensitive fish species from West Virginia's waters and should be rejected as scientifically indefensible and practically unenforceable. Additionally, the criteria fail to protect threatened and endangered species and cannot be approved in compliance with the Endangered Species Act.

1. The proposed chronic fish tissue criteria will not protect sensitive and recreationally important species in West Virginia's waters.

DEP proposed the use of 8.3 µg/g dw as a final chronic value (FCV) for whole body fish tissue and 20.0 µg/g dw as a FCV for egg/ovary tissue. Both criteria are less protective than those recommended by US EPA in its 2014 "External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium" ("2014 Draft Criterion"). DEP's calculation of the FCVs for both whole body and egg/ovary is inappropriately lax because it is not derived to protect the most sensitive recreationally-important species in West Virginia's waterways. To calculate FCVs, DEP included the GMCVs from fourteen separate genera. Even if the GMCVs derived for each of these taxa were accurate (and they are not), the consideration of fourteen genera, rather than the most sensitive species, is inappropriate.

EPA's *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) explain that water quality criteria should fully protect sensitive species that are "commercially or recreationally important." Although DEP's Scientific Justification provides very little detail on the methods used to its egg/ovary element, which forms the basis for its whole tissue element, it appears DEP averaged the genus mean chronic values for fourteen different genera. The resulting fish tissue elements are not adequate to protect certain sensitive species that are commercially and recreationally important, such as species of bluegill and catfish.

In a letter to EPA expressing concern over the egg/ovary criterion in EPA's 2010 draft proposal, selenium expert Dr. Dennis Lemly of the USDA Forest Service concluded that EPA's inclusion of more tolerant species in the criterion evaluation and development resulted in a proposed criterion that would have allowed mortality to exceed allowable limits in more sensitive species. Dr. Lemly stated that scientific studies show:

quite clearly that a criterion of 17.07 mg/kg for fish eggs/ovaries will jeopardize two of the most important freshwater fish families in North America: Centrarchidae and Ictaluridae. For example, (1) An EPA field study published in the peer reviewed journal *Environmental Toxicology and Chemistry* (Hermanutz et al 1992) found that ovary selenium concentrations of 9 mg/kg dw or greater resulted in 40% higher mortality and 80% more edema in larval bluegill

sunfish that controls for an EC40-80 (converted from wet weight using 80% moisture, based on mean wet weight $\pm$ one standard deviation).¹ The results of this study are not included in EPA's draft criterion calculation, and (2) A laboratory study at the University of California (Doroshov et al. 1992) found that the EC50 for larval mortality of channel catfish and bluegill sunfish occurred at egg selenium concentrations of 7.2 and 15.0 mg/kg dw respectively (lower limit of 95% confidence intervals). These mortality data were not included in the data used to derive the FCV.

...

Extensive field data from the Belews Lake case example, which includes reproductive analysis from young-of-the-year stock assessment, clearly show that catfish are very sensitive selenium poisoning in a real-world setting. . .equal to or greater than sunfish (Cumbie 1978, Cumbie and Van Haron 1978, Holland 1979, Garrett and Inman 1984, Lemly 1985). . . .

The FCV needs to be lower than 10 mg/kg dw in order to protect sunfish and catfish at an EC10 level, which is the level of protection afforded to trout by the 17.07 draft criterion value.

Letter to Mr. Joseph Beaman, Chief, USEPA, Office of Water, Ecological Risk Assessment Branch, Washington, DC from A. Dennis Lemly, Ph.D., Research Fish Biologist, USDA Forest Service, Southern Research Station, Piedmont Aquatic Research Laboratory, July 6, 2010 at 1-3 (emphasis added). Clearly, DEP's proposed egg/ovary element of 20.0 mg/kg would not protect those species at the EC10 level.

In addition to improperly averaging values across genera, DEP failed to adequately account for "winter stress" in sensitive bluegill species. As EPA recognized in its Draft Criterion document, a study by Dr. Lemly found the protective chronic selenium whole body concentration for juvenile bluegill to be 5.85 mg/kg prior to winter stress. Instead of using this protective value for the bluegill's genus mean chronic value, DEP apparently adopted EPA's approach in its 2014 criterion and averaged that value with the values from McIntyre et al.'s 2008 study, which also purported to account for winter stress, but arrived at a much less protective concentration of over 9 mg/kg. See EPA Draft Criterion at 122-23. Reliance on the McIntyre study to account for selenium is misplaced, however, because that study failed to actually induce winter stress, in part, because it did not control photoperiod or discuss the impacts that the lack of photoperiod controls may have on the interpretation of study results. EPA must fully account for winter stress, using studies that actually induce such stress by recreating realistic winter conditions including reduced photoperiod, when revising its fish tissue concentrations to ensure protection of sensitive aquatic species.

Protection of sensitive species could be further undermined as a result of implementation issues. If DEP allows "species composite" sampling to suffice for enforcement and assessment purposes, impacts to sensitive species could go unnoticed. Thus, if DEP adopts fish-tissue criteria, it must require compliance with those criteria are determined on a species-by-species basis. Even that approach is flawed, however, because it fails to account for variation among individuals and various life stages.

Finally, reliance on fish tissue criteria fails to protect sensitive species that have already been extirpated from a site due to selenium or other mining related pollution. Nor will it allow sensitive fish to recolonize those streams. If sensitive species are missing, for whatever reason, that will greatly distort evaluation of whether discharges are complying with water quality standards including protection of stream uses. It will mean that high selenium inputs could be authorized despite pollution that has already led to the elimination of sensitive species. If a stream contains only species that process selenium from the environment into their tissue at much slower rates, serious impairment as a result of depletion of species-richness would be missed by the proposed tissue criteria. The U.S. Fish and Wildlife Service critiqued this same "survivor bias" in its comments on EPA's 2014 Draft Criterion:

¹ DEP wrongly omits the results of this study based on "unexplained irregularities" while relying on studies with equal or greater flaws that resulted in higher, less-protective tissue values. Especially given the general paucity of selenium toxicity data, the 1992 Hermanutz studies provides valuable information that DEP should have considered.

For water bodies that are substantively over the water-based chronic criteria, how would we know that results of tissue sampling weren't biased low due to the susceptibility of nearly all fish sampling techniques to survivor bias? The changes in fish assemblages following selenium pollution from mountaintop removal-valley fill mining in Appalachia reported by Hitt and Chambers (In Press), and the differential extirpations of select species of fish at Belews Lake, in the San Luis Drain, California, and in the Swedish Lakes study (all these examples summarized in Skorupa 1998) suggest that implementation of tissue-based criteria for fish could face impediments related to sampling designs that don't have a means for detecting and protecting against the invalidating effects of survivor bias.

July 28, 2014 Comments of US FWS to Gina McCarthy, Administrator US EPA at 21–22. DEP's criteria thus do not protect streams already impaired by selenium or where other pollutants have already eliminated sensitive fish species. If a species such as bluegill were present in a stream at the time the Clean Water Act was passed, protecting the use of that stream as a bluegill fishery is mandated now. DOW criteria thus impermissibly fails to guarantee protection of stream uses.

2. The proposed chronic fish tissue criteria are effectively unenforceable and are not compatible with meaningful development of effluent limitations in WV/NPDES permits.

Because fish tissue criteria are not compatible with clear and efficient implementation, DEP should express its criteria as practically enforceable water column elements. In passing the CWA, Congress recognized the fact that water quality standards – which existed prior to 1972 – would not, of themselves, protect and improve water quality. Accordingly, Congress established the National Pollutant Discharge Elimination System (NPDES), providing a mechanism for clear application and enforcement of water quality standards. Further frustrated with a lack of progress in realizing the promise of narrative water quality goals, Congress again amended the Act in 1987, at that time requiring the development and application of numeric criteria for waterways affected by toxic pollutants. These revisions clearly illustrate Congress' intent to assure that water quality standards and goals are specific and translated into enforceable limitations on pollution sources.

Water quality criteria thus not only measure whether water bodies are meeting the uses mandated by the CWA, but also form the basis for establishing effective controls on water pollution to further the CWA's goal of "restor[ing] and maintain[ing] the chemical, physical and biological integrity of the nation's waters." *See* 33 U.S.C. § 1251(a). As EPA has recognized, water quality criteria must "serve the dual function of establishing water quality goals for a specific waterbody and providing the basis for regulatory controls." *EPA Water Quality Standards Handbook* at 4.6 (emphasis added). *See also* 40 C.F.R. § 130.3 (noting that water quality standards "serve the dual purposes of establishing the water quality goals for a specific water body and serving as the regulatory basis for establishment of water quality-based treatment controls and strategies"). Although a fish tissue-based criterion may be an accurate way to measure the threat posed by selenium in a waterbody (if the criterion is set at the appropriate level), it fails to provide the basis for effective regulatory action.

Indeed, in 2005, the USEPA/U.S. Department of Interior Tissue-based Criteria Subcommittee issued a draft report summarizing its opinions on aquatic life water quality standard guidelines. The report cautioned that fish tissue criteria alone would be insufficient to address "both scientific and regulatory needs concerning the relationship between chemical loadings and accumulated chemical residues in the tissues (i.e. bioaccumulation)." Science Advisory Board Consultation Document, Proposed Revisions to Aquatic Life Guidelines, Tissue-Based Criteria for "Bioaccumulative" Chemicals at 10.² In the Subcommittee's opinion, there was a "need to develop guidelines for translating tissue-based aquatic life...criteria into corresponding concentrations in environmental media (e.g. water)..." *Id.* at 13. The Subcommittee subsequently listed "implementability" as a reason to develop fish-tissue-to-water-column translations, noting that "monitoring and

² Available at http://www.epa.gov/scipoly/sap/meetings/2008/october/aquatic_life_criteria_guidelines_tissue_08_26_05.pdf

enforcing pollutant discharge limits on the basis of measured chemical concentrations in tissues of organisms may not be practical or desirable..." Id.

DEP has not explained how it will incorporate the proposed fish-tissue elements into enforceable measures needed for NPDES permit limits, TMDLs, and other pollution control decisions required by the Clean Water Act. DEP's proposal leaves unanswered fundamental questions about how the fish-tissue elements are to be used when issuing NPDES permits. For instance, how are regulators to determine the "reasonable potential" for a proposed new discharge to cause or contribute to violations of the fish tissue elements? How will appropriate "end of pipe" effluent limits be determined? If there is a "reasonable potential," when must treatment start? Without clear guidance from DEP, we fear that the agency will not be practically able to set necessary water quality-based permit limits. A recommended criterion that does not explicitly establish when permit limits must be imposed but instead injects considerable uncertainty into the reasonable potential analysis invites acquiescence to industry pressure to impose no limits or limits that are effectively meaningless.

Likewise, DEP's proposal lacks necessary information regarding how compliance with the fish-tissue elements should be determined for the purpose of enforcing WV/NPDES permit limits, evaluating waters for impairment, and developing and enforcing TMDLs. For instance, if a permittee receives a fish tissue-based NPDES permit limit, where must sampling of fish occur in relation to the discharge? How many fish must be collected to provide a representative sample? How often and at what stages of life must sampling take place? What fish taxa will be used to determine compliance? How will regulators account for variation and individual differences and toxicity within taxa depending on, among other things, age, individual diet, areas of forage, and duration of stay in polluted waters? If adequate numbers of fish are indeed collected, what impact will this have on fish populations that may already be pressured by selenium and other pollution? How will regulators ensure that endangered species are protected by sampling protocols such that illegal "take" of threatened or endangered species is avoided? How will impairment be detected in waters where sensitive species that rapidly accumulate selenium have already been extirpated?

DEP has not shown that compliance with the fish tissue elements can accurately be determined in most circumstances. This is particularly problematic in small headwater streams that directly receive much of the selenium pollution from coal mines in Appalachia. These streams often lack sufficient fish populations for a truly representative sample to be collected, and downstream reaches with larger fish populations often receive discharges from many different sources such that responsibility for violations of the standard will be extremely difficult to assign. Moreover, if a "species-composite" method is used to determine compliance with a fish-tissue element, wherein the tissue of all fish collected is combined for analysis, it is likely to miss impairment of sensitive species that accumulate selenium more rapidly.

Instead of relying on fish tissue standards that present critical implementation problems, DEP should adopt clearly enforceable water column criteria. EPA's 2014 Draft Criterion document recognizes that the dietary pathway of selenium accumulation can still be accounted for in water column criteria. Using the methods developed by the EPA and the United States Geological Survey, protective fish tissue concentrations can be translated to practically enforceable water column criteria. Draft Criterion at 62. The model developed by USGS recognizes that diet is the primary pathway of exposure for selenium and creates a simple, direct linkage between dissolved selenium in the water column and selenium toxicity to aquatic life. EPA's Draft Criterion document explains that the expected and measured relationships between egg-ovary concentrations and water column concentrations are "highly correlated."³ Draft Criterion at 134. An inviolable water column

³ DEP could create an even more robust water column criterion by collecting additional data correlating fish-tissue concentrations to water column concentrations. See 2014 Draft Criterion at 135 (explaining that minor variability in correlation could be due in part to small sample size). Regardless, the uncertainty in translating protective fish tissue values to water column numbers is likely far outweighed by the uncertainty in determining compliance with the fish tissue elements in the absence of robust tissue sampling protocols.

criterion that is based on fish tissue concentrations is therefore scientifically defensible because it recognizes and accounts for the fact that diet is the primary pathway for selenium uptake.

DEP's retention of its previous water column criterion in no way corrects this fundamental flaw. DEP's proposal explicitly states that the fish tissue elements should be given primacy over the water column elements. That statement largely eliminates any implementation benefits of including water column elements. The better approach would be to adopt only a translated water column criterion and to eliminate the fish tissue elements.

Not only is a translated water column criterion scientifically defensible, it is also vastly more useful as a regulatory tool. West Virginia has specific, federally-approved procedures for how to convert water column criteria to enforceable restrictions on wastewater discharges, in addition to the technical guidance, training and other materials on scientifically valid models, necessary background data, sampling protocols, and acceptable laboratory techniques for the implementation of traditional water column criteria that EPA has provided. Water column criteria also can be more easily enforced by citizens with limited resources. Enforcing the proposed fish-tissue elements, in contrast, will require a case-by-case analysis of the local ecosystem, including collection, processing, and testing of fish tissue, all of which will require significant resources and inject considerable uncertainty. Thus, in order to achieve the dual purposes of water quality criteria, DEP should adopt a set of water column criteria that are translated from protective fish-tissue concentrations.⁴

3. The proposed water column criteria is inadequate because instream selenium levels of 5 µg/l can lead to significant impacts on aquatic life.

DEP proposes to retain its existing water column criteria of 5 µg/L as one element of its tiered criteria, but does not provide a scientific justification for maintain that value. Commenters believe that a water column value must be an element of any approvable standard and that a stand-alone water column value translated from a fish tissue threshold represents the best, most easily implementable selenium criterion. However, as DEP revises its selenium criteria, it should revisit using the 5 µg/L value in light of data not available or considered when that criterion was developed. A number of leading experts promote reducing the existing national water column criterion to a level lower than 5 µg/l. Swift recommends a criterion of 2µg/l. Lemly and Skorupa criticized the existing 5 µg/l, stating that:

The USEPA last promulgated an updated national chronic criterion for selenium in 1987, some 20 years ago, setting the criterion at 5 µg Se/L on an acid-soluble basis (USEPA 1987). Since that time, serious weaknesses in the national criterion have been revealed. For example, several reviewers of more recent selenium literature suggested that the criterion should be 2 µg/L or less (DuBow 1989; Peterson and Nebeker 1992; Swift 2002).

United States Environmental Protection Agency ("EPA") researchers found significant effects in bluegill progeny with instream selenium concentrations of 2.5 µg/l. "Mean ranks of % edema, % lordosis, and % hemorrhaging in egg cup samples were significantly affected by selenium streams from which they came ($p < 0.01$, $p < 0.01$, $p < 0.05$). Mean ranks were significantly higher for the 2.5 and 10 µg/L treatments than for the control ($p < 0.05$)."⁵ They concluded that the EPA criterion of 5 µg/l might be too high considering their findings.⁶ EPA recently recognized the inadequacy of the 5 µg/L standard in their 2014 Draft Criterion, where the agency proposed water column elements of 4.8 µg/L in lotic systems and 1.3 µg/L in lentic systems. DEP's proposed retention of the 5 µg/l does not, therefore, appear to be protective and does not comply with the Clean Water Act.

⁴ As explained above, the fish tissue elements of EPA's Draft Criterion are too high to protect sensitive aquatic life and should be revised downward significantly. The water column criteria should be based on fish tissue concentrations that are revised to ensure protection of such species.

⁵ Hermanutz, R.O., K.N. Allen, N.E. Detenbeck, and C.E. Stephan. 1996. Exposure of bluegill (*Lepomis macrochirus*) to selenium in outdoor experimental streams. U.S. EPA Report. Mid-Continent Ecology Division. Duluth, MN at 17.

⁶ Hermanutz 1996 at 19, 20, 23

4. The proposed criteria will not protect wildlife dependent on aquatic habitat for survival

The Clean Water Act mandates that water quality standards protect not only fish, but all aquatic organisms and other wildlife that depend on healthy streams. Section 303(c) governs state revisions to water quality standards and requires that such standards “shall be established taking into consideration their use and value for . . . propagation of fish *and wildlife*,” among other things. 33 U.S.C. § 1313(c)(2)(A) (emphasis added); *see also* 33 U.S.C. § 1252(a) (directing states to develop comprehensive programs for controlling water pollution giving due regard to improvements necessary to “conserve such waters for the protection and propagation of fish and aquatic life and wildlife”). EPA’s regulations require states to develop standards that will “[s]erve the purposes of the Act,” meaning that they will “provide water quality for the protection and propagation of fish, shellfish *and wildlife*,” among other things. 40 C.F.R. § 130.3 (emphasis added). West Virginia does not have a wildlife-specific selenium water quality standard. In the absence of any standards that address wildlife, an approach that focusses solely on aquatic life does not satisfy the requirements of the CWA because it leaves such wildlife without any protection under the Act from selenium pollution.

Although DEP did not analyze the impacts of its criteria on aquatic-dependent wildlife, existing evidence makes clear that the concentrations of the proposed fish tissue elements are not protective of aquatic dependent wildlife. As US FWS explained in its comments on EPA’s 2014 Draft Criterion:

As the ecosystem-scale modelling approach makes clear, when EPA sets its primary criterion, which is the chronic criterion for fish E/O tissue, the effects will cascade throughout the aquatic ecosystem and therefore indirectly set the limits for selenium concentrations that can be expected to be observed in every compartment of the ecosystem. So, for example, if translation of the E/O chronic criterion leads EPA to set a fish whole body criterion of 8.1 mg Se/kg, then using EPA’s median TTF of 1.27 for transfer of selenium from aquatic invertebrates to fish (from Table 10, p. 77), we can expect that the median limit for aquatic invertebrates has now been set at about 6.4 mg Se/kg (i.e., 8.1/1.27). Ovulating female water birds rely almost exclusively on an animal diet due to the high protein demands of egg formation, and like the species of fish studied by Conley et al. (2014) and Penglase et al. (2014), water birds move selenium into their eggs directly from their diets, not from internal tissue stores of selenium (Chapman et al. 2010). Thus, using the dietary exposure-response curve developed for mallards and reported in Ohlendorf (2003) we can directly estimate the toxic risk to mallards posed by a whole body fish tissue criterion of 8.1 mg Se/kg. Based on a table of exposure-response values provided by Dr. Ohlendorf for his 2003 publication, a mallard dietary exposure to 6.4 mg Se/kg would correspond to 27% reduction in egg hatchability (EC-27) and the 10th percentile rTF of 0.901 calculated from the data presented in Table 10 (p. 77). The corresponding value of 8.99 mg Se/kg in aquatic invertebrates would lead to a 62% reduction in mallard egg hatchability.

At the median TTF of 1.27, a whole body fish tissue criterion of about 4 mg Se/kg would be required to have a safe dietary exposure of about 3 mg Se/kg for mallards. The Service notes that this is similar to the conclusion we presented in our comment package on EPA’s 2004 proposed selenium criteria (that a fish whole body tissue criterion in the range of 4-5 mg Se/kg would be required to adequately protect both fish and aquatic-dependent wildlife), which we incorporate here by reference and which is still available for viewing in the current Docket (EPA-HQ-OW-2004-0019). Furthermore, a value of 4 mg Se/kg in whole body fish tissue is the guideline value recently published by the British Columbia Ministry of Environment, in part, explicitly to provide sufficient protection for aquatic-dependent wildlife (BC MoE 2014).

FWS 2014 Comments at 20.

US FWS’s comments are very similar to criticism levied at EPA’s 2004 recommended whole-body fish tissue criterion of 7.91 µg/l that was proposed but not adopted. See Notice of Draft Aquatic Life Criteria for Selenium and Request for Scientific Information, Data, and Views, 69 Fed. Reg. 75, 541 (December 17, 2004).

A group of the nation's leading selenium scientists wrote a white paper vigorously criticizing that criterion as not protective and too high. The authors explained the history of the EPA's flawed number:

During the past 17 years numerous researchers including those funded by EPA have estimated that the toxicity threshold for selenium lies below the current chronic aquatic life criterion of 5 µg/L. Recently, corporate interests have claimed that 5 µg/L is overly restrictive. Because of an endangered species issue in California, EPA agreed to re-evaluate their CWA criteria guidance for selenium by 2002. This was problematic because:

- EPA's normal procedure for setting Aquatic Life Criteria does not directly consider toxicity data for aquatic-dependent wildlife.
- EPA has promulgated no separate wildlife criteria for selenium.
- EPA's normal procedure for setting criteria is better suited to non-bioaccumulative pollutants – selenium is bioaccumulative.
- ESA-listed species every individual of a population "counts" and therefore criteria guidance would need to be fully protective at an individual-effects level.

EPA contracted with the Great Lakes Environmental Center (GLEC) to derive the new selenium criteria. GLEC was instructed to derive the chronic criterion on a fish-tissue basis rather than on a water concentration basis. The GLEC derived criterion was released in March 2002. The draft tissue-based chronic criterion, of 7.9 µg/g, dry weight basis, assumed 20% of the target population would die. The USFWS asked EPA to not promulgate the criterion because it wasn't protective of endangered species.

Joseph P. Skorupa, USFWS, Theresa S. Presser, USGS, Steven J. Hamilton, USGS, A. Dennis Lemly, USFS, Brad E. Sample, CH2M HILL, EPA's Draft Tissue-Based Selenium Criterion: A Technical Review. Spring 2004. at 2-3.

The authors noted significant additional flaws in EPA's proposed criterion that would lead to harm to wildlife, including threatened and endangered species:

GLEC's assessment of risk to aquatic-dependent wildlife was based on an erroneous draft wildlife toxicology report. The draft tissue-based chronic criterion for selenium of 7.9 µg/g would leave a substantive proportion of aquatic-dependent wildlife species unprotected; on the order of half the species. Aquatic life criteria are considered by EPA to be separate and distinct from wildlife criteria. Nonetheless, in the absence of promulgated wildlife criteria (as is the case for selenium), if the aquatic life criteria do not protect wildlife the purposes of the CWA are not being met. More critically, for waters of the United States supporting ESA-listed aquatic-dependent wildlife, the criteria would not be approvable for incorporation into state or tribal water quality standards.

Id. Those experts estimated that EPA's previously proposed criterion would have caused reproductive impairment in, conservatively, 40% and possibly as high as 95% of exposed mallard ducks. See Lemly, A. Dennis, Assessing the toxic threat of selenium to fish and aquatic birds, Environmental Monitoring and Assessment 43: 19-35 (1996). Reproductive impairment occurs if ducks are exposed through a contaminated diet during the development of their chicks. Mallard ducks are ubiquitous, breeding near and relying on aquatic resources throughout the US. They are primarily vegetarians eating seeds of grasses and sedges and the leaves, stems and seeds of aquatic plants. They occasionally eat insects, crustaceans and mollusks, especially when they are young. See <http://www.nhptv.org/natureworks/mallard.htm>. While the ducks do not eat fish, "allowing fish tissue to reach 7.9 ug/g would allow a level of contamination in the other parts of the aquatic ecosystem sufficient to cause nearly total reproductive failure among mallard ducks." Skorupa et al. at 22.

Both of the fish tissue values that leading scientists determined would have unacceptable impacts on aquatic-dependent wildlife are more protective than the criteria proposed by DEP. DEP thus must either revise its fish tissue criteria to ensure that they protect aquatic-dependent wildlife or else adopt a concurrent wildlife criterion along with the aquatic life criteria.

5. The Criterion Must Protect All Threatened or Endangered Species

Although, DEP does not have obligations under the Endangered Species Act related to its revision of water quality standards, EPA's approval of those standards, required by 40 C.F.R. § 131.21, does trigger the requirements of the ESA. USEPA, USFWS, and the National Marine Fisheries Service have a Memorandum of Agreement (MOA) that governs protection of endangered and threatened species under Section 7 of the Endangered Species Act, 16 U.S.C. § 1536, in regard to, among other things, revisions to water quality standards.⁷ EPA has stated that "where approval of new or revised standards may have an effect on a listed species or designated critical habitat, consultation under section 7(a)(2) [of the ESA] is required. . . . [W]ater-dependent endangered and threatened species are an important component of the aquatic environment that the CWA is designed to protect, and steps to ensure the protection of those species are well within the scope of the CWA."⁸

Water quality standards must protect all existing uses in a waterbody, which uses often include supporting species that are listed as threatened or endangered pursuant to the Endangered Species Act. See 33 U.S.C. § 1313. Additionally, Section 7 of the Endangered Species Act and its implementing regulations require each federal agency, in consultation with the appropriate wildlife agency, to insure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species or (2) result in the destruction or adverse modification of the critical habitat of such species. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). EPA thus must ensure that any criteria that it approves will be fully protective of listed species.

USFWS records show that West Virginia waters support numerous species that have been listed as threatened or endangered pursuant to the Endangered Species Act, including 10 species of freshwater mussels and one crustacean. See WV DNR, *Federally Threatened and Endangered Species in West Virginia*.⁹ Additionally, both the Diamond Darter and the Big Sandy Crayfish are proposed for listing. *Id.* In the absence of specific toxicity data for those species, DEP cannot safely assume that the species it considered in setting its fish tissue criteria are good proxies. Indeed, EPA recognizes in its 2014 Draft Criterion document that "because other threatened or endangered species might be more sensitive, if relevant new information becomes available in the future, it should be considered in state- or site-specific criteria calculations." Draft Criterion at 139–40. Instead of putting off protection of sensitive endangered species to later state or site-specific standard setting, DEP must revise its criterion to ensure protection of all endangered species. It is not sufficient to say that the agency lacks information. Rather, in the absence of additional data regarding selenium-sensitive listed species, DEP must apply a substantial safety factor to its criterion to ensure protection of such species.

Moreover, as USFWS has noted to EPA, use of the EC10 effect is inappropriate for water quality criteria that apply to listed species. When dealing with listed species, every individual is important. An EC10 effects level assumes that one out of every ten individuals will suffer adverse effects. That is unacceptable for listed species. As the USFWS stated to EPA in comments on its 2014 Draft Criterion:

[I]t is still unclear how an EC-10 standard for fish-tissue criteria relates to threatened and endangered species conservation. A large majority (>90%) of all species of freshwater fish listed under the Endangered Species Act (ESA) have not been tested for sensitivity to selenium

⁷ 66 Fed. Reg. 11,202 (Feb. 22, 2001).

⁸ *Id.* at 11,206.

⁹ Available at <http://www.wvdnr.gov/Wildlife/RareSpecList.shtm>.

toxicity. Assuming that ESA-listed species exhibit a distribution of sensitivities comparable to non-listed species (as several EPA-funded studies have indicated), it can be expected that in waters achieving EPA's newly proposed fish-tissue criteria about 5% of ESA-listed species would experience a 10% or greater level of reproductive toxicity. Also, it can be expected that some unknown additional percentage of ESA-listed species would experience a level of reproductive toxicity greater than 0% but less than 10%.

FWS Comments at 3. It is thus clear that DEP's proposed criteria will not adequately protect federally-listed species and this will not be approvable as a result of the required consultation with US FWS pursuant to Section 7 of the ESA.

CONCLUSION

For the foregoing reasons, DEP must significantly reduce the concentrations allowed under its fish tissue elements to ensure they are protective of sensitive species, aquatic-dependent wildlife, and threatened and endangered species. DEP must then translate those revised tissue concentrations to enforceable water column criteria that can be practically implemented to achieve the regulatory requirements of the Clean Water Act.

Respectfully submitted,

/s/ J. Michael Becher

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Cooper, Laura K

From: Hakowski, Denise <Hakowski.Denise@epa.gov>
Sent: Thursday, July 30, 2015 2:46 PM
To: DEP Comments
Cc: MacKnight, Evelyn; Cooper, Laura K; Mandirola, Scott G
Subject: USEPA Comments on Proposed Revisions to Requirements Governing Water Quality Standards (47CSR2)
Attachments: Comments on WV 061815 WQS proposal.pdf; WV 061815 WQS proposal.EPA comments.encl 1.pdf; WV 061815 WQS proposal.EPA comments.encl 2.pdf; WV 061815 WQS proposal.EPA comments.encl 3.pdf

Attached please find the USEPA's comments on the 2016 proposed legislative rule, Requirements Governing Water Quality Standards (47CSR2), notice of which was published in the West Virginia State Register on June 18, 2015.

This email includes 4 attachments: a letter from Evelyn MacKnight, Associate Director, Office of Standards, Assessment & TMDLs, Water Protection Division, EPA Region 3, and 3 enclosures to that letter.

Please let us know if there is any issue with the attachments.

Thank you.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

JUL 30 2015

Public Information Office
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Dear Sir or Madam:

The U.S. Environmental Protection Agency (EPA), Region III has reviewed the revisions to 47CSR2—Requirements Governing Water Quality Standards as proposed in the West Virginia State Register on June 18, 2015. The purpose of this letter is to provide EPA's comments on the proposed revisions. Please note that the comments and recommendations contained in this letter are strictly for the consideration of the West Virginia Department of Environmental Protection (WVDEP) and do not constitute approval or disapproval decisions under Clean Water Act ("CWA" or "the Act") 303(c). Neither are these comments a determination by the EPA Administrator under CWA Section 303(c)(4)(B) that revised or new standards are necessary to meet the requirements of the Act.

This public notice includes several provisions: variances from Water Quality Standards (WQS) for several acid mine drainage impacted streams in the Tygart River and Cheat River basins to allow for restoration activities, and modifications to the State's aluminum and selenium criteria for the protection of aquatic life. EPA has the following comments on these provisions:

Variances

West Virginia is proposing to adopt variances from WQS for several acid mine drainage impacted streams. The rationale for the variances is that these streams cannot meet their current WQSs due to human caused conditions that have prohibited the attainment of designated uses. The variances will be in place until July 1, 2025 while improvements are made to the existing conditions in these streams, and will be evaluated during each triennial review throughout the variance period.

The proposed regulation would establish these variances in 47CSR2.7.2.d.8 (Cheat River) for Martin Creek and its tributaries Glade Run, Fickey Run and their unnamed tributaries, and 47CSR2.7.2.d.11 (Tygart River) for Maple Run, Left Fork Little Sandy Creek, Left Fork Sandy Creek for the portion upstream of Stevensburg, and their unnamed tributaries. The variances are



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for these specific pollutants: pH, dissolved iron and dissolved aluminum. Based upon WV's proposed regulation and the supplemental information provided, EPA has the following comments:

- The proposed rule indicates that the variances would be for dissolved iron, but the State's criterion is for total iron. The proposed interim criteria need to be modified to be expressed as total iron or the underlying total iron criterion would remain effective.
- For Fickey Run, Glade Run, Martin Creek and tributaries in the Cheat River basin, WVDEP is establishing one set of interim criteria to address all streams covered by the variance. EPA has reviewed the monitoring data submitted with the supplemental information and believes that based on widely varying conditions between the streams, interim criteria need to be assigned to each waterbody individually.

In addition, EPA believes the interim criteria values may not be stringent enough to appropriately represent the highest attainable condition at the time of the adoption of this WQS variance. WVDEP set the interim criteria for all the streams covered by this variance using the "worst case scenario" reported for both iron and aluminum, based on monitoring data from August 2006 for Fickey Run. WVDEP needs to review the available monitoring data and set the interim criteria based on what is actually attainable at this time in each waterbody.

- For Maple Run, Left Fork Little Sandy Creek, Left Fork of Sandy Creek and tributaries in the Tygart River basin, WVDEP is establishing one set of interim criteria to address all streams covered by the variance. EPA has reviewed the monitoring data submitted with the supplemental information and believes that based on widely varying conditions between the streams, interim criteria need to be assigned to each waterbody individually.

In addition, as with the Cheat River basin variances, EPA believes the interim criteria may not be stringent enough for the Tygart River basin. WVDEP set the interim criteria using the highest concentration reported for iron in the Left Fork Little Sandy Creek in October 2002 and for aluminum in the Left Fork Little Sandy Creek in July 2012. WVDEP needs to review the available monitoring data and set the interim criteria based on what is actually attainable at this time in each waterbody.

- The supporting documentation provides a demonstration that attaining the designated uses is not feasible during the term of these WQS variances due to human-caused conditions which prohibit the full attainment of the designated uses. EPA's water quality standards at 40 CFR 131.10(g) state that "Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied..." presumably for the term of the variance. The documentation should include more information to support the 10 year variance term, preferably the activities that will be occurring to return the water to the point of achieving the underlying WQSs. This could be met by providing more details on the pollutant control activities that will be used to achieve the underlying criteria and designated

uses. We also suggest that the variance should clarify the relationship of the variance to any existing or potential new discharges that would occur over the 10-year term.

- The state should identify and document any cost-effective and reasonable best management practices for nonpoint source controls related to the pollutants and locations specified in the WQS variances that could be implemented to make progress towards attaining the underlying designated uses and criteria. The State should provide the public an opportunity to comment on this documentation.

To aid in the identification and documentation of any cost-effective and reasonable best management practices for nonpoint source controls, note that WVDEP supported the development of a watershed-based plan for Sandy Creek of the Tygart Valley River. This plan can be used as a guide to site and install treatment systems. EPA reviewed and approved the plan under Section 319 guidelines. The plan is posted on the WVDEP website at:

http://www.dep.wv.gov/WVF/Programs/nonptsource/WBP/Documents/WBP/SandyCreek_WBP.pdf

EPA recommends that WVDEP support development of similar plans for the subwatersheds in the Cheat River.

Aluminum

West Virginia is proposing to modify its aluminum criteria for the protection of aquatic life to a hardness-based equation to be applied at certain pH and hardness levels. The chronic criterion, which is proposed for the protection of both WV's warmwater and coldwater fish species, would calculate to a criterion of 1365 µg/L at a hardness of 100 mg/l; and 3527 µg/L at a hardness of 200 mg/l. For acute exposures, in waters with a hardness of 200 mg/l, the aluminum criterion would be 8803 µg/L. WV's existing criteria are 750 µg/L dissolved aluminum for acute and chronic protection of warmwater species. For coldwater species, WV's existing criteria are 750 µg/L for acute exposure and 87 µg/L for chronic exposure. WV's proposal would be the same values for both cold and warmwater species.

With the exception of a slight modification of the applicable hardness range, West Virginia's proposed criteria and supplemental information remain the same as those proposed in 2013. In response to the 2013 proposal, EPA provided information on the latest scientific studies on aluminum toxicity to aquatic life, as well as an in-depth analysis comparing the studies WVDEP considered in calculating the proposed aluminum criteria with studies EPA is considering in its revisions to the national CWA Section 304(a) acute and chronic aluminum criteria recommendations for the protection of aquatic life. EPA also forwarded the concerns of the U.S. Fish and Wildlife Service (USFWS) that West Virginia's proposed criteria would not be protective of federally listed endangered mussels in the State.

For your reference and as a matter of public record, EPA is including as enclosures to this letter the following documents from our previous review:

- The USFWS's July 19, 2013 letter to EPA, Region III, expressing concern that West Virginia's proposed aluminum criteria will not be protective of federally endangered mussels in the State.
- EPA's November 21, 2013 analysis of West Virginia's hardness-based aluminum criteria. This analysis is in two parts: A list of studies EPA is considering to include in its update of the national 304(a) recommended aluminum criteria not included in West Virginia's criteria derivation report, and a spreadsheet with the details of EPA's analysis.
- EPA's January 30, 2014 letter to WVDEP summarizing EPA's view of WVDEP's proposed aluminum criteria.

As the State's proposed aluminum criteria have not been modified significantly from the 2013 proposal, EPA reiterates all of the same comments in the letters listed above. Namely, as stated previously, WVDEP must justify how the proposed criteria are protective of mussels in West Virginia, as well as appropriately take into consideration potential pH interaction with aluminum toxicity, as well as hardness.

Selenium

West Virginia is proposing to modify its selenium criteria for the protection of aquatic life to include chronic, fish tissue-based elements. EPA is in the process of updating the existing selenium CWA Section 304(a) criteria recommendations for the protection of aquatic life to reflect the latest scientific information. On July 27, 2015, EPA proposed in the Federal Register its draft recommended aquatic life ambient water quality criterion for selenium in freshwaters (80 FR 44350). As with WVDEP's proposal, EPA's draft 304(a) selenium criteria recommendation includes fish tissue-based elements, in recognition of the fact that selenium toxicity to aquatic life is driven by dietary (chronic) exposure. In the July 27, 2015 draft, EPA retains the paradigm it first presented in the agency's May 2014 peer review public draft (79 FR 27601), with four elements: two fish tissue-based and two water column-based.

West Virginia is not proposing to revise its current acute water column-based aquatic life selenium criterion of 20 µg/L. EPA's draft recommended criteria do not include an acute water column-based criterion because selenium is bioaccumulative and toxicity primarily occurs via dietary (chronic) exposure. Acute toxicity associated with selenium occurs only at very high levels, making an acute criterion unnecessary.

WVDEP is not proposing to revise its chronic selenium water column criterion of 5 µg/l. EPA recommends that WVDEP review and revise its chronic selenium water column criterion in light of the latest science as discussed in EPA's Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015 (EPA 822-P-15-001, July 2015). In its draft, EPA is recommending two water column-based elements, 1.2 µg/L for lentic aquatic systems (i.e. still waters), and 3.1 µg/L for lotic (i.e. flowing) aquatic systems to acknowledge the bioaccumulation variability in waters with long residence times such as lakes, ponds, reservoirs, or wetlands, versus those with shorter residence times such as rivers and streams. In addition, EPA is recommending a water-column intermittent element to account for potential chronic effects from repeated, short-term exposures to selenium. WVDEP should consider whether a single chronic water column criterion of 5 µg/L is protective of the aquatic life in WV waters,

particularly in lentic systems in the State (WV has at least 132 lakes/reservoirs/ponds recognized in its most recent 305(b) report). EPA recommends that WVDEP adopt water column-based criteria to protect lotic and lentic aquatic systems, as well as criteria to protect waters that receive short-term, intermittent selenium discharges.

West Virginia is proposing to add two additional components to its selenium criteria. These are two chronic fish tissue-based criteria, one for fish whole-body concentration, and one for fish egg/ovary concentration. WVDEP has structured the criteria such that the fish egg/ovary concentration takes precedence over both the chronic water column criterion and the fish whole-body concentration, and the fish whole-body concentration takes precedence over the chronic water column criterion of 5 µg/L. This structure is similar to the structure of EPA's draft recommendation. EPA supports the adoption of fish tissue-based selenium criteria, but EPA has several concerns with the values presented. EPA has reviewed the supporting documentation provided, Updated Freshwater Aquatic Life Criteria for Selenium (GEI Consulting Engineers and Scientists, March 2015), as well as WVDEP's "Scientific Justification of Revision of Selenium Standards" submitted to EPA on July 15, 2015. First, EPA requests that WVDEP provide additional justification on the source of its fish tissue-based criteria values proposed for adoption as they do not match the recommendations in the GEI Consultants' report and are not well explained in WVDEP's additional one page justification.

Second, EPA disagrees with several of WVDEP's apparent decisions with respect to the toxicity studies and data used to derive WV's proposed fish tissue criteria. EPA recommends that WVDEP review EPA's draft selenium criteria, published July 27, 2015 with particular attention to EPA's consideration of data for bluegill, brown trout, Dolly Varden and white sturgeon. These species all reside in WV waters (with the exception of Dolly Varden, but this species is a surrogate for brook trout, genus *Salvelinus*), so any criteria that WVDEP adopts should protect these species.

Third, because selenium concentrations in fish tissue are a result of selenium bioaccumulation via dietary exposure, there are two specific circumstances where the fish tissue concentrations do not fully represent potential effects on fish and the aquatic ecosystem: 1) "fishless" waters, and 2) waters with new or increased selenium inputs.

Fishless waters are defined as waters with insufficient instream habitat and/or flow to support a population of any fish species on a continuing basis, or waters that once supported populations of one or more fish species but no longer support fish (i.e., extirpation) due to temporary or permanent changes in water quality (e.g., due to selenium pollution), flow or instream habitat. Because of the inability to collect sufficient fish tissue to measure selenium concentrations in fish in such waters, EPA recommends that WVDEP use water column-based selenium criteria to protect aquatic communities and downstream waters in such areas.

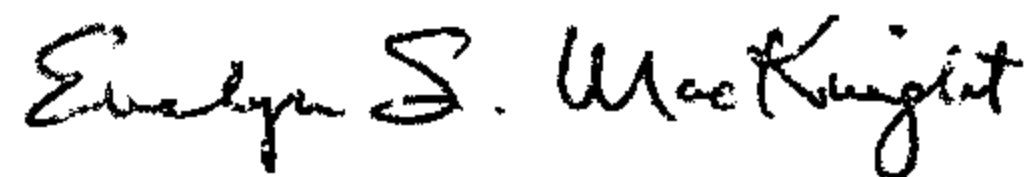
Waters with new inputs refer to waters with discharges from new activities resulting in selenium being released into a lentic or lotic waterbody. Increased input is defined as an increased discharge of selenium from a current activity released into a lentic or lotic waterbody. New or increased inputs will likely result in increased selenium in the food web, likely resulting in increased bioaccumulation of selenium in fish over a period of time until the

new or increased selenium release achieves a quasi-"steady state" balance within the food web. EPA estimates that concentrations of selenium in fish tissue will not represent a "steady state" for several months after the new or increased selenium discharges in lotic systems, and longer time periods (e.g., 2 to 3 years) in lentic systems, dependent upon the hydrodynamics of a given system; the location of the selenium input related to the shape and internal circulation of the waterbody, particularly in reservoirs with multiple riverine inputs; and the particular food web. Thus, EPA recommends that WVDEP specify that fish tissue concentrations do not override water column concentrations until these periods of time have passed after new or increased selenium discharges are released into lotic and lentic systems, respectively.

Finally, WVDEP does not provide detail on how it will interpret the term "override" in terms of monitoring requirements, assessment, National Pollutant Discharge Elimination System (NPDES) permitting or compliance determinations. It is especially important WVDEP make clear to EPA and the public how it intends to implement its water column numbers in NPDES permits. For example, will the water-column values be used to develop water quality-based NPDES permit limits, or is it the intention of WVDEP to use those water-column values only as a screening tool?

Thank you for this opportunity to provide comments on these revisions to West Virginia's water quality standards regulation. If you have any questions concerning this letter, please contact me at (215)814-5717, or Denise Hakowski at (215)814-5726.

Sincerely,



Evelyn S. MacKnight, Associate Director
Office of Standards, Assessment & TMDLs
Water Protection Division

Enclosures (3)

cc: Laura Cooper (WVDEP)



United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241



July 19, 2013

John Capacasa, Director
Water Protection Division
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Re: Proposed Changes to the West Virginia Water Quality Standards

Dear Mr. Capacasa:

At the request of Denise Hakowski of your staff, the U. S. Fish and Wildlife Service has reviewed the proposed changes to the West Virginia water quality standards set forth in *Title 47 Legislative Rule Department of Environmental Protection Water Resources Series 2 Requirements Governing Water Quality Standards*, as well as the supporting documents. The following comments are prepared in accordance with the requirements of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) and the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

1. Federally Listed Species

Freshwater mussels are among the most endangered groups of organisms in North America. West Virginia stands out by continuing to support a high diversity of native freshwater mussels, including 62 species that are distributed in waters throughout the State. Many of these species have been eliminated from most of the rest of the continent and ten of these mussel species have been listed as federally endangered under the ESA. A list of federally endangered mussels and where they occur in West Virginia, as well as a map showing the location of West Virginia streams that support populations of these listed mussels are attached. Federally listed mussels occur primarily in warm water streams that are not considered trout waters including in the Ohio River and its tributaries, and within the Potts Creek watershed. That these sensitive species persist is a testament to the high water quality and habitat present in some sections of these watersheds, and we appreciate the crucial role the U.S. Environmental Protection Agency (EPA) and West Virginia Department of Environmental Protection (WVDEP) play in maintaining this globally-significant resource.

Section 9 of the ESA prohibits the take of any federally listed animal species by any person subject to the jurisdiction of the United States. The term "person" is defined as "... an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal government, of any State, municipality, or political subdivision of a State, or any other entity subject to the jurisdiction of the United States." Section 11 of the ESA provides for both civil and criminal penalties for those convicted of section 9 violations.

As defined in the ESA, take means "... to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" in the definition of take means an act that kills or injures wildlife. Such act may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR part 17.3). "Harass" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Modification of any habitat to the extent that unauthorized take occurs ("harass" as defined above) would constitute a section 9 violation.

As currently proposed, the revisions to the water quality standards would not be protective of native freshwater mussels, including federally listed species. We recommend that either the water quality standard for Category B1 waters be revised so that it is protective of all native freshwater mussel species that occur throughout the State, or at a minimum, more protective standards should be applied to waters that support federally listed mussel species. Developing revised standards that are protective of all native freshwater mussel species would ensure that all West Virginia waters can support healthy shellfish populations and would reduce the potential that additional species of freshwater mussels would qualify for listing under the ESA in the future.

2. Aluminum Water Quality Standard for Aquatic Life

The Service's primary concern is the potential effects of the proposed change to the chronic aquatic life standard for dissolved aluminum (8.1, Table 1, Appendix E). The proposal would change this standard from 87µg/L to 750 µg/L for all acidic (<6.5 pH) and alkaline (> 9.0 pH) warm water fishery streams (B1) and wetlands (B4), but would remain at 87µg/L for trout waters (B2). For circum neutral waters (pH 6.5 to 9.0), the chronic standard for aluminum would be based on the hardness of the receiving stream according to $e = (1.395[\ln(\text{hardness})] + 0.9121)$. For a receiving water of 50 mg/L hardness, the standard would be 528 µg/L, while for a 100 mg/L hardness stream, it would rise to 1365 µg/L. As noted above, federally listed mussels primarily occur in circum neutral waters including the Ohio River and its tributaries that are classified as warm water fishery streams (B1). As proposed, these listed species could be chronically exposed to concentrations of dissolved aluminum far exceeding the current acute standard.

Based on our review of the literature, the potential exists for the application of this hardness based criterion to severely modify the feeding behavior of federally listed mussels. Kádár, et al. (2001) studied the filtering behavior of the freshwater bivalve *Anodonta cygnea* in neutral fresh water.

John Capacasa, Director
July 19, 2013

3

Aluminum at 500 µg/L at neutral pH for 15 days reduced mean duration of shell opening by 50%. A concentration of 250 µg/L did not produce this avoidance behavior. The effect was irreversible over a 15 day recovery period. This study provides evidence for the bioavailability and toxicity of aluminum to mussels at neutral pH. The Service concludes that the changes in behavior and uptake of aluminum could affect the fitness of the federally listed mussel populations.

Furthermore, a study conducted with two different freshwater mussels (*Anodonta anatina* and *Unio pictorum*) demonstrate that as filter feeders exposure to and accumulation of aluminum are not significantly related to water hardness (Pynnönen, 1990). These mussels were exposed to aluminum (300 and 900 µg/L) for two weeks in acid (pH 4-5) and circumneutral (pH 6.6-8.3) conditions in hard (35 mg Ca/L) and soft water (3.5 mg Ca/L). The aluminum concentration in the gills and kidney increased linearly, and saturation level was not reached before the end of the study. In both species, the ambient pH had a significant effect on the accumulation in the gills, whereas the effect of the water hardness was only of minor importance. The Service contends that hardness should not be considered in setting the standard to protect mussels as it does not affect exposure in these filter feeders and would greatly increase the risk of take.

EPA has considered sensitive species in deriving National Ambient Water Quality Criteria. The value of 87 µg/L aluminum is based on a toxicity test with the striped bass in water with pH = 6.5-6.6 and hardness <10 mg/L (Buckler et al. 1987). EPA determined that this study warranted consideration in deriving the chronic standard for protection of sensitive fish species. The Service contends that similar consideration should be given to the avoidance response (Kádár et al., 2001) and accumulation (Pynnönen, 1990) studies in freshwater mussels given that populations of federally listed species are likely to be at risk. Based on these studies, we recommend that the chronic standard for the protection of all native freshwater mussels including federally listed species be no higher than 250 µg/L dissolved aluminum with no hardness adjustment.

We appreciate the opportunity to provide input on the proposed changes to the West Virginia water quality standards and would like to work cooperatively with EPA and the WVDEP to develop standards that are protective of federally listed species and all native freshwater mussels. If you have any questions regarding this letter, please contact Dr. Kathleen Patnode at (304) 234-0238 or at the letterhead address.

Sincerely,

Handwritten signature of Barbara Dargatzis in cursive script.

John E. Schmidt
Field Supervisor

Literature Cited

Buckler, D.R., P.M. Mehrle, L. Cleveland, and F.J. Dwyer. 1987. Influence of pH on the toxicity of aluminum and other inorganic contaminants to east coast striped bass. *Water Air Soil Pollut.* 35:97-10

Kádár, E., J. Salánki, R. Jugdaohsingh, J. Powell, C. McCrohan, and K. White. 2001. Avoidance responses to aluminium in the freshwater bivalve *Anodonta cygnea*. *Aquatic Toxicology* 55:137-148.

Pynnönen, K. 1990. Aluminium accumulation and distribution in the freshwater clams (unionidae). *Comparative Biochemistry and Physiology Part C: Comparative Pharmacology* 97 (1): 111-117.

**Aquatic Habitats Supporting Federally listed Endangered and Threatened Species, and Proposed
Endangered Species in West Virginia (Updated July 2013)**

There are fourteen federally listed endangered and threatened species that are associated with specific aquatic habitats in West Virginia. These include ten endangered freshwater mussels - clubshell (*Pleurobema clava*), fanshell (*Cyprogenia stegaria*), James spiny mussel (*Pleurobema collina*), northern riffleshell (*Epioblasma torulosa rangiana*), pink mucket pearly mussel (*Lampsilis abrupta*), rayed bean (*Villosa fabilis*), sheepsnose (*Plethobasus cyphus*), snuffbox (*Epioblasma triquetra*), spectaclecase (*Cumberlandia monodonta*), and tubercled-blossom pearly mussel (*Epioblasma torulosa torulosa*); two endangered plants - Harperella (*Ptilimnium nodosum*) and northeastern bulrush (*Scirpus ancistrochaetus*); one threatened plant - Virginia spiraea (*Spiraea virginiana*); and one threatened crustacean - Madison Cave isopod (*Antrolana lira*). Additionally, the diamond darter (*Crystallaria cincotta*), a fish found only in the Elk River, is currently proposed for listing under the Endangered Species Act. If eventually listed, it will not affect the number of West Virginia waterways with federally listed species because its range overlaps with other currently listed species. Nine other listed species not associated with specific aquatic habitats also occur in West Virginia. Those species are not addressed here.

The aquatic habitats below, listed alphabetically within the two U.S. Army Corps of Engineers (Corps) regulatory districts that operate in West Virginia (Huntington and Pittsburgh districts), represent the most current information on the known and potential distribution of the federally listed species described above. Prior to conducting any activities that could result in adverse impacts to these aquatic habitats (e.g., projects that involve the placement of rock or other fill material into or adjacent to these habitats, the withdrawal or diversion of water, projects that could introduce sediment or toxic chemicals into waterways, or which could alter water temperature, streamside vegetation, etc.), please contact the U.S. Fish and Wildlife Service, West Virginia Field Office, at (304) 636-6586. To determine if a Corps permit is required for activities in or near these or other aquatic habitats in West Virginia, please contact the Huntington District at (304) 399-5710 or the Pittsburgh District at (412) 395-7152.

U.S. Army Corps of Engineers Huntington District

1. **Big Sandy Creek**: Kanawha County: Snuffbox.
2. **Bluestone River**: Mercer and Summers Counties (Bluestone Gorge to slackwater of Bluestone Reservoir): Virginia spiraea.
3. **Cedar Creek**: Braxton and Gilmer Counties: Snuffbox.
4. **Cove Creek**: Monroe County: James spiny mussel.
5. **Elk River**: Braxton, Clay, and Kanawha Counties (Sutton Dam to slackwater below Coonskin Park), including the lower one-half mile reaches of its tributaries **Birch River**, **Blue Creek**, and **Laurel Creek**: Clubshell, pink mucket pearly mussel, northern riffleshell, rayed bean, and snuffbox. The Elk River also contains the diamond darter (proposed endangered).
6. **Gauley River**: Fayette and Nicholas Counties (Summersville Dam to Swiss): Virginia spiraea.
7. **Greenbrier River**: Greenbrier and Pocahontas Counties: Virginia spiraea.
8. **Henry Fork**: Calhoun and Roane Counties: Snuffbox.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

January 30, 2014

Mr. Scott G. Mandirola, Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street, SE
Charleston, West Virginia 25304

Dear Mr. Mandirola:

Thank you for soliciting EPA's views on the West Virginia Department of Environmental Protection (WVDEP) proposed revision of statewide aluminum water quality criteria for the protection of aquatic life. As you may know, EPA is in the process of updating the existing Clean Water Act Section 304(a) criteria recommendations for aluminum. EPA's updated criteria will reflect consideration of the latest scientific information on aluminum toxicity, including new data on mussels' sensitivity and pH effects on aluminum toxicity.

EPA encourages West Virginia to monitor the latest research and any updates to EPA's 304(a) aluminum criteria in order to ensure that West Virginia's criteria are based on sound scientific rationale and are protective of aquatic life. As such, WVDEP should consider whether the proposed criteria are protective of mussels in West Virginia, as well as appropriately take into consideration potential pH interactions with aluminum toxicity, as well as hardness. EPA believes the results of the on-going research on aluminum toxicity will provide valuable information to aid West Virginia in development of an appropriate statewide aluminum criteria revision.

EPA reviewed West Virginia's proposed revisions to the aluminum criteria in 47CSR2 "Requirements Governing Water Quality Standards," and provided comments on July 29, 2013, asking West Virginia to consider a list of the latest studies on aluminum toxicity to aquatic life. EPA also shared West Virginia's revisions with the U.S. Fish and Wildlife Service (USFWS), who provided comments on July 19, 2013, expressing concerns regarding aluminum toxicity to mussel species, including federally listed endangered mussels, in West Virginia and citing two studies on impacts to mussels exposed to aluminum. EPA asked West Virginia to consider the concerns raised by USFWS, particularly since West Virginia has a high diversity of native freshwater mussels. Finally, on November 26, 2013, EPA sent West Virginia an in-depth analysis comparing the studies West Virginia considered in calculating the draft aluminum revisions, with studies EPA believes may inform the revised national 304(a) recommendations for aluminum.

Information provided by USFWS indicates that mussels may be more sensitive to the effects of aluminum than other organisms for which EPA currently has data. The Kadar et al. (2001) study that USFWS included in their analysis indicated that adult *Anodonta cygnea* mussels may be sensitive to aluminum at concentrations above 250 µg/L, with reductions in mean duration of shell opening of 50% at 500 µg/L aluminum in the water column (at circumneutral pH) when compared to paired controls. This suggests that chronic elevated aluminum concentrations could lead to feeding for shorter durations with potential implications for survival and growth, and possibly even reproduction. Pynniönen (1990) conducted toxicity tests with two freshwater mussels in the Unionidae family (*Anodonta anatina* and *Unio pictorum*). In both species, pH had a significant effect on accumulation of aluminum in the gills, while hardness in the water was of minor importance, supporting USFWS conclusions that hardness-based criteria alone (without additional consideration of pH) will not be protective of mussels. The *Anodonta* mussel species in the two studies described above are not native to the US, but there are mussel species of the *Anodonta* genus present in West Virginia, including *Anodonta suborbiculata*, listed as a rare, threatened or endangered species in the West Virginia Department of Natural Resources' Rare, Threatened, and Endangered Animal listing that can be found at: (http://www.wvdnr.gov/Wildlife/PDFFiles/RTE_Animals_2012.pdf)

Finally, EPA recently became aware of another study, Simon 2005, that was conducted on mussels native to West Virginia and corroborates the evidence from the mussel studies provided by USFWS. In this 21-day chronic aluminum toxicity test conducted at circumneutral pH with the juvenile mussel *Villosa iris*, growth was significantly reduced at aluminum levels above 337 µg/L.

EPA believes that these studies provide a sufficient weight of evidence to indicate mussels may be more sensitive to aluminum exposure than other species in West Virginia's data set. West Virginia's proposed revisions to their existing aluminum criteria currently do not take into account potential impacts on mussels and a rationale for the exclusion of these potential effects has not been provided. The proposed chronic criteria values generated using West Virginia's proposed hardness-based equation are approximately three to six times higher than the chronic criteria value recommended as protective of mussel species by USFWS, at approximately median hardness ranges for West Virginia. As the USFWS noted in their letter, the state has a high diversity of mussel species, with 62 mussel species present throughout the state, including 10 federally listed species. EPA believes protection of these resources should be an important consideration in the derivation of any new water quality criteria for the protection of aquatic life in West Virginia.

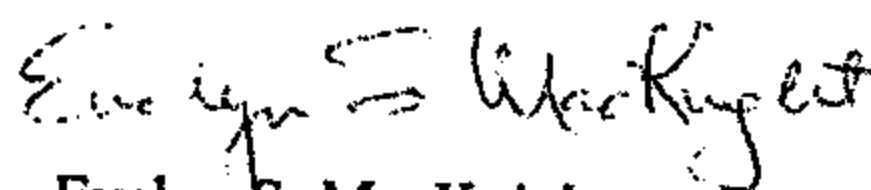
Because of the concern of mussel sensitivity to aluminum, EPA will be looking for additional data to refine our estimates of aluminum toxicity to mussels. In addition, aluminum experts with whom EPA has consulted have indicated that pH is also a critical factor that should be taken into account in developing an aluminum criteria equation. By spring 2014, EPA expects to receive additional data about pH interactions with aluminum toxicity across a range of species, as well as the results of mussel toxicity tests with aluminum. EPA will consider this information to ensure that the national 304(a) aluminum criteria update will be protective of all aquatic life, including mussels, at various pH and hardness levels.



EPA appreciates WVDEP's commitment to protecting water quality, and remains supportive of WVDEP's consideration of new data and information to revise its existing aluminum criteria. If you have any questions concerning this letter, please contact me at (215)814-5717, or have your staff contact Denise Hakowski at (215)814-5726.

Please note that our comments above are preliminary in nature and do not constitute a final decision by EPA under Clean Water Act § 303(c). Approval/disapproval decisions will be made by the Region following adoption of any new/revised standards by the state and submittal to EPA. Any determination pursuant to Clean Water Act § 303(c)(4)(B) may only be made by the Administrator or her duly authorized delegate.

Sincerely,



Evelyn S. MacKnight
Associate Director
Office of Standards, Assessment & TMDLs
Water Protection Division

cc: Kevin Coyne (WVDEP)

References

- Kadar, E., J. Salanki . R. Jugdaohsingh, J.J. Powell, C.R. McCrohan, and K.N. White . 2001. Avoidance responses to aluminum in the freshwater bivalve *Anodonta cygnea* . *Aqua. Tox.* 55: 137-148.
- Pynnönen, K. 1990. Aluminum accumulation and distribution in the freshwater clams (Unionidae). *Comp. Biochem. Physiol. C Comp. Pharmacol.* 97(1): 111-117.
- Simon, M. L. 2005. Sediment and interstitial water toxicity to freshwater mussels and the ecotoxicological recovery of remediated acid mine drainage streams. Master of Science thesis. Virginia Polytechnic Institute and State University. 113 pages.



ise

subject: MacKnight, Evelyn
Tuesday, November 26, 2013 5:07 PM
Mandirolo, Scott G; Coyne, Kevin R
Hakowski, Denise; Fleisig, Erica
Attachments: FW: HECD WV Aluminum analyses attached
Comments on WV AluminumCriteria_11.21.13[1].docx; Aluminum WV Table Crosswalk_11.21.13(1).xlsx
Importance: High

Scott and Kevin, As promised, attached please find the analyses of the WV aluminum criteria as developed by GEI that EPA HQ's Health and Ecological Criteria Division (HECD) with the aid of their contractor, GLEC. We would like to spend some time discussing these with you, either before or after you have had the opportunity to do a preliminary review. My goal was to get something to you, even if it would not represent our final position, so that you could manage activities during the legislative session in the best way.

There are 2 documents attached.

The first document is a text file that compares studies included or excluded in the respective analyses, based on EPA's current work to date on the update of the EPA national AI criteria. This document also provides an overview of the rationale behind inclusion/exclusion of studies, and full citations for studies EPA included to date but WV did not.

The second document is a spreadsheet file that contains the details of the analyses, e.g., what species, other data details, what concerns EPA has, the specifics of why EPA is excluding some data the WV criteria included. There are 2 tabs: one for acute data and one for chronic data. The rationale identifying differences is also color coded.

Green = in GEI report but EPA is not considering using for data acceptability issues Yellow = data EPA is considering but is not in GEI report Orange = difference in EPA/GEI paper interpretation

EPA's analyses should be considered in the light that our work is on going, and is based on the draft to date, not a completed, peer reviewed criteria document.

There is also additional data EPA may include as it becomes available, or exclude based on further consideration.

So this is EPA's analysis to date, with our caveats. (Erica et al, thank you very much for y our help with this). We hope this meets the needs of WV. I will be in on Friday, but most folks will be out. I hope that you have a great holiday and look forward to hearing from you next week.

Evelyn S. MacKnight | Associate Director, Office of Standards, Assessment, and TMDLs (3WP30) | Water Protection Division | U.S. EPA Region III | Tel (215) 814-5717 | Fax (215) 814-2318 | macknight.evelyn@epa.gov

EPA/OW Comments on WV AI Criteria
11-21-13

Additional studies EPA is considering beyond those included in the WV analysis (please see spreadsheet for studies and values):

Note: we are considering some data that goes beyond pH range of 6.5-9.0

Acute:

Fort and Stover 1995 (*Ceriodaphnia dubia*)
Shephard 1983 (*Ceriodaphnia reticulata* and *Daphnia magna*)
Holtze 1983 (*Oncorhynchus mykiss* @ pH=5.5)
Tandjung 1982 (*Salvelinus fontinalis* @ pH=5.6)
Boyd 1979 (*Pimephales promelas*, no hardness information though)
Palmer et al. 1989 (*Pimephales promelas*, may be an outlier, unbounded)
Kane and Rabeni 1987 (*Micropterus dolomieu*)
Jung and Jagoe 1995 (*Hyla cinerea* @ pH=5.5)
Shuhaimi-Othman et al. 2011 (*Stenocypris major*)

Chronic:

ENSR 1992b (*Ceriodaphnia dubia*)
Palawski et al. 1989 (*Chironomus riparius* pH=5.0, 5.6)
McKee et al. 1989 (*Salmo salar* @ pH=5.5)
Buckler et al. 1995 (*Salmo salar* @ pH=5.5)

GEI included studies that EPA does not plan on including (see spreadsheet)

Acute Toxicity Data Comparison

- For the most part our analysis and the GEI (2010) report are using the same data
 - The GEI report does limit the acceptable pH range to be from 6.5-9.0
 - When we limit to the same pH range, the EPA analyses and GEI reports have very similar CMC values across the low range of hardness (<150). However due to the differences in calculated pooled slope, the EPA values tend to be lower than those used by GEI.
 - We would like a more detailed explanation of their calculated pool slope methods.

Chronic Toxicity Data Comparison

- The GEI (2010) report includes a number of studies that are not considered valid according to the Guidelines. Most of these additional studies are using too few exposure concentrations or had control survival issues and therefore did not meet data acceptability criteria in the EPA analysis. Two papers were not evaluated by EPA's contractor and are currently being requested from Duluth.
- The GEI report is also using a different FACR in their analysis. The current EPA recommended ACR is 2, but GEI calculated their FACR as the geometric mean of *Ceriodaphnia dubia*, *Daphnia magna*, and *Pimephales promelas* (0.9591, 10.65, and 12.19, respectively). To calculate the CCC,

GEI divided the FAV by the FACR. The current EPA contractor recommendation is to lower the CCC to protect a commercially and recreationally important species.

- A major issue arose when attempting to follow the math behind the reported normalized SMCV and GMCVs in the GEI report. Despite reporting the studies used and the pooled slope, EPA was unable to calculate the same values in the Ranked Chronic Table and cannot account for these differences
- We request a more detailed methodology of the pool slope approach.

Full Citations for Additional Studies EPA is considering for National AI Criteria Draft:

Boyd, C.E. 1979. Aluminum sulfate (alum) for precipitating clay turbidity from fish ponds. Trans. Am. Fish. Soc. 108: 307-313.

Buckler, D.R., L. Cleveland, E.E. Little and W.G. Brumbaugh. 1995. Survival, sublethal responses, and tissue residues of Atlantic salmon exposed to acidic pH and aluminum. Aquat. Toxicol. 31(3): 203-216.

ENSR Consulting and Engineering. 1992b. Chronic toxicity of aluminum to *Ceriodaphnia dubia* under static renewal test conditions at four levels of water hardness. Doc. No. 8505-092-047, Prepared for Climax Metals Company, Golden, CO by ENSR Consulting and Engineering, Ft. Collins, CO, 122 p.

Fort, D.J. and E.L. Stover. 1995. Impact of toxicities and potential interactions of flocculants and coagulant aids on whole effluent toxicity testing. Water Environ. Res. 67(6): 921-925.

Holtze, K.E. 1983. Effects of pH and ionic strength on aluminum toxicity to early developmental stages of rainbow trout (*Salmo gairdneri* Richardson). Res. Rep., Ontario Ministry of the Environment, Rexdale, Ontario, Canada, 39 p.

Jung, R.E. and C.H. Jagoe. 1995. Effects of low pH and aluminum on body size, swimming performance, and susceptibility to predation of green tree frog (*Hyla cinerea*) tadpoles. Can. J. Zool. 73(12): 2171-2183.

Kane, D.A. and C.F. Rabeni. 1987. Effects of aluminum and pH on the early life stages of smallmouth bass (*Micropterus dolomieu*). Water Res. 21(6): 633-639.

McKee, M.J., C.O. Knowles and D.R. Buckler. 1989. Effects of aluminum on the biochemical composition of Atlantic salmon. Arch. Environ. Contam. Toxicol. 18(1/2): 243-248.

Palawski, D.U., J.B. Hunn, D.N. Chester and R.H. Wiedmeyer. 1989. Interactive effects of acidity and aluminum exposure on the life cycle of the midge *Chironomus riparius* (Diptera). J. Fresh. Ecol. 5: 155.

Palmer, R.E., R.J. Klauda, M.A. Jepson and E.S. Perry. 1989. Acute sensitivity of early life stages of fathead minnow (*Pimephales promelas*) to acid and aluminum. Water Res. 23(8): 1039-1047.

Shephard, B. 1983. The effect of reduced pH and elevated aluminum concentrations on three species of zooplankton: *Ceriodaphnia reticulata*, *Daphnia magna* and *Daphnia pulex*. U.S. EPA, Duluth, MN, 14 p.

Shuhaimi-Othman, M., N. Yakub, N.A. Ramle and A. Abas. 2011. Toxicity of metals to a freshwater ostracod: *Stenocypris major*. J. Toxicol. Article ID 136104, 8 p.

Tandjung, S.D. 1982. The acute toxicity and histopathology of brook trout (*Salvelinus fontinalis*, Mitchill) exposed to aluminum in acid water. Ph.D. Thesis, Fordham University, New York, NY, 330 p.

EPA OW Crosswalk of WV AI Acute Data - ranked least to most sensitive (based on GEI GMAV ranking Green = in GEI report but EPA is not considering using for data acceptability issues
Yellow = data EPA is considering but is not in GEI report
Orange = differences in EPA/GEI paper interpretations)

Species	Method ^a	Chemical	Hardness (mg/L as CaCO ₃)	pH	LC50 or EC50 Concentration (µg/L)	Reference
Midge (2nd-3rd instar larvae), <i>Tanytarsus distansilis</i>	S, U	Aluminum sulfate	17.43	6.85-7.71	>	77,700 Lamb and Bailey 1981; 1983
Green sunfish (juvenile, 3 mo.), <i>Lepomis cyanellus</i>	S, M	Aluminum chloride	47.4	7.55	>	50,000 Call et al. 1984
Yellow perch, <i>Perca flavescens</i>	S, M		47.4	7.55	>	49,800 Call et al. 1984
Chesapeake cutthroat shiner, <i>Notropis punctatus</i>	S, M		47.4	7.54	>	47,900 Call et al. 1984
Snail (adult), <i>Physa</i> sp.	S, M	Aluminum chloride	47.4	6.59	>	23,400 Call et al. 1983
Snail (adult), sp.	S, M	Aluminum chloride	47.4	7.55		30,600 Call et al. 1984
Snail (adult), sp.	S, M	Aluminum chloride	47.4	8.17	>	24,700 Call et al. 1984
Snail (adult), sp.	S, M	Aluminum chloride	47.4	7.46		55,500 (aged solution) Call et al. 1984
Stonefly (nymph), <i>Acroneuria</i> sp.	S, M	Aluminum chloride	47.4	7.46	>	22,600 Call et al. 1984
Amphipod, <i>Gammarus pseudolimnoides</i>	S, M		47.4	7.53		22,000 Call et al. 1984
Planarian (adult), <i>Dugesia tigrina</i>	-	Aluminum chloride	47.4	7.48	>	16,660 Brooke 1985
Rio Grande silvery minnow, <i>Hybognathus amarus</i>	R, M	Aluminum chloride	140	8.1	>	59,100 Buhl 2002

Comparison:

GEI (2010) has a slightly different LC50 (>79900)

We excluded this value for this species, b/c there were only two exposure concentrations

We excluded this value for this species, b/c there were only two exposure concentrations

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c EPA 1988 says it is an unusual experimental design

We excluded this value for this species, b/c there was leaf disc in the exposure chamber that served as shelter and a possible substrate for food organisms

EPA contractor review - duration too short (48 hr)

Atlantic salmon (Sac fry, ~0.2 g), <i>Salmo salar</i>	S, U	Aluminum chloride	6.8 (6.6-7)	6.5	599	Hamilton and Haines 1995
Amphipod (4 mm), <i>Crangonyx pseudogracilis</i>	R, U	Aluminum sulfate	50	6.75	9,190	Martin and Holdich 1986
Rainbow trout, <i>Oncorhynchus mykiss</i>			1	7	3800	Thomsen et al. 1988
Rainbow trout, <i>Oncorhynchus mykiss</i>			150	7	71000	Thomsen et al. 1988
Rainbow trout (fingerling), <i>Oncorhynchus mykiss</i>	S, M	Aluminum chloride	47.4	6.59	7,400	Call et al. 1984
Rainbow trout (fingerling), <i>Oncorhynchus mykiss</i>	S, M	Aluminum chloride	47.4	7.31	14,600	Call et al. 1984
Rainbow trout (fingerling), <i>Oncorhynchus mykiss</i>	S, M	Aluminum chloride	47.4	8.17	24,700	Call et al. 1984
Rainbow trout (fingerling), <i>Oncorhynchus mykiss</i>	S, M	Aluminum chloride	47.4	7.46	8,600 (aged solution)	Call et al. 1984
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	27.4	7.58	9,840	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	45.2	7.62	8,070	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	89.5	7.58	8,160	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	130.4	7.58	8,200	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	23.2	8.3	6,170	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	35.0	8.3	6,170	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	83.6	8.3	7,670	Gundersen et al. 1994
Rainbow trout (juvenile, 1-3 g), <i>Oncorhynchus mykiss</i>	F, M	Aluminum chloride	115.8	8.3	6,930	Gundersen et al. 1994

EPA review - Dilution water not characterized; unmeasured chronic exposure (25 d exposure); GEI listed the test but doesn't use it in the SMAV calculation

EPA review - Dilution water not characterized; unmeasured chronic exposure (25 d exposure); GEI listed the test but doesn't use it in the SMAV calculation

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c EPA 1988 says it is an unusual experimental design

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c it is undefined

GEI (2010) doesn't use b/c it is undefined

Chinook salmon (juvenile), <i>Oncorhynchus tshawytscha</i>	S, M	Sodium aluminate	28.0	7.00	>	40,000	Peterson et al. 1974
Fathead minnow (adult), <i>Pimephales promelas</i>	S, U	Aluminum sulfate	-	7.6	>	18,900	Boyd 1979
Fathead minnow (juvenile), <i>Pimephales promelas</i>	S, M	Aluminum sulfate	220	7.34		35,000	Kimball 1978
Fathead minnow (juvenile, 32-33 d), <i>Pimephales promelas</i>	S, M	Aluminum chloride	47.4	7.61	>	48,200	Call et al. 1984
Fathead minnow (juvenile, 32-33 d), <i>Pimephales promelas</i>	S, M	Aluminum chloride	47.4	8.05	>	49,800	Call et al. 1984
Fathead minnow (juvenile, 1 mm, 3 mg), <i>Pimephales promelas</i>	F, M	Aluminum chloride	21.6	6.5	>	400	Palmer et al. 1989
Fathead minnow (juvenile, 1 mm, 3 mg), <i>Pimephales promelas</i>	F, M	Aluminum chloride	21.6	7.5	>	400	Palmer et al. 1989
Fathead minnow (larvae, 1 d), <i>Pimephales promelas</i>	F, M	Aluminum chloride	21.6	6.5	>	400	Palmer et al. 1989
Fathead minnow (larvae, 1 d), <i>Pimephales promelas</i>	F, M	Aluminum chloride	21.6	7.5	>	400	Palmer et al. 1989
Fathead minnow (<7 d), <i>Pimephales promelas</i>	R, M	Aluminum chloride	26	7.8		1,160	ENSR 1992c
Fathead minnow (<7 d), <i>Pimephales promelas</i>	R, M	Aluminum chloride	46	7.6		8,180	ENSR 1992c
Fathead minnow (<7 d), <i>Pimephales promelas</i>	R, M	Aluminum chloride	96	8.1		20,300	ENSR 1992c
Fathead minnow (<7 d), <i>Pimephales promelas</i>	R, M	Aluminum chloride	194	8.1		44,800	ENSR 1992c
Fathead minnow (larva, 4-6 dph), <i>Pimephales promelas</i>	R, U	Aluminum chloride	140	8.1	>	59,100	Buhl 2002
Tubificid worm, <i>Tubifex tubifex</i>		Aluminum ammonium sulfate	245	7.6		50,230	Khangaroo 1991
Cladoceran, <i>Daphnia magna</i>	Aluminum chloride	Aluminum chloride	45.4	7.61	>	25,300	Brooke 1985

GEI (2010) doesn't use this species in the GMAV calculation

EPA review - test species fed

GEI (2010) doesn't use b/c EPA 1988

GEI (2010) doesn't use b/c EPA 1989

EPA review - inappropriate form of toxicant

EPA review - No dose response observed; GEI (2010) not used per EPA 1988

Cladoceran (>12 hr), <i>Daphnia magna</i>	S, U	Aluminum chloride	45.3	7.74	3,900	Biesinger and Christensen 1972
Cladoceran (<24 hr), <i>Daphnia magna</i>	S, M	Aluminum sulfate	220	7.05	38,200	Kimball 1978
Cladoceran (0-24 hr), <i>Daphnia magna</i>	S, U	Aluminum chloride	45	7.7	2,800	Shepherd 1983
Isopod (7 mm), <i>Asellus aquaticus</i>	S, U	Aluminum sulfate	50	6.75	4,370	Martin and Holdich 1986
Cladoceran, <i>Ceriodaphnia dubia</i>	S, M		98.5	7.6	2,880	Soucek et al. 2001
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	S, M	Aluminum chloride	50.0	7.42	1,900	McCauley et al. 1986
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	S, M	Aluminum chloride	50.5	7.86	1,500	McCauley et al. 1986
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	S, M	Aluminum chloride	50.0	8.13	2,560	McCauley et al. 1986
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	R, M	Aluminum chloride	26	7.5	720	ENSR 1992d
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	R, M	Aluminum chloride	46	7.6	1,880	ENSR 1992d
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	R, M	Aluminum chloride	96	7.8	2,450	ENSR 1992d
Cladoceran (<24 hr), <i>Ceriodaphnia dubia</i>	R, M	Aluminum chloride	194	8.1	99,600	ENSR 1992d
Cladoceran (<12 hr), <i>Ceriodaphnia dubia</i>	S, U	Aluminum sulfate	90 (80-100)	7.0-7.3	3,726	Fort and Stover 1995
Cladoceran (<12 hr), <i>Ceriodaphnia dubia</i>	S, U	Aluminum sulfate	90 (80-100)	7.0-7.3	5,672	Fort and Stover 1995
Cladoceran (0-24 hr), <i>Ceriodaphnia reticulata</i>	S, U	Aluminum chloride	45	7.7	2,800	Shepherd 1983
Cladoceran, <i>Ceriodaphnia sp.</i>	S, M		47	7.36	2,300	Call 1984
Cladoceran, <i>Ceriodaphnia sp.</i>	S, M		47	7.36	3,690	Call 1984

EPA review - Duration too short (72 hrs)

EPA contractor review - since there are other identified species, we exclude these values b/c of the guidelines

EPA contractor review - since there are other identified species, we exclude these values b/c of the guidelines

THE STUDIES BELOW THIS BLACK LINE ARE NOT IN THE GEI (2010) REPORT
(but are in the pH range of 6.5-9.0)

Ostracod (adult, 1.5 mm, 0.3 mg), <i>Succinea major</i>	R, M	Aluminum sulfate	15.63	6.51		3,101.96	Shubarti-Ghman et al. 2011a
Brook trout (14 mo., 210 mm, 130 g), <i>Salvelinus fontinalis</i>	F, U	Aluminum sulfate	-	6.5		3,600	Decker and Menendez 1974
Smallmouth bass (larvae, 48 hr post hatch), <i>Micropterus dolomieu</i>	S, M	Aluminum sulfate	12.45 (12.1-12.8)	6.0-7.5	>	978	Kane and Rabin 1987
Smallmouth bass (larvae, 48 hr post hatch), <i>Micropterus dolomieu</i>	S, M	Aluminum sulfate	12.45 (12.1-12.8)	7.2-7.7	>	217	Kane and Rabin 1987

WV DEP Response adds this value with a hypothetical hardness of 50 to be conservative

GEl (2010) doesn't use this species in the SMAV/GMAV calculation because the effect seen at this concentration was only 20% mortality and thus would pull down the FAV artificially

GEl (2010) doesn't use this species in the SMAV/GMAV calculation because the effect seen at this concentration was only 20% mortality and thus would pull down the FAV artificially

THESE STUDIES ARE NOT IN THE GEl (2010) REPORT (but are out of the pH range; pH<6.5)

Species	Method ^a	Chemical	Hardness (mg/L as CaCO ₃)	pH	LCS0 or EC50 Concentration (µg/L)	Reference
<i>Cladocera</i> (0-24 hr), <i>Ceriodaphnia reticulata</i>	F, M	Aluminum chloride	45	6.0	304	Shepherd 1983
<i>Cladocera</i> (0-24 hr), <i>Ceriodaphnia reticulata</i>	F, M	Aluminum chloride	4.0	5.5	362	Shepherd 1983
Rainbow trout, <i>Oncorhynchus mykiss</i>	S, U	-	-	5.5	310	Holtze 1983
Atlantic salmon (Sac fry, ~0.2 g), <i>Salmo salar</i>	S, U	Aluminum chloride	6.8 (6.6-7)	5.5	584	Klimtun and Halsey 1995
Brook trout (14 mo., 210 mm, 130 g), <i>Salvelinus fontinalis</i>	F, U	Aluminum sulfate	-	6.0	4,400	Decker and Menendez 1974
Brook trout (14 mo., 210 mm, 130 g), <i>Salvelinus fontinalis</i>	F, U	Aluminum sulfate	-	5.5	4,000	Decker and Menendez 1974
Brook trout (0.6 g, 4.4-7.5 cm), <i>Salvelinus fontinalis</i>	S, U	Aluminum sulfate	40	5.6	6,530	Tandjung 1982

Brook trout (0.6 g, 4.4-7.5 cm), <i>Salvelinus fontinalis</i>	S, U	Aluminum sulfate	18	5.6		3,400	Tandjung 1982
Brook trout (0.6 g, 4.4-7.5 cm), <i>Salvelinus fontinalis</i>	S, U	Aluminum sulfate	2	5.6		370	Tandjung 1982
Fathead minnow (juvenile, 1 mm, 3 mg), <i>Pimephales promelas</i>	F, M	Aluminum chloride	21.6	5.5	>	50	Pelmer et al. 1989
Smallmouth bass (larvae, 48 hr post hatch), <i>Micropterus dolomieu</i>	S, M	Aluminum sulfate	12	5.1		130	Kota and Rabeni 1987
Green tree frog (tadpole), <i>Hyla cinerea</i>	R, M	Aluminum chloride	1.5	5.5	>	400	Jung and Jago 1995

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

Cooper, Laura K

From: nicola bastian <nicolabastian@yahoo.de>
Sent: Friday, July 31, 2015 7:47 AM
To: DEP Comments
Subject: aluminum standard

Please,
to whom it may concern,
aluminum is a metal our bodies do not need,
and it should be kept out of any public water , period.
Please see link : Aluminum and Alzheimers.
Thank you for doing the right thing
icola

Cooper, Laura K

From: gawalsh@frontiernet.net
Sent: Tuesday, July 28, 2015 7:53 PM
To: DEP Comments
Subject: Aboveground Storage Tank Comments

Mr. Sizemore,

As a lifelong resident of West Virginia, I wish to express my concern for proposed revisions to our West Virginia Water Quality Standards.

Protection of our water supply of above-ground storage tanks can only happen through strong regulations. Any change to the rules that may relax timelines for enforcement or weaken standards needs to be avoided.

Throughout the years, I have followed news articles and testimonials by WV residents with proof of personal health and in their communities where the environment has been compromised because follow-up in keeping the health of the land was not held in check. Evidence is everywhere, as anyone who drives through the state can see, that we're not doing all that we can to protect our waterways and land.

Specifically, aluminum in any form is toxic in our streams---the proposed revision to the aluminum standard ignores the existence of this. The proposed revision to the selenium standard leaves both human life and our aquatic life open to health issues.

Please strongly consider the future of the health of our state lands and waterways as these revisions are being proposed. We no longer live in the 20th century where we ignored what big industry did to our environment. It's time to take a lead and think of the health of our state population. Those who reap the wealth of our resources need to be the ones to protect it for future generations.

This isn't an option--it's your duty.

Anna Mary Walsh
254 Chandler Drive
Shepherdstown, WV 25443

"Attitude is everything. It motivates action, which increases productivity and improves morale, which perpetuates a positive attitude." -- Robert Urich

Cooper, Laura K

From: Zimajunkie@aol.com
Sent: Tuesday, July 28, 2015 6:33 PM
To: DEP Comments
Subject: Aboveground Storage Tank Comments

I wanted to make known that I

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

I do want the water supply protected through strong regulations of aboveground storage tanks and that I want the rule to:

1. Not weaken standards for tanks or relax timelines for enforcement;
2. Provide an opportunity for public notice and comment on amendments to permits and plans before a tank is excused from the Act's requirements;
3. Establish registration fees that adequately fund and staff the program; and
4. Increase bond amounts so that they cover potential liability of a tank failure.

Thank you for your consideration.
Ilene Sussman

Cooper, Laura K

From: Mark Blumenstein <markb@mountain.net>
Sent: Tuesday, July 28, 2015 9:44 PM
To: DEP Comments
Subject: 2015 proposed changes

1. I Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. I Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.
3. Selenium is already significant problem in the coal mining regions of West Virginia. Weakening the standard will make it hard to hold coal companies accountable for the damage they cause. Eventually, the pollution will have to be treated, and the cost is likely to fall on the taxpayers.

Sent from my iPad

Cooper, Laura K

From: Jason P Ericson (Services - 6) <jason.p.ericson@dom.com>
Sent: Friday, July 31, 2015 10:49 AM
To: Cooper, Laura K
Subject: Revisions to WV Water Quality Standards: Dominion Comments
Attachments: 2015 WV WQS revisions_dominion cmnts.pdf

Attached are Dominion's comments on the proposed revisions to the water quality standards.

Thank you,

Jason P. Ericson, PG
Dominion Resources Services, Inc.
Environmental Policy
5000 Dominion Blvd
Glen Allen, VA 23060
Phone: (804) 273-3012
Mobile: (804) 317-9464
Fax: (804) 273-2964

CONFIDENTIALITY NOTICE: This electronic message contains information which may be legally confidential and or privileged and does not in any case represent a firm ENERGY COMMODITY bid or offer relating thereto which binds the sender without an additional express written confirmation to that effect. The information is intended solely for the individual or entity named above and access by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, distribution, or use of the contents 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.

Pamela F. Faggert
Chief Environmental Officer and
Vice President Corporate Compliance

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Phone: 804-773-3167
dom.com

 Dominion
RESOURCES

Via Electronic Submission to: Laura.k.cooper@wv.gov

July 30, 2015

West Virginia Department of Environmental Protection
Laura Cooper, Water Quality Standards, DWWM
601 57th Street, SE
Charleston, West Virginia 25304

RE: Revisions to West Virginia Water Quality Standards, 47 CSR 2

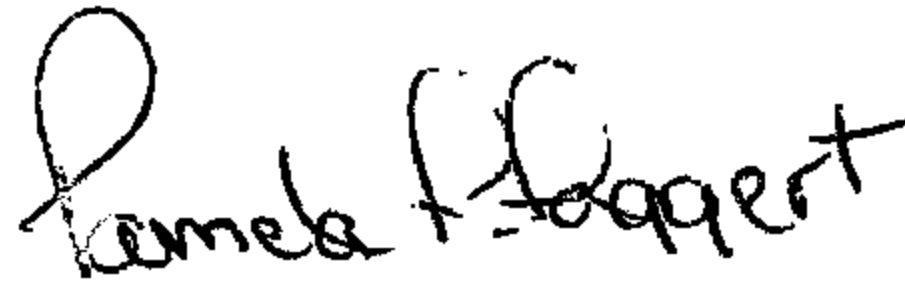
Dear Ms. Cooper,

Dominion Resources, Inc. (Dominion) appreciates the opportunity to submit comments on the West Virginia Department of Environmental Protection (WVDEP) proposal for revisions to the Water Quality Standards (47 CSR 2) and the associated Emergency Rule. Dominion is the owner of the Mount Storm Power Station, a power generating station located in Mt. Storm, West Virginia, as well as numerous facilities associated with our natural gas transmission, gathering and storage, and distribution operations. Wastewater discharges associated with our facilities, and specifically, from the Mt. Storm Power Station are covered under National Pollutant Discharge Elimination System (NPDES) permits and are discharged to receiving streams that are subject to the water quality standards that are addressed by this rulemaking.

We specifically support the proposed revisions to the aluminum water quality standard. The proposal would change the aluminum criteria from the existing numeric value to an equation that is based on in-stream hardness for streams with a pH between 6.5 and 9.0. We concur with WVDEP that scientific evidence supports the direct relationship between dissolved aluminum toxicity and in-stream hardness. The proposed hardness-based approach provides for a water quality calculation that relies on site-specific data and is more defensible than the current state-wide numeric criteria. The proposed equation to determine the site-specific criteria will offer increased protections for low-hardness streams while avoiding unnecessary impairment listings for streams with higher hardness that are not impaired. Similar hardness-based standards have been approved by EPA in other states and we support WVDEP's balanced approach. The proposed revisions set surface water quality standards that safeguard public health and the environment while avoiding unnecessary compliance costs to the regulated community.

We appreciate the opportunity to provide comments on this rulemaking and respectfully request that proposed revisions to the water quality standards be approved. If you have any questions, please call me at 804-273-3467 or Jason Ericson at 804-273-3012 (jason.p.ericson@dom.com).

Sincerely,

A handwritten signature in black ink that reads "Pamela F. Faggert". The signature is written in a cursive style with a large initial "P" and a stylized "F".

Pamela F. Faggert

Cooper, Laura K

From: jpratt1@aol.com
Sent: Wednesday, July 29, 2015 3:42 PM
To: DEP Comments
Subject: Comment on Water Quality Standards Proposed Rule

Dear People,

I'm writing to comment on the proposed rule for Water Quality Standards. I strongly oppose the proposed emergency rule that weakens the aluminum criteria, as well as the proposed revision to the selenium standard.

Thank you for your consideration of this comment.

Julie Pratt
104 Buckhorn Road
Charleston, WV 25314

Cooper, Laura K

From: Mike Jenkins <mjj@aquafix.com>
Sent: Thursday, July 30, 2015 10:48 AM
To: Cooper, Laura K
Subject: Comments on public hearing held July 21, 2015
Attachments: Scan0003.pdf

Ms Cooper

Please find attached my comments on the July 21 public hearing.

Thank You
Mike Jenkins

July 30, 2015

Comments on the public hearing held on July 21st concerning the DEP waiver request for Martin and Sandy creeks in Preston and Barbour counties.

I attended the public hearing and would like to comment on what I heard. I understand that these waivers are being requested to run a trial in stream treatment using lime dosers with hydrated lime as a treatment chemical. I was surprised to hear Friends of the Cheat and other environmental groups were opposed to this waiver. The streams in question have been dead streams for more than 60 years due to pre law and post law mining in the area. Martin creek carries acidity and various metals downstream to Muddy creek and then to Cheat River, these are carried in solution as dissolved metals. The dissolved metals and acidity kill everything in its path.

Friends of the Cheat seem to be concerned with the amount of sediment that will be produced by this type of treatment. As alkalinity is added metals will precipitate and will be disbursed downstream, the Hydrated Lime will dissolve and make very little sediment, if any, itself. The in stream dosing treatment has been used in Ohio, Maryland and West Virginia with very good results. In West Virginia alone Three Forks Creek, that flows from Preston county thru Taylor county to Tygart River over 20 miles, has been brought back to life in less than a year after the startup of four dosing stations. The fish population continues to grow the entire length of the stream to within 100' of the dosing stations, the fish do not seem to mind the sediment, what better judge of stream health.

How many miles of dead streams can Friends of the Cheat document that they have brought back to life thru their efforts that lime dosing has not played a role in? Friends of the Cheat is a good organization and I applaud their efforts, but I feel they are wrong on this issue.

If the test is not successful then let the streams go back to the dead state that they have been in for the last 60 years, but if it does improve the quality of the stream then we are one step closer to the goal that we all want of clean streams. If we continue to do nothing we know the outcome.

Thank You for Your Time


Mike Jenkins

Cooper, Laura K

From: Kevin Ryan <kevin@cheat.org>
Sent: Thursday, July 30, 2015 5:09 PM
To: DEP Comments; Cooper, Laura K
Cc: Amanda Pitzer; David Petry
Subject: Friends of the Cheat Comments
Attachments: Friends of the Cheat Martin Creek Variance Comments.pdf

Hello,

Please find comments from Friends of the Cheat attached to this e-mail in a document titled, "Friends of the Cheat Martin Creek Variance Comments".

Thank you,

Kevin Ryan
Friends of the Cheat
Mobile:304-698-6270
Office:304-329-3621
119 S. Price St.
Suite 206
Kingwood, WV 26537
cheat.org

Friends of the Cheat
July 30th, 2015

The comments included below specifically relate to the proposed variance for the Martin Creek watershed (Martin Creek, Glade Run, and Fickey Run) located in Preston County.

Friends of the Cheat (FOC) has worked collaboratively with Federal, state, and local agencies, academic institutions, fellow non-profits, businesses, and private landowners to restore Muddy Creek (including the Martin Creek subwatershed) and the Cheat River mainstem from the damaging effects of acid mine drainage since the group's formation. Following a series of blowouts into Muddy Creek from an illegally sealed mine in 1993 and 1994, FOC came together to bring attention and resources to the severe acid mine drainage (AMD) problem in the Cheat River watershed. Catalyzed by the River of Promise task force group and the various partnerships this group has spawned, stakeholders have seen the once dead Cheat River return to life. Fish can be found throughout the entire main stem and the river maintains a neutral pH. In 2012, 26.5 miles of the Cheat River mainstem was removed from the DEP's 303(d) list of impaired waters for pH impairments. FOC is cautious to alter the existing water treatment strategies in a way that might degrade this success.

FOC's primary focus has been remediating AMD from abandoned coal mines—installing 16 treatment systems in cooperation with private landowners. These restoration efforts have been limited due to the severity and complexity of the AMD pollution problem and constraints on funding including long-term operations and maintenance costs. There are over 500 identified abandoned coal mine areas within the Cheat River watershed, many of which discharge AMD. Approximately 70 of these known areas exist in the Muddy Creek subwatershed with the vast majority of these sites in the Martin Creek subwatershed.

FOC has been searching for a solution to the severe AMD problem in Muddy Creek for over 20 years and knows that the "status quo" is not working. FOC recently submitted a new Muddy Creek Watershed Based Plan (WBP) to EPA that identifies in-stream dosing as a valuable tool in the toolbox, but not the only solution to AMD pollution.

It is clear that the in-stream dosing treatment efforts on Three Fork Creek have improved water quality and thus habitat and aquatic communities. As each watershed is unique, FOC is interested in further study of the parameters that would allow in-stream dosing to provide similar results in Muddy Creek, and other watersheds.

In 2012, Friends of the Cheat conducted an EPA-funded study, in partnership with the WV Water Research Institute's National Mine Land Reclamation Center and DEP's Office of Special Reclamation, to use in-stream lime dosing for acid mine drainage treatment in the Martin Creek watershed. During the study, FOC found that sludge accumulated in the water and on the stream banks in the Martin Creek watershed and in Muddy Creek downstream. In-stream lime dosing altered the visual appearance of the stream, turning clear water into turbid, red water with sludge. These solids contribute to embedded

streambeds which smother habitats for stream flora and fauna. We concluded from the study that in-stream lime dosing should be implemented in a way to minimize these side effects. Pictures of the stream during this lime dosing study are included below these comments.

Since there is precedent that lime-dosing may not be the only strategy necessary to restore these streams impacted from acid mine drainage, Friends of the Cheat offers the following concerns and questions regarding the proposed variance.

The proposed variance application provides very little information on how the in-stream dosing by DEP would be implemented and evaluated. The variance application does not adequately explain how DEP will be accountable for either the continued treatment of bond forfeiture sites in the watershed, or the success of the dosing program. Instead, the variance asks for a 10 year period of worst case scenario water quality. What incentive will there be for DEP to revise the standards during tri-annual reviews once standards are established at the worst case scenario?

In addition, the following questions should be adequately addressed publically before revisions to water quality standards would be acceptable.

1. What is the specific goal of the Alternative Restoration Measures? This variance application proposes to set water quality standards to the worst case scenario which is a low standard for a restoration effort. Once the standards are set to the worst case scenario, what incentive will DEP have to follow through on meeting any restoration goals? If restoration is not expected within the Martin Creek watershed, then what is the goal for restoration in Muddy Creek and the Cheat River downstream?
2. What metrics will be used to determine the success of the lime dosing? For example, will DEP be required to monitor benthic macroinvertebrates and fish populations within the entire Muddy Creek watershed?
3. Which downstream sample sites will be monitored to determine success or failure? The proposed variance is only for the Martin Creek watershed, but it is likely that sludge created from in-stream dosing will flow, in some places less than a mile downstream, into Muddy Creek and eventually into the Cheat River.
4. How will DEP know when to stop or alter the dosing strategy? How will evaluation of downstream water quality in Muddy Creek and the Cheat River be considered during the tri-annual review process? For example, if the in-stream conditions are not acceptable, will DEP be required to add additional, more conventional sludge management measures to the restoration effort?

FOC believes that in-stream dosing can be a valuable tool for restoration, but does not think it is the only solution. Based on previous in-stream dosing study in the watershed, it is likely that successful restoration in Martin Creek (Muddy Creek) will require a

combination of in-stream dosing and active, at-source treatment that includes the management of AMD sludge using more conventional sludge collection and disposal methods.

Broadly, FOC does have concerns about the overall logic of rolling back water quality standards in an effort to improve water quality. Instead of implementing a 10-year watershed-wide exception, FOC suggests that the DEP work with the “Keeley Case” plaintiffs to revise their mandated compliance schedule to allow that 1) stakeholders can collaboratively develop goals and metrics for evaluating the “Alternative Restoration Measures”, 2) the new T&T treatment system is constructed and fully functional, and 3) “Alternative Restoration Measures” study partners implement and evaluate at least one full year of lime dosing. Until the new T&T system is fully operational, it will be very challenging to determine if the upstream lime dosing is working as intended once several hundred gallons per minute of raw, untreated mine water discharges into Muddy Creek from the Preston Energy/Ruthbell mine discharge. Additionally, more time would allow DEP to continue its innovative work with EPA on NPDES in-stream/watershed-scale permits to insure that treatment is maintained to acceptable restoration goals.

Based on our previous experience and study, FOC has concerns about the “Alternative Restoration Measure’s” impact on water quality throughout the newly protected, Cheat River Canyon. Added solids from lime dosing could degrade water quality, particularly water color and clarity, which could have a negative impact on aquatic communities and outdoor recreation.

In conclusion, FOC shares with DEP the goal to restore Muddy Creek, but FOC cannot support the proposed variance in its current form. FOC applauds DEP for considering new approaches to watershed restoration. FOC believes there is a better way to utilize the available resources through a collaborative, outside-of-the-box, watershed based approach to achieve restoration and water quality goals.

It has taken over two decades to restore the once-dead Cheat to a River of Promise. FOC believes that continued progress and new success stories will require even greater patience, persistence, and collaboration between all stakeholders. FOC appreciates the opportunity to comment on this proposed variance and feels it is important to engage all West Virginia watershed stakeholders from local landowners to regional stream protection and restoration experts in preparation for and throughout using in-stream dosing strategies.

Photo #1: Fickey Run during in-stream lime dosing study in 2012.



Photo #2: Fickey Run during in-stream lime dosing study in 2012.



Photo #3: Muddy Creek near the mouth during the in-stream lime dosing study in 2012.



Cooper, Laura K

From: Kathy Mace <kmace@prestoncountywv.gov>
Sent: Friday, July 31, 2015 7:55 AM
To: Cooper, Laura K
Subject: Comment
Attachments: 7.27.2015 DEP Letter.pdf

Ms. Cooper,

Sorry Ms. Cooper I sent you the unsigned copy. Here is the signed copy of the letter of support regarding the pending waiver to allow a trial in stream treatment using lime dosers with hydrated lime as a treatment chemical. We would like it considered as part of the comment period.

Thank you for your consideration. Questions just let me know.
Have a great day!

Kathy

Kathy Mace
County Administrator
Preston County Commission
106 West Main Street, Suite 202
Kingwood, West Virginia 26537

Phone: 304.329.1805

Fax: 304.329.3192

Cell: 304.288.5030

Email: kmace@prestoncountywv.gov

www.prestoncountywv.org

PRESTON COUNTY COMMISSION

**T. Craig Jennings, President
Dave Price, Commissioner
Don Smith, Commissioner**

July 27, 2015



The Preston County Commission is in full support of the Department of Environment Protections' request for waiver to allow a trial in stream treatment using lime dosers with hydrated lime as a treatment chemical.

The streams for the trial have been dead streams for more than a half of century due to pre law and post law mining in the area. It is our understanding that the Three Forks Creek that flows from Preston County through Taylor County to Tygart River over 20 miles has been brought back to life after the startup of four dosing stations. Also this method being proposed by the DEP has been used in neighboring states with very good results.

We see no down side to the waiver as it allows for a test. If the outcome is successful then the stream will be improved and if the test is not successful then the stream will go back to its current condition.

The Preston County Commission appreciates the opportunity to make comment on the proposal before you by the Department of Environmental Protection for a trial as it relates to the Clean Stream initiative.

Respectfully submitted,


**T. Craig Jennings, President
On behalf of the Preston County Commission**

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 1:42 PM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Rule

From: David Billups [mailto:dbillups@mix.wvu.edu]
Sent: Thursday, July 30, 2015 1:41 PM
To: DEP Comments
Subject: Water Quality Standards Rule

Good afternoon,

I would like to express my concerns regarding the new water quality standards rule. Water is likely to be the next big item on the list of limited resources. Yes, there is a lot of water on Earth, but there are also a lot of people. The world population has nearly doubled in the last 45 years and there are no signs indicating that this trend will taper off. Therefore, everyone needs to do their part to conserve, manage, and protect our clean water sources. The proposed rule would significantly weaken the aluminum and selenium content criteria. Aluminum has been shown to correlate with Alzheimers development later in life. We are trying to advance the populous of our state, not degrade it. Please consider excluding these revisions to the rule.

Thank you for your time.

With warm regards,

David Billups

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 5:04 PM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Comments

From: Chuck Wyrstok [mailto:wyro@appalight.com]
Sent: Thursday, July 30, 2015 5:01 PM
To: DEP Comments
Subject: Water Quality Standards Comments

Dear DEP staff:

Our State Water Quality Standards set limits for the amount of pollution allowed in our streams.

Please accept my comments on the proposed rule. It would weaken standards for two toxic pollutants: selenium and aluminum and that is not acceptable.

I oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is *no* emergency and *not enough* scientific data to support the change.

I oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thank you for the opportunity to comment.

Sincerely,

Chuck Wyrstok

230 Griffith Run
Spencer, West Virginia 25276
T: 304 927 2978

Water is Life...Keep It Clean



This email has been checked for viruses by Avast antivirus software.
www.avast.com

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 11:31 AM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Comments

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

-----Original Message-----

From: John DeMary [mailto:jedemary@citlink.net]
Sent: Thursday, July 30, 2015 11:29 AM
To: DEP Comments
Subject: Water Quality Standards Comments

Clean Water is the future of West Virginia! Our past has been filled with the destruction of the most valuable resource in the Mountain State. We can no longer tolerate special interest groups over riding common sense at our children's expense. Please insure that our water resources are protected at the maximum level!

John E. DeMary
Harpers Ferry, WV

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 11:31 AM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Comments

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

-----Original Message-----

From: John DeMary [mailto:jedemary@citlink.net]
Sent: Thursday, July 30, 2015 11:29 AM
To: DEP Comments
Subject: Water Quality Standards Comments

Clean Water is the future of West Virginia! Our past has been filled with the destruction of the most valuable resource in the Mountain State. We can no longer tolerate special interest groups over riding common sense at our children's expense. Please insure that our water resources are protected at the maximum level!

John E. DeMary
Harpers Ferry, WV

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 10:30 AM
To: Cooper, Laura K
Subject: FW: Water quality standards comments

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

From: Pam Ruediger [mailto:pjruediger@yahoo.com]
Sent: Thursday, July 30, 2015 10:28 AM
To: DEP Comments
Subject: Water quality standards comments

WATER IS LIFE!!!! I expect the following from the WVDEP:

- 1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria!!!! There IS NO EMERGENCY and not enough scientific data to support the change!!!!!!**
- 2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement!!! CLEAN WATER IS ESSENTIAL TO THE GOOD HEALTH OF EVERY LIVING BEING!**

MOST sincerely,
Pam Ruediger
64 Weeping Willow Run
Parsons WV 26287

Sent from my iPhone

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 9:53 AM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Comments

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
501 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

From: John Doyle [mailto:jdoyle952@gmail.com]
Sent: Thursday, July 30, 2015 9:46 AM
To: DEP Comments
Cc: Laura Mahony
Subject: Water Quality Standards Comments

Dear WVDEP,

I want our water supply protected through strong regulations of aboveground storage tanks. I want the rule to:

1. Not weaken standards for tanks or relax timelines for enforcement;
2. Provide an opportunity for public notice and comment on amendments to permits and plans before a tank is excused from the Act's requirements;
3. Establish registration fees that adequately fund and staff the program; and
4. Increase bond amounts so that they cover potential liability of a tank failure.

Water Quality Standards Rule

Our State Water Quality Standards set limits for the amount of pollution allowed in our streams. This proposed rule weakens standards for two toxic pollutants: selenium and aluminum.

Sincerely,

John Doyle

1527 Hampton Rd.

Charleston, WV 25314-1656

Phone 304-437-2186

Cooper, Laura K

From: DEP Comments
Sent: Wednesday, July 29, 2015 12:46 PM
To: Cooper, Laura K
Subject: FW: Water Quality Standards Comments

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

From: condon12@frontiernet.net [mailto:condon12@frontiernet.net]
Sent: Wednesday, July 29, 2015 10:02 AM
To: DEP Comments
Subject: Water Quality Standards Comments

We

- 1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.**
- 2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.**

It is time to address long standing pollution violations and complacent law makers willing to trade campaign contributions for much needed tax revenues>

Thank you for your time,
Michael Condon
24946

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 10:38 AM
To: Cooper, Laura K
Subject: FW: Water quality standards comment

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

From: Carla [mailto:parrottlover@gmail.com]
Sent: Thursday, July 30, 2015 10:38 AM
To: DEP Comments
Subject: Water quality standards comment

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement

Cooper, Laura K

From: DEP Comments
Sent: Wednesday, July 29, 2015 2:05 PM
To: Cooper, Laura K
Subject: FW: water quality standards

.....

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0499 ext. 1335
Mobile: (304) 993-0473

Please consider the environment before printing this email.

-----Original Message-----

From: Paul Baker [mailto:paulfran3@gmail.com]
Sent: Wednesday, July 29, 2015 1:55 PM
To: DEP Comments
Subject: water quality standards

To all concerned;

I wish to state my opposition to the proposed changes in the aluminum and selenium water standards. In both cases water quality will be degraded if the proposed rule changes are implemented.

The change in the aluminum standard is a real shot in the dark. Not enough is known about aluminum toxicity at this time to warrant such drastic change. Changing the selenium standard from concentration in water to concentration in fish tissue weakens the existing regulation drastically. In both cases, I think that the changes are not science based but are based on the coal industries demands. Risking public health and damage to the aquatic environment is not worth these futile efforts to save a moribund coal industry.

Paul J. Baker
438 Gristmill Rd.
Fairmont, WV 26554

304 363 7338

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 30, 2015 4:28 PM
To: Cooper, Laura K
Subject: FW: Water quality comments

Another one for your collection ...

From: Lissa and David Fox [mailto:lissadavidfox@gmail.com]
Sent: Thursday, July 30, 2015 4:18 PM
To: DEP Comments
Subject: Water quality comments

I do not support weakening any rules or laws allowing more aluminum or selenium in our water.
Thank you,

Cooper, Laura K

From: DEP Comments
Sent: Wednesday, July 22, 2015 9:34 AM
To: Cooper, Laura K
Subject: FW: Aluminum and selenium water quality standards

This comment came in on the DEP Comments email.

Jake Glance
Public Information Specialist

West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

Office: (304) 926-0440
Mobile: (304) 993-0473

From: Ned Savage [mailto:nedsavage@gmail.com]
Sent: Monday, July 20, 2015 2:04 PM
To: DEP Comments
Subject: Aluminum and selenium water quality standards

To whom it may concern,

Concerning the **2015 PROPOSED REVISIONS TO WV WATER QUALITY STANDARDS:**

I oppose the proposed emergency rule that significantly weakens the aluminum criteria.

The revisions are drastic and equate to greater than a 12-fold and 40-fold increase over the current criteria for acute and chronic dissolved Aluminum toxicity to aquatic life respectively. It would make West Virginia's standard the weakest in the nation.

There is no emergency that justifies this change.

The rule is not necessary to prevent an emergency that is causing substantial harm to the public interest, but rather protects the private profits of a small number of coal mine and industrial facility operators who do not want to bear the cost of treating their waste.

There is not enough scientific data available to support this change.

Very little is known about the fate and biological effects of Aluminum in natural aquatic systems. The revision ignores toxicity of non-dissolved forms of Aluminum on aquatic life.

SELENIUM

I oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

The change relies on fish tissue sampling that would prolong the process of determining violations. Compliance can only be determined when fish are present to sample. Streams with no fish present, including in cases due to pollution from mining or other sources, may never receive the protections needed to restore their fish populations.

We deserve protection from toxins such as selenium known to damage human health and aquatic life.

Selenium is already significant problem in the coal mining regions of West Virginia. Weakening the standard will make it hard to hold coal companies accountable for the damage they cause. Eventually, the pollution will have to be treated, and the cost is likely to fall on the taxpayers.

Thank you for your time.

Yours,
Edward Savage
PO Box 115
Thomas, WV 26292

Cooper, Laura K

From: DEP Comments
Sent: Thursday, July 23, 2015 5:14 PM
To: Cooper, Laura K
Subject: FW: WV Water Quality Standards

From: gibbins [mailto:gibbins@frontier.com]
Sent: Thursday, July 23, 2015 4:50 PM
To: DEP Comments
Subject: WV Water Quality Standards

LEAGUE OF WOMEN VOTERS OF WEST VIRGINIA

July 23, 2014

To: WV Department of Environmental Protection
From: The League of Women Voters of West Virginia
Re: Water Quality Standards

The League of Women Voters of West Virginia opposes weakening the aluminum and selenium criteria for West Virginia waters.

ALUMINUM

We question the necessity of submitting the emergency rule. West Virginia needs more information about the effects of aluminum vis-a-vis the hardness of water before it concludes that weakening the aluminum criteria is advisable. As recommended by the U.S. EPA we also need to know the effects of aluminum and the hardness of our waters on our indigenous fish.

SELENIUM

We oppose efforts to weaken the standards for selenium. Because the mining of coal releases selenium into our waters, West Virginia's waters and fauna in the waters are subject to the cumulative effects of all the mines' effluent. The public should not pay for cleaning up the toxics in our waters; the toxics should be prevented in the first place.

We must be vigilant in protecting human and aquatic health. West Virginia should be known as a protector of our waters, not a state that weakens the protections.

Thank you for your consideration of our comments.

Nancy Novak, President
League of Women Voters of WV, nnovakwv@gmail.com

Helen Gibbins, Director
League of Women Voters of WV, gibbins@frontier.com

Cooper, Laura K

From: DEP Comments
Sent: Monday, July 20, 2015 2:42 PM
To: Cooper, Laura K
Subject: FW: Aluminum and selenium water quality standards

From: Ned Savage [mailto:nedsavage@gmail.com]
Sent: Monday, July 20, 2015 2:04 PM
To: DEP Comments
Subject: Aluminum and selenium water quality standards

To whom it may concern,

Concerning the **2015 PROPOSED REVISIONS TO WV WATER QUALITY STANDARDS:**

I oppose the proposed emergency rule that significantly weakens the aluminum criteria.

The revisions are drastic and equate to greater than a 12-fold and 40-fold increase over the current criteria for acute and chronic dissolved Aluminum toxicity to aquatic life respectively. It would make West Virginia's standard the weakest in the nation.

There is no emergency that justifies this change.

The rule is not necessary to prevent an emergency that is causing substantial harm to the public interest, but rather protects the private profits of a small number of coal mine and industrial facility operators who do not want to bear the cost of treating their waste.

There is not enough scientific data available to support this change.

Very little is known about the fate and biological effects of Aluminum in natural aquatic systems. The revision ignores toxicity of non-dissolved forms of Aluminum on aquatic life.

SELENIUM

I oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

The change relies on fish tissue sampling that would prolong the process of determining violations. Compliance can only be determined when fish are present to sample. Streams with no fish present, including in cases due to pollution from mining or other sources, may never receive the protections needed to restore their fish populations.

We deserve protection from toxins such as selenium known to damage human health and aquatic life.

Selenium is already significant problem in the coal mining regions of West Virginia. Weakening the standard will make it hard to hold coal companies accountable for the damage they cause. Eventually, the pollution will have to be treated, and the cost is likely to fall on the taxpayers.

Thank you for your time.

Yours,
Edward Savage
PO Box 115
Thomas, WV 26292

Cooper, Laura K

From: dianamullis@aol.com
Sent: Tuesday, July 28, 2015 7:23 PM
To: DEP Comments
Subject: Comments on the Water Quality Standards Rule ...

To: WVDEP

From: Diana Mullis, 890 Cannon Hill Road, Hedgesville, WV 25427

Subject: Comments on the Water Quality Standards Rule ...

Our State Water Quality Standards set limits for the amount of pollution allowed in our streams. This proposed Rule weakens standards for two toxic pollutants: selenium and aluminum.

1. **I oppose** the proposed **emergency** rule that significantly weakens the aluminum criteria; **there is no emergency** and there is **not enough scientific data to support the change**.
2. **I oppose** the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

I want our water supply protected through strong regulations of aboveground storage tanks and I want the rule to:

1. **Not weaken standards** for tanks or relax timelines for enforcement;
2. **Provide an opportunity for public notice and comment** on amendments to permits and plans before a tank is excused from the Act's requirements;
3. **Establish registration fees** that adequately fund and staff the program; and
4. **Increase bond amounts** so that they cover potential liability of a tank failure.

Thank you for the opportunity to comment.

Diana Mullis

Cooper, Laura K

From: Tom Nagle <tom@statlernagle.com>
Sent: Wednesday, July 29, 2015 7:14 AM
To: DEP Comments
Subject: Comments on Water Quality Standards

Our states rivers are among it most critical resources of any kind. It is the reason we bought our home in Great Cacapon and moved to West Va. As a homeowner on the Cacapon River I oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change. I also oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Sincerely,

Tom Nagle

Tom Nagle
362 Fishers Bridge Lane
Great Cacapon, West Virginia
25422

304-947-5408

Cooper, Laura K

From: SAM GOLSTON <sam_golston@hotmail.com>
Sent: Tuesday, July 28, 2015 5:30 PM
To: DEP Comments
Subject: Water quality

I am opposed to the proposed emergency rule lowering both aluminum and selenium discharge limits. Our water quality is vital to aquatic life and human life. Please rely on solid science rather than industry requests for you are charged with 'protecting' us rather than them.

Sam Golston
132 Cheat River Acres
Elkins, WV 26241

Sam Golston
Sent via iPad

Cooper, Laura K

From: Carli Mareneck <cmareneck@yahoo.com>
Sent: Tuesday, July 28, 2015 7:14 PM
To: DEP Comments
Subject: Water Quality Standards

Dear DEP,

It is your express responsibility to protect water to the highest standards for WV citizens. PLEASE oppose the passage of the emergency rule regarding the criteria for aluminum and the revision of the selenium standard. Neither strengthen water protection. Our water is essential to life, to health. Your agency must not bend to corporate pressure but rather act on behalf of powerless citizens. Think of the health and safety of your own family members when you make these grave decisions.

Thank you, Carli Mareneck

Cooper, Laura K

From: L DADISMAN <ldadisman@yahoo.com>
Sent: Tuesday, July 28, 2015 9:58 PM
To: DEP Comments
Subject: Water Quality Standards Rule

I am opposed to the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change. It is not a healthy element that should be introduced and accumulated by human consumption.

I am also opposed to the revision to selenium standard that presents serious challenges in its implementation and enforcement. Selenium has already been proven to be extremely harmful to the environment and food supportive of human life. Providing and entertaining ideas of this sort to the beneficiaries of corporate and political suppliers without true consideration for the welfare of families and children of this state and adjoining states who have little resources to move, provide alternative supplies of water, and financial means to correct destruction of their drinking water is criminal.

Poisoning water is a crime against mankind, a crime every set of laws the United States and many other countries have recognized throughout history.

Larry Brent Dadisman
912 Greendale Dr
Charleston, WV 25302-3224

Cooper, Laura K

From: Hicks, William <WHicks@bethanywv.edu>
Sent: Thursday, July 30, 2015 8:08 PM
To: DEP Comments
Subject: Water Quality Standards Rule

To Whom It May Concern

WV needs stronger water quality rules not weaker. Specifically, the WVDEP should:

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Sincerely,
Bill Hicks
Bethany WV
304-829-4274

Cooper, Laura K

From: Hicks, William <WHicks@bethanywv.edu>
Sent: Thursday, July 30, 2015 8:08 PM
To: DEP Comments
Subject: Water Quality Standards Rule

To Whom It May Concern

WV needs stronger water quality rules not weaker. Specifically, the WVDEP should:

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Sincerely,
Bill Hicks
Bethany WV
304-829-4274

Cooper, Laura K

From: MLickert <mar3356@citynet.net>
Sent: Thursday, July 30, 2015 7:54 PM
To: DEP Comments
Subject: Water Quality Standards Comments

Please do the following for the health of all West Virginians:

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thank you for your time.

Mary L.

Cooper, Laura K

From: MLickert <mar3356@citynet.net>
Sent: Thursday, July 30, 2015 7:54 PM
To: DEP Comments
Subject: Water Quality Standards Comments

Please do the following for the health of all West Virginians:

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thank you for your time.

Mary L.

Cooper, Laura K

From: Elaine Wolf Komarow <elaine@siriusacupuncture.com>
Sent: Thursday, July 30, 2015 7:52 PM
To: DEP Comments
Subject: Water Quality Standards Comments

As a property owner in West Virginia I want you to know that I oppose the proposed emergency rule that significantly weakens the aluminum criteria. There is not enough scientific data to support this change and any changes should wait until there is more data. I also opposed the proposed revision to the selenium standard. The revision presents serious implementation and enforcement challenges.

The citizens of West Virginia deserve protection from selenium and other toxins known to damage human health and aquatic life.

Thank you,

Elaine Wolf Komarow
201 Warden Lake Hollow
Wardensville, WV 26851

Cooper, Laura K

From: condon12@frontiernet.net
Sent: Wednesday, July 29, 2015 10:02 AM
To: DEP Comments
Subject: Water Quality Standards Comments

We

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

It is time to address long standing pollution violations and complacent law makers willing to trade campaign contributions for much needed tax revenues>

Thank you for your time,
Michael Condon
24946

Cooper, Laura K

From: Michael Klausing <mike_klausing@hotmail.com>
Sent: Tuesday, July 28, 2015 5:20 PM
To: DEP Comments
Subject: Water Quality Standards Comments

Good day,

My comments on the Water Quality Standards are as follows:

1. I strongly oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. I strongly oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thank you for considering my comments.

Sincerely,

Michael L. Klausing
624 Cross Lanes Dr Apt 11
Nitro WV 25143-1156

Cooper, Laura K

From: ChuckandNancy Brabec <thebrabecs@gmail.com>
Sent: Tuesday, July 28, 2015 5:40 PM
To: DEP Comments
Subject: Water Quality Standards Comments

We oppose the proposed emergency rule that significantly weakens the aluminum criteria.

The revisions are drastic and equate to greater than a 12-fold and 40-fold increase over the current criteria for acute and chronic dissolved Aluminum toxicity to aquatic life respectively. It would make West Virginia's standard the weakest in the nation.

There is no emergency that justifies this change. The rule is not necessary to prevent an emergency that is causing substantial harm to the public interest, but rather protects the private profits of a small number of coal mine and industrial facility operators who do not want to bear the cost of treating their waste.

There is not enough scientific data available to support this change. Very little is known about the fate and biological effects of Aluminum in natural aquatic systems. The revision ignores toxicity of non-dissolved forms of Aluminum on aquatic life.

We also oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

The change relies on fish tissue sampling that would prolong the process of determining violations. Compliance can only be determined when fish are present to sample. Streams with no fish present, including in cases due to pollution from mining or other sources, may never receive the protections needed to restore their fish populations.

We deserve protection from toxins such as selenium known to damage human health and aquatic life. Selenium is already significant problem in the coal mining regions of West Virginia. Weakening the standard will make it hard to hold coal companies accountable for the damage they cause. Eventually, the pollution will have to be treated, and the cost is likely to fall on the taxpayers.

Charles & Nancy Brabec
PO Box 273
Canvas, WV 26662-0273

Cooper, Laura K

From: Jim Hatfield <hatfield.jch@gmail.com>
Sent: Tuesday, July 28, 2015 6:20 PM
To: DEP Comments
Subject: Water Quality Standards Comments

I oppose the proposed emergency rule that significantly weakens the aluminum criteria. The proposed rule is misnamed because there is no emergency. At the very least it must be requested under some other pretense. Also, if there was a request to tighten the standard, it would be expected that proponents should present scientific evidence to support their claim. The same (scientific evidence) must be presented to loosen the standard.

I oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement. As for the aluminum standards, scientific evidence, not industrial preference, need to drive changes in allowable discharge levels. The ability of existing water treatment plants to mitigate aluminum and selenium also needs to be considered.

jim hatfield
1077 foley drive
st albans, wv 25177

Cooper, Laura K

From: Humes Barbara <bhumes1@comcast.net>
Sent: Tuesday, July 28, 2015 7:47 PM
To: DEP Comments
Subject: Water Quality Standards Comments

I am writing because I am alarmed that the above named proposed rule weakens standards for selenium and aluminum. These are two very toxic pollutants. There is no reason to support such a change. There is no emergency. Of equal concern is the proposed revision to the selenium standard that would rely on fish tissue sampling. Streams with no fish present would receive no protections from pollution caused by mining activities and thus no hope of restoring fish populations. The coal companies, not the innocent taxpayer, must be held accountable for the damage caused by toxins such as selenium known to damage human health and aquatic life.

Sincerely
Barbara Humes
PO Box 11786
Harpers Ferry, WV 25425

Cooper, Laura K

From: Michael R Moore <moorem@live.marshall.edu>
Sent: Tuesday, July 28, 2015 8:11 PM
To: DEP Comments
Subject: water quality standards comments

Please don't weaken the standards on amounts of aluminum and selenium in our waters. We need clean water for healthy West Virginians, particularly our children.

Cooper, Laura K

From: Brian Dorsey <bdorsey@aol.com>
Sent: Wednesday, July 29, 2015 12:00 AM
To: DEP Comments
Subject: Water Quality Standards Comments

WATER QUALITY STANDARDS RULE:

I want West Virginia's water supply to be protected as much as possible through strong regulations of the amounts of toxic pollutants allowed in our streams, and I would like the rule to:

1. Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
2. Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

We MUST protect and safeguard our waters as much as possible! We only have ONE chance!!

Thank you,

Brian Dorsey
87 Melbourne LN
Pool, WV 26684
bdorsey@aol.com

Cooper, Laura K

From: Steve Runfola <stevenrunfola@gmail.com>
Sent: Wednesday, July 29, 2015 6:06 AM
To: DEP Comments
Subject: Water Quality Standards Comments

Hello:

I am a WV resident with the following comments on Water Quality Standards Comments :

I Oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.

I Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thank you
Steve Runfola
45 Park Ridge Dr
Morgantown, WV. 26508
304-291-0770

Cooper, Laura K

From: George Little <george.wilbur.little@gmail.com>
Sent: Wednesday, July 29, 2015 6:33 AM
To: DEP Comments
Subject: Water Quality Standards Comments

I am absolutely opposed to the proposed emergency rule that will significantly weaken the aluminum criteria - the ONLY emergency here is to make sure our water standards are strong enough, and there certainly is no emergency for enacting this "emergency rule". In addition, there is not enough scientific data to support the change so it should not be considered.

I also oppose the proposed revision to the selenium standard as it presents serious challenges to its implementation and enforcement. Relying on fish tissue sampling would prolong the process to determine violations and ignores the fact that fish can clearly not be available to sample in situations such as pollution from mining and other sources that has killed aquatic life. To me there is clearly no doubt that we deserve strong protection from toxins such as selenium that are known to damage human health and aquatic life - it is time to make sure of this.

Thank you,

George W Little
307 Hillside Pass
Frankford, WV 24938
304-645-4705

Cooper, Laura K

From: Midge Flinn Yost <mflinnyost@aol.com>
Sent: Wednesday, July 29, 2015 6:53 AM
To: DEP Comments
Subject: Water Quality Standards Comments

Thank you for the opportunity to comment on the proposed water quality standards modifications.

I am a WV resident and landowner, and I oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.
Oppose the proposed revision to the selenium standard that presents serious challenges to its implementation and enforcement.

Thanks again,

Marjorie Yost
Harpers Ferry, WV

Cooper, Laura K

From: galesviento@comcast.net
Sent: Thursday, July 30, 2015 6:59 PM
To: DEP Comments
Subject: Water Quality Standards Comment

After 300,000 lost their supply of water for so long the government was quick to pass strong measures to prevent that from happening again.

Now they've waited for time to pass and attention to wane in order to undo the strong protections they enacted under public outrage.

DON'T LET THIS HAPPEN.

I urge you to:

1. Not weaken standards for tanks or relax timelines for enforcement;
2. Provide an opportunity for public notice and comment on amendments to permits and plans before a tank is excused from the Act's requirements;
3. Establish registration fees that adequately fund and staff the program; and
4. Increase bond amounts so that they cover potential liability of a tank failure.

Do not change the new requirements for aluminum and selenium. The DEP needs to stand up for people and the environment. Not industry!!

Sincerely,
Gale Simplicio
1275 Tartan Lane
Morgantown 26505

Cooper, Laura K

From: Patti Miller <panoramaatp@gmail.com>
Sent: Tuesday, July 28, 2015 5:42 PM
To: DEP Comments
Subject: Water Quality Standards

1. **I oppose the proposed emergency rule that significantly weakens the aluminum criteria; there is no emergency and not enough scientific data to support the change.**
2. **I oppose the proposed revision to the selenium standard** There are too many serious challenges to its implementation and enforcement.

Please protect our water supply every time you get the chance.
We've all seen what happens, repeatedly in WV when we don't.
Please, do the right thing

Patti Miller
1313 Apple Orchard Circle
Berkeley Springs, WV 25411

Cooper, Laura K

From: Jeff Iliff <pfpjeff@gmail.com>
Sent: Wednesday, July 29, 2015 10:08 AM
To: DEP Comments
Subject: Water Quality Standards

To WVDEP,

As a West Virginian I am proud of our wilderness areas and the quality of life our state has to offer. I don't want to see anything put our environment at risk. That is why I am sending you this e-mail today about two parts of the Water Quality Standards Rule.

1. I oppose the proposed "emergency" rule that weakens Aluminum Criteria, as there is no real emergency
2. I oppose the proposed revision of the selenium standard because it presents serious challenges to its implementation and enforcement.

Increasing pollution loads is harmful to sensitive wildlife and habitats. We need to protect our environment, not the freedom to pollute it.

Thanks for your time,
Jeff Iliff, Watershed member and outdoor enthusiast.

Cooper, Laura K

From: Ann Payne <paynestake@gmail.com>
Sent: Wednesday, July 29, 2015 11:01 AM
To: DEP Comments
Subject: Water Quality Standards

One ongoing problem with government regulation in West Virginia is its effect on industry attitudes toward compliance. Bending rules, lax regulation and enforcement encourage industry to ignore its responsibility to the public. Not that regulations should make work in WV too difficult, but continually weakening standards, allowing extensions and exceptions, sets a tone for industry that does not encourage compliance or cooperation. Rather, the current 'flexible' attitude toward rules and regulations by WV government agencies encourages laxness, sloppiness, and, recently, reckless danger to the public and the environment.

Please do not relax standards for selenium or stretch regulation of aluminum. These substances do not belong in our waters. Government needs to stand firm to encourage industry to comply and cooperate in protecting us.

Thank you for considering my comments.

Ann Payne
304.692-3180

Cooper, Laura K

From: John Jones <no-reply@mail150.wdc04.mandrillapp.com> on behalf of John Jones <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:22 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **John Jones** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

It is clear that West Virginia has some water quality standards that are overly-burdensome and not based on current science. In the case of Selenium, EPA recognized nearly 20 years ago that the current standard was outdated, yet we are still stuck with this outdated standard. The existing Aluminum standard does not reflect the best science either. In addition, improper standards have allowed anti-mining groups to adversely influence the state's mining program and to repeatedly sue the industry. This has resulted in a permitting quagmire and needless distractions that do not promote environmental protection.

I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

John Jones
One Alpha Place
Bristol, Virginia 24202
United States
(276) 619-4443
jpjones@alphanr.com

Cooper, Laura K

From: Joyce Morton <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Joyce Morton <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:33 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joyce Morton** and I work for Self. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Joyce Morton
1792 Webster Road
Webster Springs, West Virginia 26288
United States
(304) 847-7446
joycehm@frontiernet.net

Cooper, Laura K

From: Justin Skeens <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Justin Skeens <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:34 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Justin Skeens** and I work for Brake Supply. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Justin Skeens
278 Commerce Drive
Beaver, West Virginia 25813
United States
(304) 252-6241
jskeens@brake.com

Cooper, Laura K

From: Jay Perry <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Jay Perry <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:35 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jay Perry** and I work for Natural Resource Partners L.P.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Jay Perry
111 Camelot Drive
Huntington, West Virginia 25701
United States
(304) 525-0555
jperry@wpplp.com

Cooper, Laura K

From: Anthony Gatens <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Anthony Gatens <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:35 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Anthony Gatens** and I work for Decota Consulting Company. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Anthony Gatens
85 Sitting Bull Drive
Saint Albans, West Virginia 25177
United States
(304) 437-1422
anthonygatens@decotaconsulting.com

Cooper, Laura K

From: STEVE SUTPHIN <no-reply@mail150.wdc04.mandrillapp.com> on behalf of STEVE SUTPHIN <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:37 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **STEVE SUTPHIN** and I work for ALLIANCE CONSULTING. INC.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

STEVE SUTPHIN
124 Philpott Lane
Beaver, West Virginia 25813
United States
(304) 255-0491
ssutphin@aci-wv.com

Cooper, Laura K

From: Brian Chapman <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Brian Chapman <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:54 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Brian Chapman** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Brian Chapman
103 Fox Lane, PO Box 834
Ansted, West Virginia 35812
United States
(304) 651-3662
bchapman@alphanr.com

Cooper, Laura K

From: JASON ROSE <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of JASON ROSE <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:59 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **JASON ROSE** and I work for BUCHANAN PUMP. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

JASON ROSE
POB 37
OAK HILL, West Virginia 25901
United States
(304) 469-3443
jason@bpspump.com

Cooper, Laura K

From: Earl Chornsbay <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Earl Chornsbay <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:00 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Earl Chornsbay** and I work for Cardno. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Earl Chornsbay
208 East Wilson Street
Oak , West Virginia 25901
United States
(304) 640-2898
earl.chornsbay@cardno.com

Cooper, Laura K

From: Sandra Moore <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Sandra Moore <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:00 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Sandra Moore** and I work for Wolf Run Mining Co., Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

Sandra Moore
PO Box 201
Buckhannon , West Virginia 26201
United States
(304) 406-8216
samoore@archcoal.com

Cooper, Laura K

From: David Hickman <no-reply@mail150.wdc04.mandrillapp.com> on behalf of David Hickman <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:04 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **David Hickman** and I work for Maxxim Shared Services. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

David Hickman
P.O. Box 1568
Craigsville, West Virginia 26205
United States
(304) 929-6652
dnjhickman@frontier.com

Cooper, Laura K

From: Robert Tipane <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Robert Tipane <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:10 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Robert Tipane** and I work for Raleigh County Board of Education . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Robert Tipane
208 Queen Street
Beckley, West Virginia 25801
United States
(304) 237-3314
rtipane@rocketmail.com

Cooper, Laura K

From: Brett Holbrook <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Brett Holbrook <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:03 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Brett Holbrook** and I work for Consol Energy. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Brett Holbrook
10545 Riverside Drive
Oakwood, Virginia 24631
United States
(276) 498-8222
brettholbrook@consolenergy.com

Cooper, Laura K

From: James Miles <no-reply@mail150.wdc04.mandrillapp.com> on behalf of James Miles <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:37 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **James Miles** and I work for Walker Machinery. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

James Miles
6 Bridlewood Rd
Charleston, West Virginia 24314
United States
(304) 545-2433
jmiles@walker-cat.com

Cooper, Laura K

From: Bradford Hunt <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Bradford Hunt <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:06 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Bradford Hunt** and I work for Delta Electric, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Bradford Hunt
16 Marvin Gardens
Morgantown, West Virginia 26508
United States
(304) 241-4690
brad@deltaelectricwv.com

Cooper, Laura K

From: Bradford Hunt <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Bradford Hunt <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:06 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Bradford Hunt** and I work for Delta Electric, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

Bradford Hunt
16 Marvin Gardens
Morgantown, West Virginia 26508
United States
(304) 241-4690
brad@deltaelectricwv.com

Cooper, Laura K

From: JOHN WORKMAN <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of JOHN WORKMAN <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:12 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **JOHN WORKMAN** and I work for WALKER MACHINERY CO.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

JOHN WORKMAN
837 ADAMS AVENUE
HUNTINGTON, West Virginia 25704
United States
(304) 526-4800
jfworkman@walker-cat.com

Cooper, Laura K

From: Larry Ward <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Larry Ward <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:19 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Larry Ward** and I work for retired. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Larry Ward
108 Skyline Drive
Beckley, West Virginia 25801
United States
(304) 255-1160
lgw1@suddenlink.net

Cooper, Laura K

From: Pamela Parrish <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Pamela Parrish <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:20 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Pamela Parrish** and I work for Appalachian Power. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Pamela Parrish
907-16th Street
Vienna, West Virginia 26105
United States
(304) 295-8974
furballs_442@msn.com

Cooper, Laura K

From: John Popp <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of John Popp <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:34 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **John Popp** and I work for Natural Resource Partners L.P.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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John Popp
5260 Irwin Road
Huntington, West Virginia 25705
United States
(304) 522-5757
jpopp@wpplp.com

Cooper, Laura K

From: Steve McGrath <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Steve McGrath <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:36 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Steve McGrath** and I work for Walker Machinery. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Steve McGrath
114 Carbide Dr.
Belle, West Virginia 25015
United States
(304) 949-7393
smcgrath@walker-cat.com

Cooper, Laura K

From: William Rounkles <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of William Rounkles <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:37 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **William Rounkles** and I work for Self. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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William Rounkles
P.o box 326
Floyd, Virginia 24091
United States
(321) 266-4642
wrounkles@gmail.com

Cooper, Laura K

From: DONNA DUNCAN <no-reply@mail150.wdc04.mandrillapp.com> on behalf of DONNA DUNCAN <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:38 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **DONNA DUNCAN** and I work for EAGLE COAL SALES, INC.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

DONNA DUNCAN
PO BOX 1360
3575 ROBERT C BYRD DR., West Virginia BECKLEY
United States
(304) 575-7989
donna.duncan30@yahoo.com

Cooper, Laura K

From: Gary c <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Gary c <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:43 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Gary c** and I work for Criste Engineering Services. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Gary c
402 Herold Court
Summersville, West Virginia 26651
United States
(304) 872-6331
gcriste@cristeengineering.com

Cooper, Laura K

From: Charles Dunbar <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Charles Dunbar <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:46 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Charles Dunbar** and I work for Arch Coal Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Charles Dunbar
51 Layden Street
Hurricane, West Virginia 25526
United States
(304) 613-1864
cdunbar@archcoal.com

Cooper, Laura K

From: MIKE BEAVER <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of MIKE BEAVER <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 8:51 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **MIKE BEAVER** and I work for WEST VIRGINIA MANUFACTURING SOLUTIONS, INC.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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MIKE BEAVER
PO BOX 135
505 WASHINGTON AVE, West Virginia PRATT
United States
(304) 442-4664
MIKE.BEAVER@WVMFGSOLUTIONS.COM

Cooper, Laura K

From: Rachel Metheny <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Rachel Metheny <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:05 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Rachel Metheny** and I work for Greer. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Rachel Metheny
1093 Snake Hill Rd
Morgantown, West Virginia 26508
United States
(304) 980-2460
mrsmetheny@yahoo.com

Cooper, Laura K

From: Robert Stephens <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Robert Stephens <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:13 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Robert Stephens** and I work for Pocahontas Land Corporation. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Robert Stephens
P. O. Box 1517
800 Princeton Ave., West Virginia 24701
United States
(304) 324-2422
robert.stephens@nscorp.com

Cooper, Laura K

From: Preston Lewis <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Preston Lewis <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:16 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Preston Lewis** and I work for Patriot Coal. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Preston Lewis
6033 Straight Fork
Hamlin, West Virginia 25523
United States
(304) 595-5039
plewis@patriotcoal.com

Cooper, Laura K

From: Shawn Parsons <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Shawn Parsons <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:20 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Shawn Parsons** and I work for Nelson Brothers. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Shawn Parsons
HC 89 Box 117B
Saulsville, West Virginia 25876
United States
(304) 541-0851
cparsons@nelbro.com

Cooper, Laura K

From: Rodney Campbell <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Rodney Campbell <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:22 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Rodney Campbell** and I work for Mineral Labs. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Rodney Campbell
95 School Drive
Belle, West Virginia 25015
United States
(304) 595-6256
hotrod_campbell@hotmail.com

Cooper, Laura K

From: Ricky Moore <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Ricky Moore <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:22 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Ricky Moore** and I work for Miller Transportation. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Ricky Moore
1896 J.B. Ball Lane
Webster, Kentucky 40176
United States
(270) 945-0947
rickypmoore@att.net

Cooper, Laura K

From: Kevin Shehan <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Kevin Shehan <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:29 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Kevin Shehan** and I work for Duke Energy. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Kevin Shehan
573 Duke Power Rd
Mooresboro, North Carolina 28114
United States
(828) 657-2353
kevin.shehan@duke-energy.com

Cooper, Laura K

From: Joe Lester <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Joe Lester <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 9:33 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joe Lester** and I work for Brooks Run South Mining Co. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

Joe Lester
195 Russell St
Cedar Bluff, Virginia 24609
United States
(276) 963-0675
lester_joe@hotmail.com

Cooper, Laura K

From: Robin Poling <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Robin Poling <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:03 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Robin Poling** and I work for Stonewall Resort. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Robin Poling
12717 US Hwy 19 South
Roanoke, West Virginia 26447
United States
(304) 269-8822
rpoling@stonewallresort.com

Cooper, Laura K

From: Daniel Simmons <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Daniel Simmons <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:04 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Daniel Simmons** and I work for Pocahontas Land Corporation. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Daniel Simmons
P.O. Box 1517
Bluefield, West Virginia 24701
United States
(304) 324-2432
danny.simmons@nscorp.com

Cooper, Laura K

From: Tamara Smith <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Tamara Smith <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:44 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Tamara Smith** and I work for Silver Spur Conveyors, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Tamara Smith
578 Raven Road
Raven, Virginia 24639
United States
(276) 963-4622
silverspur.tammy@aol.com

Cooper, Laura K

From: Norman Douglas <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Norman Douglas <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:47 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Norman Douglas** and I work for Charleston Area Medical Center. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Norman Douglas
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Charleston, West Virginia 25311
United States
(304) 346-6320
nhdouglas1963@gmail.com

Cooper, Laura K

From: LOGAN FEATHER <no-reply@mail150.wdc04.mandrillapp.com> on behalf of LOGAN FEATHER <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 11:03 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **LOGAN FEATHER** and I work for UNEMPLOYED. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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LOGAN FEATHER
207 HARRISON AVE
207 HARRISON AVE, West Virginia WESTON
United States
(304) 269-0179
LOGANMICHAELFEATHER@HOTMAIL.COM

Cooper, Laura K

From: Molly Antonk <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Molly Antonk <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 11:36 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Molly Antonk** and I work for USPS. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Molly Antonk
P.O. Box 1002
New Haven, West Virginia 25265
United States
(304) 971-0009
molleezoo@hotmail.com

Cooper, Laura K

From: Kyle Bane <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Kyle Bane <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 12:31 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Kyle Bane** and I work for ALPHA NATURAL RESOURCES. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Kyle Bane
300 HYDE PARK ROAD
WINFIELD, West Virginia 25213
United States
(304) 369-8547
KBANE@ALPHANR.COM

Cooper, Laura K

From: michael carpenter <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of michael carpenter <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 12:51 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **michael carpenter** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

michael carpenter
po box 707
summersville, West Virginia 26651
United States
(304) 872-5065
mcarpenter@alphanr.com

Cooper, Laura K

From: Michael Vaught <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Michael Vaught <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 12:58 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Michael Vaught** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Michael Vaught
585 Timber Ridge Road
Fayetteville, West Virginia 25840
United States
(304) 574-1453
mvaught@alphanr.com

Cooper, Laura K

From: craig havelka <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of craig havelka <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:00 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **craig havelka** and I work for Marshal county Coal company . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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craig havelka
1013 McAdoo Ridge Rd
wellsburg, West Virginia 26070
United States
(304) 794-8022
craighavelka@hotmail.com

Cooper, Laura K

From: Stephanie Morgan <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Stephanie Morgan <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:07 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Stephanie Morgan** and I work for ANR - Maxxim Shared Services. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Stephanie Morgan
602 Lower Sandlick Road
Beckley, West Virginia 25801
United States
(304) 854-3118
smorgan1@alphanr.com

Cooper, Laura K

From: Joshua Birchfield <no-reply@mail133-2.atf131.mandrillapp.com> on behalf of Joshua Birchfield <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:17 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joshua Birchfield** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Joshua Birchfield
PO Box 457
Whitesville, West Virginia 25209
United States
(304) 854-3014
Jbirchfield@alphanr.com

Cooper, Laura K

From: Justin Richardson <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Justin Richardson <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:21 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Justin Richardson** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Justin Richardson
851 Lake Stephens Road
Surveyor, West Virginia 25932
United States
(304) 854-3037
jrichardson@alphanr.com

Cooper, Laura K

From: Margaret McClaugherty <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Margaret McClaugherty <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:23 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Margaret McClaugherty** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Margaret McClaugherty
Margaret McClaugherty
386 South Ridge Road , West Virginia Herndon
United States
(304) 673-4494
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Cooper, Laura K

From: Jennifer Ratliff <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Jennifer Ratliff <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:27 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jennifer Ratliff** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Jennifer Ratliff
PO Box 1
Clear Creek, West Virginia 25044
United States
(304) 595-1870
jlratliff@alphanr.com

Cooper, Laura K

From: James Williams <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of James Williams <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:28 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **James Williams** and I work for Powell Construction Company, Inc. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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James Williams
PO Box 1
Clear Creek, West Virginia 25044
United States
(304) 595-1870
jlratliff@alphanr.com

Cooper, Laura K

From: Dale Lewis <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Dale Lewis <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 1:55 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Dale Lewis** and I work for Csx. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Dale Lewis
4247
Pumping station road, Virginia Appomattox
United States
(434) 607-2956
lewisdale96@yahoo.com

Cooper, Laura K

From: Mike Mosteller <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Mike Mosteller <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 2:11 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Mike Mosteller** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

Mike Mosteller
226 Cox's Fork Rd.
Danville, West Virginia 25053
United States
(304) 687-2086
mmosteller@alphanr.com

Cooper, Laura K

From: Robert Meeks <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Robert Meeks <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:07 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Robert Meeks** and I work for Walker Machinery Co.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Robert Meeks
3 Central Ave.
Chapmanville, West Virginia 25508
United States
(304) 784-1639
robertmeeks57@yahoo.com

Cooper, Laura K

From: Kyle Estep <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Kyle Estep <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:13 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Kyle Estep** and I work for Alpha natural resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Kyle Estep
2
Cottonwood drive, West Virginia Elkview
United States
(304) 784-4353
Kwestep@gmail.com

Cooper, Laura K

From: Jim Dean <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Jim Dean <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:22 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jim Dean** and I work for West Virginia University. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Jim Dean
327 Blacks Run Rd
Core, West Virginia 26541
United States
(304) 276-0591
Wvumext@gmail.com

Cooper, Laura K

From: Varaha Cast <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Varaha Cast <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:22 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Varaha Cast** and I work for None. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Varaha Cast
4235 Topsail Ct.
4235 Topsail Ct., California Soquel
United States
(925) 594-1729
Qbertvision@Gmail.Com

Cooper, Laura K

From: Charles Howard, P E. <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Charles Howard, P E. <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:34 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Charles Howard, P E.** and I work for Howard Engineering, inc. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Charles Howard, P E.
1125 Queens Ct
Morgantown , West Virginia 26508
United States
(304) 292-6842
MiningEngineerWV@aol.com

Cooper, Laura K

From: Eddie Carter <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Eddie Carter <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:50 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Eddie Carter** and I work for retired fire fighter. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Eddie Carter
4114 Poli Poli Ct. Lot #205
Ruskin, Florida 33570
United States
(813) 410-1994
snow59dog@aol.com

Cooper, Laura K

From: William Cooper <no-reply@mail150.wdc04.mandrillapp.com> on behalf of William Cooper <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:52 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **William Cooper** and I work for Elgin Separation Solutions. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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William Cooper
4092 Highland Ave.
Shadyside, Ohio 43947
United States
(304) 281-4980
bill.cooper@elginindustries.com

Cooper, Laura K

From: Tammy Murphy <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Tammy Murphy <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:53 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Tammy Murphy** and I work for Homemaker . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Tammy Murphy
230 West Locust Drive
Beckley, West Virginia 25801
United States
(304) 894-2199
pmmurphy24@hotmail.com

Cooper, Laura K

From: Neil Novak <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Neil Novak <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:54 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Neil Novak** and I work for Universal Consulting Solutions, LLC. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Neil Novak
4960 Traynor
Naples, Florida 34112
United States
(314) 378-1709
neil.d.novak@gmail.com

Cooper, Laura K

From: Gary Manning <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Gary Manning <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:55 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Gary Manning** and I work for retired. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Gary Manning
2255 6th St.
Culloden, West Virginia 25510
United States
(304) 633-4320
gmanning@suddenlink.net

Cooper, Laura K

From: William Arnold <no-reply@mail150.wdc04.mandrillapp.com> on behalf of William Arnold <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:57 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **William Arnold** and I work for Walter Energy. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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William Arnold
3648 County Road 42 West
Jemison, Alabama 35085
United States
(205) 789-2526
dakotavaden@yahoo.com

Cooper, Laura K

From: John Pigza <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of John Pigza <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 9:59 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **John Pigza** and I work for Retired call mine maintenance manager. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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John Pigza
230 Fountain View
Morgantown, West Virginia 26505
United States
(304) 276-1406
johnpigza44@gmail.com

Cooper, Laura K

From: Laud Gifford Jr <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Laud Gifford Jr <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 10:30 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Laud Gifford Jr** and I work for Disable. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Laud Gifford Jr
68 Second Street
Gypsy, West Virginia 26361
United States
(304) 838-5457
lgjr5457@frontier.com

Cooper, Laura K

From: John Vance <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of John Vance <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 12:01 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **John Vance** and I work for Retired. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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John Vance
47 Whispering Hills Drive
Cross Lanes, West Virginia 25313
United States
(304) 776-2343
jvan59@suddenlink.net

Cooper, Laura K

From: CR ALLEN <no-reply@mail150.wdc04.mandrillapp.com> on behalf of CR ALLEN <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 12:03 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **CR ALLEN** and I work for PHILLIPS. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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CR ALLEN
367 GEORGE STREET
BECKLEY, West Virginia 25801
United States
(304) 255-0537
crallen@phillipsmachine.com

Cooper, Laura K

From: George Fisher <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of George Fisher <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 3:15 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **George Fisher** and I work for Bluefield Regional Medical Center. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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George Fisher
213 Fincastle Lane
Bluefield, Virginia 24605
United States
(304) 809-6597
kd4zua@hotmail.com

Cooper, Laura K

From: rick mullens <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of rick mullens <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 5:50 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **rick mullens** and I work for LEMAC Mine Service. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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rick mullens
166 distributor dr
morgantown, West Virginia 26501
United States
(304) 292-6163
rickmullens@lemacmineservice.com

Cooper, Laura K

From: joe beam <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of joe beam <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 5:55 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **joe beam** and I work for beam blasting, llc. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

joe beam
874 chester rd.
charleston, West Virginia 25302
United States
(304) 343-4443
jbeam.beam@earthlink.net

Cooper, Laura K

From: Kevin Craig <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Kevin Craig <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:14 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Kevin Craig** and I work for Natural Resource Partners L.P.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Kevin Craig
34 Chestnut Dr
Huntington, West Virginia 25705
United States
(304) 638-0190
kjcraigwv@aol.com

Cooper, Laura K

From: Cindy Dotson <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Cindy Dotson <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:15 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Cindy Dotson** and I work for Walker Machinery Co.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Cindy Dotson
63 Tom's Fork Road
Summersville, West Virginia 26651
United States
(304) 883-2013
cdotson@walker-cat.com

Cooper, Laura K

From: Charles Kurzyna <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Charles Kurzyna <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:15 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Charles Kurzyna** and I work for New River Engineering, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Charles Kurzyna
120 Howard Ave.
120 Howard Ave., West Virginia Beckley
United States
(304) 595-3290
ckurzyna@nrei-wv.com

Cooper, Laura K

From: Chuck Connor <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Chuck Connor <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:15 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Chuck Connor** and I work for Brake Supply . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Chuck Connor
278 Commerce Drive
Beaver, West Virginia 25813
United States
(304) 252-6241
cconnor@brake.com

Cooper, Laura K

From: Jim Ashby <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Jim Ashby <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:26 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jim Ashby** and I work for Alliance Coal, LLC. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Jim Ashby
293 Table Rock Road
Oakland, Maryland 21550
United States
(301) 334-5336
jim.ashby@arlp.com

Cooper, Laura K

From: Joe Fisher <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Joe Fisher <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:38 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joe Fisher** and I work for Putnam County Schools. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Joe Fisher
3470 Teays Valley Road
Hurricane, West Virginia 25526
United States
(304) 562-3916
jtfisher@suddenlink.net

Cooper, Laura K

From: KERRY LILLY <no-reply@mail150.wdc04.mandrillapp.com> on behalf of KERRY LILLY <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:40 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **KERRY LILLY** and I work for Red Bone Mining. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

**KERRY LILLY
701 UNION AVE
MORGANTOWN, West Virginia 26505
United States
(304) 328-5116
KLILCOALMINER@HOTMAIL.COM**

Cooper, Laura K

From: David Rosier <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of David Rosier <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:46 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **David Rosier** and I work for Mepco. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

David Rosier
22 Babcock dr
Fairmont, West Virginia 26554
United States
(304) 282-7692
Davs45ruger@aol.com

Cooper, Laura K

From: Tom Lobb <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Tom Lobb <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:06 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Tom Lobb** and I work for MSHA. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Tom Lobb
305 Pleasant Avenue
Kingwood, West Virginia 26537
United States
(304) 329-2502
Oldminer85@icloud.com

Cooper, Laura K

From: Donald Phillips <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Donald Phillips <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:14 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Donald Phillips** and I work for Cardno, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Donald Phillips
1606A Ridge Rd.
Oak Hill, West Virginia 25901
United States
(304) 469-3700
donaldp3@suddenlinkmail.com

Cooper, Laura K

From: Jeff Leuckel <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Jeff Leuckel <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:14 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jeff Leuckel** and I work for Ameren Missouri. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Jeff Leuckel
100 Big Hollow Rd
Festus, Missouri 63028
United States
(314) 992-9420
jleuckel@ameren.com

Cooper, Laura K

From: Brerry Hudson <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Brerry Hudson <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 2:15 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Brerry Hudson** and I work for Alpha . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Brerry Hudson
1503 Virginia Street East
Charleston, West Virginia 25311
United States
(304) 380-8478
bhudson@alphanr.com

Cooper, Laura K

From: Jenna Worry <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of Jenna Worry <no-reply@friendsofcoal.org>
Sent: Friday, July 31, 2015 2:11 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jenna Worry** and I work for SGS. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Jenna Worry
407 Duquesne Ave Apt. A
Canonsburg, Pennsylvania 15317
United States
(724) 961-7781
awesomejenna5683@gmail.com

Cooper, Laura K

From: Karen Cobb <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Karen Cobb <no-reply@friendsofcoal.org>
Sent: Thursday, July 30, 2015 7:20 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Karen Cobb** and I work for Patriot Coal. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Karen Cobb
P.O. Box 474
Buffalo, West Virginia Buffalo
United States
(304) 382-3789
Kcobb1970@yahoo.com

Cooper, Laura K

From: Mike Jenkins <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Mike Jenkins <no-reply@friendsofcoal.org>
Sent: Thursday, July 30, 2015 2:06 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Mike Jenkins** and I work for AQUAFIX SYSTEMS INC.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Mike Jenkins
301 Maple Lane
Kingwood, West Virginia 26537
United States
(304) 329-1056
mjj@aquafix.com

Cooper, Laura K

From: Randall Cunningham <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Randall Cunningham <no-reply@friendsofcoal.org>
Sent: Thursday, July 30, 2015 11:34 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Randall Cunningham** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Randall Cunningham
P.O. Box 150
Cannelton, West Virginia 25036
United States
(304) 595-6935
rcunningham@alphanr.com

Cooper, Laura K

From: gary smith <no-reply@mail150.wdc04.mandrillapp.com> on behalf of gary smith <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 9:20 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **gary smith** and I work for csx railroad. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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gary smith
512A Walnut St
Clendenin, West Virginia 25045
United States
(304) 965-0280
deanasmith304@outlook.com

Cooper, Laura K

From: gary smith <no-reply@mail150.wdc04.mandrillapp.com> on behalf of gary smith <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 9:20 PM
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My name is **gary smith** and I work for csx railroad. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

gary smith
512A Walnut St
Clendenin, West Virginia 25045
United States
(304) 965-0280
deanasmith304@outlook.com

Cooper, Laura K

From: Mitchell Kalos <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Mitchell Kalos <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 4:59 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Mitchell Kalos** and I work for Patriot Coal Company. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Mitchell Kalos
63 Corporate Centre Drive, P.O. Box 1001
Scott Depot, West Virginia 25560-1001
United States
(304) 368-9958
mkalos@patriotcoal.com

Cooper, Laura K

From: AHMED ASFAR <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of AHMED ASFAR <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 5:14 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **AHMED ASFAR** and I work for midoumorocco. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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AHMED ASFAR
N 6 RUE 7 DERB CHOUAY
AZEMMOUR MOROCCO, Alabama 24100
United States
(212) 665-2211
midoumorocco@gmail.com

Cooper, Laura K

From: Mary Barratt <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Mary Barratt <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 3:14 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Mary Barratt** and I work for N/A. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Mary Barratt
1505 Grant St
318, Colorado Denver
United States
(720) 556-0785
mbar@mail.org

Cooper, Laura K

From: Ron Van Horne <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Ron Van Horne <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 1:01 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Ron Van Horne** and I work for Murray Energy Corp. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Ron Van Horne
46226 National Road
Saint Clairsville, Ohio 43950
United States
(740) 338-3214
rvanhorne@coalsource.com

Cooper, Laura K

From: John Praskwicz <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of John Praskwicz <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 8:47 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **John Praskwicz** and I work for Pardee Resources Co.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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John Praskwicz
4012 Ridgeview Lane
Hurricane, West Virginia 25526
United States
(304) 760-7226
john.praskwicz@pardee.com

Cooper, Laura K

From: Aven Sizemore <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Aven Sizemore <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 9:50 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Aven Sizemore** and I work for Alpha Natural Resources . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Aven Sizemore
215 New Richmond Bottom Road
New Richmond, West Virginia 24867
United States
(304) 250-7473
asizemore@alphanr.com

Cooper, Laura K

From: James Skeens <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of James Skeens <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 3:02 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **James Skeens** and I work for Norfolk Southern. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

James Skeens
150 Sierra Circle
Princeton, West Virginia 24739
United States
(540) 797-4461
jgskeens@nscorp.com

Cooper, Laura K

From: Jon Ours <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Jon Ours <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 4:15 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jon Ours** and I work for First Sentry Bank. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Jon Ours
823 Eighth Street
Huntington, West Virginia 25701
United States
(304) 522-6400
jours@firstsentry.com

Cooper, Laura K

From: Randy Adams <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Randy Adams <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 6:11 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Randy Adams** and I work for arch coal. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Randy Adams
5577 N. Mountaineer Hwy.
Newburg , West Virginia 26410
United States
(304) 892-2885
radamsp@frontier.com

Cooper, Laura K

From: james beighle <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of james beighle <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 7:18 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **james beighle** and I work for fola coal. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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james beighle
3218 thorofare rd
clendenin, West Virginia 25045
United States
(304) 549-2761
beighle55@suddenlink.net

Cooper, Laura K

From: Jack Harrison <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Jack Harrison <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:25 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jack Harrison** and I work for Goodwin & Goodwin . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I want to stay here and keep my job!

Jack Harrison
1116 Shamrock Road
Charleston , West Virginia 25314
United States
(304) 346-7000
jeh@goodwingoodwin.com

Cooper, Laura K

From: eric kelly <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of eric kelly <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 10:58 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **eric kelly** and I work for Csx transportation. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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eric kelly
841 oak spring dr
aylett, Virginia 23009
United States
(804) 517-9693
250ekelly@comcast.net

Cooper, Laura K

From: paul james <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of paul james <no-reply@friendsofcoal.org>
Sent: Tuesday, July 28, 2015 11:05 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **paul james** and I work for Not a company. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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paul james
256 Glenwood drive
Metairie, Louisiana 70005
United States
(504) 508-0102
pauljames256@gmail.com

Cooper, Laura K

From: Joseph Dotson <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Joseph Dotson <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 6:38 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joseph Dotson** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Joseph Dotson
PO Box 1098
Holden, West Virginia 25625
United States
(304) 239-6025
jrdotson@alphanr.com

Cooper, Laura K

From: Joe Crane <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Joe Crane <no-reply@friendsofcoal.org>
Sent: Wednesday, July 29, 2015 7:11 AM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Joe Crane** and I work for Alpha natural resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Joe Crane
9522 n Preston hwy
Albright, West Virginia 26519
United States
(304) 290-4319
Jcrame@alphanr.com

Cooper, Laura K

From: Ben Beakes <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Ben Beakes <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 4:42 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Ben Beakes** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Ben Beakes
206 Monarch Drive
Cross Lanes, West Virginia 25313
United States
(276) 698-5140
bbeakes@alphanr.com

Cooper, Laura K

From: Carolyn Capelli <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Carolyn Capelli <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 7:31 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Carolyn Capelli** and I work for adv+, Inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Carolyn Capelli
P. O. Box 1424
Elkins, West Virginia 26241
United States
(304) 591-4268
carolyncapelli@aol.com

Cooper, Laura K

From: Bradley Lewis <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Bradley Lewis <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 7:43 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Bradley Lewis** and I work for Laid off from the coal industry . I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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I am in support of the adoption of proposed Water Quality Standards for Selenium and Aluminum for the state of West Virginia that are based on current science. They will protect our streams and will not leave our state coal industry at a competitive disadvantage.

I want to stay here and keep my job!

Bradley Lewis
405 East Main Street
Clarksburg, West Virginia 26301
United States
(412) 369-7233
bradlewis4@comcast.net

Cooper, Laura K

From: Kristi Johnson <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Kristi Johnson <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:14 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Kristi Johnson** and I work for Standard labs. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Kristi Johnson
Po box 203
Hewett, West Virginia 25108
United States
(304) 784-0275
Johnson3fan@yahoo.com

Cooper, Laura K

From: Jay Isaly <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Jay Isaly <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:18 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Jay Isaly** and I work for Gms mine repair. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Jay Isaly
40 Rhine ave
Wheeling, West Virginia 26003
United States
(304) 780-6948
J_isaly39@ymail.com

Cooper, Laura K

From: fred mohr <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of fred mohr <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:26 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **fred mohr** and I work for Mohr trucking co. inc.. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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fred mohr
3855 river park drive
ona, West Virginia 25545
United States
(304) 638-6477
fdmohr@wvdsi.net

Cooper, Laura K

From: Doug Yanak <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Doug Yanak <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:34 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Doug Yanak** and I work for retired/disabled. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Doug Yanak
10055 Coal River Road
St. Albans, West Virginia 25177
United States
(304) 727-7915
deyanak@suddenlink.net

Cooper, Laura K

From: Vijnton Fry <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Vijnton Fry <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:39 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Vijnton Fry** and I work for Fry Realty. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Vijnton Fry
10308 Kerns Road
Huntersville , North Carolina 28078-3605
United States
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vfryrealty7@yahoo.com

Cooper, Laura K

From: Paul Ostand <no-reply@mail150.wdc04.mandrillapp.com> on behalf of Paul Ostand <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:46 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Paul Ostand** and I work for Ostand Design. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Paul Ostand
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United States
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proinwv@gmail.com

Cooper, Laura K

From: jim johnston <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of jim johnston <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:48 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **jim johnston** and I work for cat. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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jim johnston
205 fairmeadow circle
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United States
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johnston_jim@cat.com

Cooper, Laura K

From: Steve Phares <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Steve Phares <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:48 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Steve Phares** and I work for Alpha Natural Resources. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Steve Phares
722 Bright Mtn Rd
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United States
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sphares@alphanr.com

Cooper, Laura K

From: Chad Parsons <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Chad Parsons <no-reply@friendsofcoal.org>
Sent: Monday, July 27, 2015 8:52 PM
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

My name is **Chad Parsons** and I work for AEP. I live in West Virginia and am proud to be a coal miner here. I love the mountains and streams we have here in this beautiful state. I care about the quality of the water and take seriously the obligation to protect the environment where I live and work. My job is very important to me and my family. It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

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Chad Parsons
4725 Trace Fork Rd
Sandyville , West Virginia 25275
United States
(304) 372-3422
Csp102677@hotmail.com

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DEP response to comments to 47 CSR 2 Rule Revisions

Written Comments on 2015 Proposed WQS Rule – DEP Responses

Comments in favor of revisions to aluminum and selenium standards

Commenters: Ahmed Asfar, Anthony Gatens, Aven Sizemore, Ben Beakes, Bradford Hunt, Bradley Lewis, Brerry Hudson, Brett Holbrook, Brian Chapman, C.R. Allen, Carolyn Capelli, Chad Parsons, Charles Dunbar, Charles Howard, P.E., Charles Kurzyna, Chuck Connor, Cindy Dotson, Craig Havelka, Dale Lewis, Daniel Simmons, Darrell Trent, David Hickman, David Rosier, David Steadham, Donald Parrish, Donald Phillips, Donna Duncan, Doug Yanak, Earl Chornsbay, Eddie Carter, Eric Kelly, Fred Mohr, Gary C., Gary Manning, Gary Smith, George Fisher, Greg Vincent, Jack Harrison, James Beighle, James Miles, James Skeens, James Williams, Jason Rose, Jay Isaly, Jay Perry, Jeff Leuckel, Jennifer Ratliff, Jim Ashby, Jim Dean, Jim Johnston, Joe Beam, Joe Crane, Joe Fisher, Joe Lester, John Jones, John Pigza, John Popp, John Praskiewicz, John Vance, John Workman, Jon Ours, Jordan Maynard, Joseph Dotson, Joshua Birchfield, Joyce Morton, Justin Richardson, Justin Skeens, Kenneth Carini, Kerry Lilly, Kevin Craig, Kevin Shehan, Kristi Johnson, Kyle Bane, Kyle Estep, Larry Ward, Laud Gifford Jr., Logan Feather, Margaret McClaugherty, Mary Barratt, Michael Carpenter, Michael Vaught, Mike Beaver, Mike Hanks, Mike Mosteller, Mitchell Kalos, Molly Antonk, Neil Novak, Norman Douglas, Pameal Parrish, Patrick Popicg, Paul James, Paul Ostand, Preston Lewis, Rachel Metheny, Randy Adams, Rick Mullens, Ricky Moore, Robert Meeks, Robert Stephens, Robert Tipane, Robin Poling, Rodney Campbell, Ron Van Horne, Sandra Moore, Shawn Parsons, Sidney Price, Stephanie Morgan, Steve James, Steve McGrath, Steve Phares, Steve Sutphin, Tamara Smith, Tammy Murphy, Terry Cole, Tom Lobb, Varaha Cast, Vjnton Fry, William Arnold, William Cooper and William Rounkles

A total of 126 individuals provided comments which were similar in substance and supported the proposed water quality standards rule revisions to aluminum and selenium. These very similar comments contained the following:

It seems that our industry is confronted with new challenges almost daily, including from existing and proposed regulations that impose significant costs but do not have substantial benefits for these streams.

It is clear that West Virginia has some water quality standards that are overly-burdensome and not based on current science. In the case of Selenium, EPA recognized nearly 20 years ago that the current standard was outdated, yet we are still stuck with this outdated standard. The existing Aluminum standard does not reflect the best science either. In addition, improper standards have allowed anti-mining groups to adversely influence the state's mining program and to repeatedly sue the industry. This has resulted in a permitting quagmire and needless distractions that do not promote environmental protection.

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DEP Response: Thank you for your comments.

Comments opposing revisions to aluminum and selenium standards

Commenters: Ann Payne, Anna Mary Walsh, Barbara Humes, Bert Lustig, Bill Hicks, Brian Dorsey, Carla, Carli Mareneck, Charles & Nancy Brabec, Chuck Wyrstok, David Billups, Diana Mullis, Edward Savage, Elaine Wolf Komarow, Gale Simplicio, George W Little, Helen Gibbins, Director, League of Women Voters of WV, Ilene Sussman, Jeff Iliff, jim hatfield, John Doyle, Julie Pratt, Larry Brent Dadisman, Lissa and David Fox , Marjorie Yost, Mark Blumenstein, Mary Lickert, Michael Condon, Michael L. Klausing, Michael R Moore, Nicola Bastian, Pam Ruediger, Patti Miller, Paul J. Baker, Sam Golston, Steve Runfolo , Tom Nagle

A total of 37 individuals provided comments which were similar in substance and opposed the proposed water quality standards rule revisions to aluminum and selenium. Many of these comments contained the following reasons, which have been responded to individually below.

Comment: *These revisions are not an emergency, and DEP should not bend to corporate pressure*

DEP Response: As found in West Virginia's State Administrative Procedures Act, an emergency rule may be promulgated when an emergency exists, or when the law specifically authorizes an emergency rule to allow implementation of a law before the next legislative session. 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."

The DEP proposed an emergency rule to address the aquatic life aluminum and selenium criteria in the state water quality standards rule in accordance with the mandates imposed by the West Virginia Legislature in SB562 (2012) and SB357 (2015), which amended W. Va. Code §22-11-6 to require these changes.

Comment: *Aluminum toxicity is complex, its biological effect in aquatic systems is unknown, and there is not enough scientific data to support this revision*

DEP Response: The fate of aluminum in aquatic ecosystems is indeed complex, and is largely dependent upon pH and water hardness concentration. Because of this, DEP has not proposed a change to its aluminum standard in waters with acidic (less than 6.5) pH, nor in waters with highly alkaline pH (greater than 9.0). DEP considered many scientific studies (references shown below) and used Environmental Protection Agency methodology to develop a hardness-based, pH dependent aluminum criterion that is protective of aquatic life.

Comment: *Selenium threatens human and aquatic life, threatens fish as a food source, and there is not enough scientific data to support this revision*

DEP Response: The U.S. Environmental Protection Agency has been developing a revised selenium criterion for the last several years, and on July 27, 2015, released a new “Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater, 2015.” This is a peer-reviewed document that takes into account all current research on selenium, and presents a selenium criterion that EPA is very confident is protective of aquatic life. DEP has used elements of EPA’s draft selenium criterion; furthermore, DEP has subsequently revised the proposed selenium revision in 47CSR2 to reflect updates made to EPA’s draft document since its previous release in 2014.

Comment: *Making these changes to aluminum and selenium criteria weakens West Virginia standards of water quality*

DEP Response: Water quality standards must be designed to fully protect the use. Based on the studies which were used to derive these standards, the uses are fully protected; therefore, it is not considered a weakening of water quality standards.

Comment: *Implementation of selenium standard with fish tissue and egg/ovary analyses will complicate compliance and enforcement*

DEP Response: Water quality standards are based on fully protecting the use, not on ease of enforcement. The fish tissue and egg/ovary approach is consistent with EPA’s new draft proposal (July 27, 2015), and their methodology. It is considered fully-protective.