west virginia department of environmental protection

Division of Water & Waste Management
601 57th Street, Southeast
Charleston, WV 25304
Phone: (304) 926-0440
Fax: (304) 926-0463

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

June 8, 2016

Shawn M. Garvin, Regional Administrator
EPA Region 3
1650 Arch Street
Mail Code: 3RA00
Philadelphia, PA 19103-2029

Re: West Virginia's Submission of Revised Water Quality Standards

Dear Mr. Garvin:

The West Virginia Department of Environmental Protection (DEP) hereby submits its revised water quality standards rule to the United States Environmental Protection Agency (EPA) in accordance with section 303(c) of the federal Clean Water Act and 40 C.F.R. §§ 131.6 and 131.20(c). This Legislative Rule, entitled *Requirements Governing Water Quality Standards*, 47 C.S.R. 2, became effective on June 2, 2016. The state authority for the rule exists under W. Va. Code § 22-11-4(a)(16) and 22-11-7b. This submittal package includes the required Legal Certification from DEP's General Counsel.

DEP respectfully requests EPA's timely review and determination of approval of these revisions to the State's water quality standards in accordance with 40 C.F.R. §131.21. Alternatively, DEP requests that EPA consider the review of each criterion individually, in order to expedite the approval of each criteria revision. If you have any questions or need any additional information, please contact Laura Cooper at (304) 926-0499 extension 1110 or via email at Laura.K.Cooper@wv.gov.

Sincerely,

Scott G. Mandirola
Director

cc: Denise Hakowski, EPA Region 3

West Virginia Department of Environmental Protection
Division of Water and Waste Management
Water Quality Standards Program
Requirements Governing Water Quality Standards Rule

Final Rule Submittal Package Contents

The following items are included in this submittal package for EPA review and consideration:

1. **Legal Certification from DEP General Counsel**, dated June 8, 2016
2. **Rationale for Revisions** to Water Quality Standards Rule (47CSR2) and related attachments, A-G
3. **Final Water Quality Standards Rule** (47CSR2), effective date June 2, 2016
4. **Materials for Revision of 47CSR2**
    a. Proposed rule with strikethrough/underline revisions, as revised during 2016 Legislative session
    b. House Bill 4053, authorizing promulgation of 47CSR2
5. **Public Comment Materials**
    c. Public Hearing Transcript
    d. Written & Oral comments
    e. DEP Response to Comments

Entire document can be found on attached DVD

1. Legal Certification from DEP General Counsel

west virginia department of environmental protection

Executive Office
601 57th Street, Southeast
Charleston, West Virginia 25304
Phone: (304) 926-0440
Fax: (304) 926-0446

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
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June 8, 2016

Shawn M. Garvin, Regional Administrator
EPA Region 3
1650 Arch Street
Mail Code: 3RA00
Philadelphia, PA 19103-2029

Re: Legal Certification: 47 C.S.R. 2, *Requirements Governing Water Quality Standards*

Dear Mr. Garvin:

This letter constitutes the legal certification that must accompany the State's submission of revised water quality standards to EPA pursuant to 40 C.F.R. § 131.6(e). The undersigned hereby certifies that the State's revised water quality standards, a copy of which is included in this submittal packet, were duly approved by the West Virginia Legislature in accordance with State law to become effective immediately upon final approval by EPA.

As General Counsel to the West Virginia Department of Environmental Protection (DEP), I am the agency's chief legal officer and thus am authorized to provide legal counsel and representation to the agency in all matters. DEP is permitted to utilize its own legal counsel (as opposed to being represented by the West Virginia Attorney General) by virtue of W. Va. Code § 22-1-6(d)(7).

If you have any questions or concerns, or if you wish to discuss this matter in any particular, please do not hesitate to contact me.

Very truly yours,

Kristin A. Boggs
General Counsel

cc: Denise Hakowski, EPA Region 3

2. Rationale for Revisions to Water Quality Standards Rule

Rationale Purpose

The purpose of this rationale document is to provide the U.S. Environmental Protection Agency (EPA) with a description of and scientific justification for changes made during the 2016 Legislative Session to the West Virginia water quality standards rule, entitled *Requirements Governing Water Quality Standards*, 47 C.S.R. 2.

Water Quality Standards Rule

West Virginia's *Requirements Governing Water Quality Standards* establishes the surface water quality standards for the waters of the State and establishes standards of purity and quality consistent with public health and the public enjoyment thereof; the propagation and protection of animal, bird, fish, and other aquatic and plant life; and the expansion of employment opportunities, maintenance and expansion of agriculture and the provision of a permanent foundation for healthy industrial development. *See*, W. Va. Code § 22-11-2.

Rule Making Process in West Virginia & Details of 2016 Rulemaking

The promulgation of the Legislative water quality standards rule in West Virginia begins with review by the Environmental Protection Advisory Council, public notice, and public hearing. After considering received comments and making any revisions based thereon, the rulemaking process continues with submittal to the Secretary of State and subsequent review by the Legislative Rulemaking Review Committee (LRMRC). Following review and possible modification by LRMRC, the rule is introduced as a bill during the Regular Session and works its way through the legislative process, usually being considered by four committees (two in the Senate and two in the House). After consideration by the Legislature, the Governor signs into law the bill of authorization of the rule, and the agency "final files" the rule with the Secretary of State.

DEP initiated the rule revision process by submitting an "agency proposed" amendment to the Water Quality Standards rule for review by both EPA and the public on June 17, 2015 and holding a public hearing on July 21, 2015. After receiving comments and making changes to the rule based thereon, DEP submitted the "agency approved" rule to LRMRC on July 31, 2015. On September 21, DEP completed and submitted to the Secretary of State the agency's response to the comments it received on the proposed amendments. On November 23, LRMRC made some DEP-requested technical corrections and advanced the modified rule for review by the full Legislature during the 2016 Regular Session. The rule revision, introduced as HB4103 but ultimately bundled into HB4053, was considered by four committees and passed both chambers, but due to an attempt to amend the "bundle bill" on the floor on the last night of the Regular Session, the whole DEP rule package, including the Water Quality Standards rule, failed to pass. During the First Extraordinary Session of the Legislature, held from May 12 through June 2, the Legislature again took up the bundle bill, and it passed both houses on June 2. The Governor signed the bill of authorization on June 7, 2016. (For documents detailing this process for 47 C.S.R. 2, please access the Secretary of State's website at http://apps.sos.wv.gov/adlaw/csr/ and the Legislature's website at http://www.legis.state.wv.us/Bill_Status/bills_history.cfm?INPUT=117&year=2016&sessiontype=1X).

Scientific Justification

Variances for Martin Creek and Sandy Creek Watersheds

In March 2015, DEP's Office of Special Reclamation (OSR) approached DEP Water Quality Standards Program regarding a variance for water quality standards for streams in the Muddy Creek watershed of Cheat River and in the Sandy Creek watershed of Tygart River. The variance requests were based on human-caused conditions which prohibit the full attainment of designated uses and could not be immediately remedied. The streams in question have been affected by a long history of coal mining, particularly at several sites abandoned prior to the 1977 passage of the Surface Mining Control and Reclamation Act (SMCRA). To treat these streams OSR plans to implement the use of in-stream lime dosers and to report on stream conditions with each water quality standards triennial review, in order to improve the established variance criteria throughout the duration of the 10-year variance. Details of these variance requests are provided in Attachments D and E.

The variance language put forth in 47CSR2 was developed in conjunction with EPA Region 3 personnel, including the NPDES permits branch as well as EPA Region 3 Office of Standards, Assessment, and TMDLs' Water Quality Standards personnel. During public review of proposed changes, DEP responded to additional EPA comments by clarifying the language before submittal of the rule on July 31, 2015 for approval by the Legislature. The finalized language was intended to assure the variances were compliant with the then-draft version of federal water quality standards regulation 40 CFR 131, which was officially updated in August, 2015.

In October 2015, OSR conducted a tour for EPA Region 3 personnel, showing the watersheds for which these variances were developed. This tour of the Martin Creek and Sandy Creek watersheds included both a driving and helicopter tour showing the acid mine drainage (AMD) sites, existing treatment, and dismal state of the streams. Since that tour, OSR has installed temporary in-stream dosers, which have shown favorable results in most of the streams. In Martin Creek and Glade Run upstream of the confluence with Fickey Run, pH is averaging above 6.0 and no iron flocculation is extending downstream. In Fickey Run, however, the extremely low pH and high pollutant concentrations have necessitated a different approach. To properly treat the AMD in Fickey Run headwaters, these discharges will be conveyed to T&T Fuels treatment facility for treatment before being released into Muddy Creek. In Sandy Creek watershed, OSR has installed dosers, and water quality in Maple Run and at the mouth of Left Fork of Little Sandy is already meeting the variance criteria.

To facilitate this effort to restore quality water to these streams which have been long-affected by acid mine drainage, DEP respectfully requests EPA's approval of the following variances in West Virginia water quality standards, *Requirements Governing Water Quality Standards*, 47 C.S.R. 2 (shown below and in Section 3, Final Water Quality Standards Rule herein):

7.2.d.8.2. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to West Virginia DEP Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by West Virginia DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

and

7.2.d.11.1. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to West Virginia DEP Division of Land Restoration's Office of Special Reclamation's discharges into Maple Run, Left Fork Little Sandy Creek, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: For Maple Run, pH range of 3.3-9.0, 2 mg/L total iron, and 12 mg/L dissolved aluminum; for Left Fork Little Sandy Creek, pH range of 2.5-9.0, 14 mg/L total iron, and 33 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by West Virginia DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated and reported upon during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

Dissolved Aluminum

Scientific research has shown that the toxicity of dissolved aluminum, like many other metals, is inversely related to hardness, and numerous scientific studies have validated the impact of hardness as it relates to toxicity to the aquatic community. These studies have been used to update and justify new hardness based approaches to aluminum criteria in Colorado and New Mexico, and subsequently these approaches were approved by both the respective EPA regions and EPA headquarters.

Relevant research on aluminum toxicity, studied in *Updated Freshwater Aquatic Life Criteria for Aluminum August 2011, Version 2* (GEI Consultants 2011), was used to determine a relationship

between water hardness and toxicity of dissolved aluminum, within the pH range of 6.5 to 9.0. This research was used to produce an equation using stream hardness concentrations that calculates the dissolved aluminum criteria necessary to protect the designated uses of West Virginia waters.

DEP has used the GEI Consultants 2011 study, as well as independent analysis of aluminum toxicity research, in order to arrive at the hardness equations for acute and chronic aluminum proposed in the 2015 revision to *Requirements Governing Water Quality Standards* (47CSR2).

The hardness equations arrived upon by DEP include lower and upper boundaries for hardness levels to be applied in the calculation (from 26 to 200 mg/L) because, based on hardness levels from the scientific studies used to develop the equation, there is no data to support extending a hardness curve above or below this range. The proposed criterion incorporates a safety factor of 200 mg/L, establishing a threshold beyond which allowable aluminum will not be increased despite increased hardness. To ensure this approach is protective to aquatic species in West Virginia, DEP requested that a brook trout study completed by Decker and Menendez (1974) be included in development of the equation. GEI Consultants agreed to this inclusion, and a copy of the correspondence sent by DEP to the applicant on August 2, 2012, and the September 6, 2012 reply letter which includes the final version of the hardness-based equation that is being proposed has been included in this submittal (Attachment A).

EPA Comments and Response

When DEP proposed a similar aluminum revision as an Emergency Rule in 2013, EPA requested that DEP justify how the proposed hardness-based aluminum criterion is protective of mussels in West Virginia and asked that DEP's criterion take into consideration potential pH interaction with aluminum toxicity. In support of these requests, EPA cites the following communications with DEP regarding the proposed revisions to the aluminum criteria:

- USFWS letter dated July 19, 2013 expressing concern that DEP's proposed aluminum criteria will not protect federally endangered mussels (Attachment B);
- EPA's communication dated November 21, 2013, which contains a list of studies considered by EPA in its work to update the national recommended criteria for aluminum, and a worksheet summarizing EPA's analysis of the available studies (Attachment C); and
- EPA's January 30, 2014, letter summarizing EPA's response to DEP's proposed aluminum criteria (Attachment C).
- EPA's March 17, 2016 letter commenting on DEP's proposed aluminum criteria, and summarizing recent unpublished USGS mussel study

While the agency has responded to these communications in the past, DEP will present a complete response to each of these documents separately.

July 19, 2013 Letter from USFWS

USFWS contends that the proposed hardness-based aluminum criteria are not protective of native freshwater mussels, including federally listed species. USFWS notes that federally listed mussels occur in the Ohio River and its tributaries. USFWS recommends that DEP either revise the Category B1 criteria to be protective of all native freshwater mussel species in West Virginia, or that DEP apply more protective standards to waters that support federally listed mussel species.

In support of this request, USFWS cites two studies: Kádár, et al. (2001), which studied the feeding behavior of bivalve *Anodonta cygnea* in neutral freshwater (Kádár), and Pynnönen (1990), which studied the aluminum concentration in the gills and kidneys of *Anodonta anatina and Unio pictorum* over a two-week study (Pynnönen). USFWS contends that Kádár demonstrates that exposure to aluminum at concentrations of aluminum around 500 µg/L change the feeding behavior of *Anodonta cygnea* and therefore could affect the fitness of federally listed mussel populations. Likewise, USFWS contends that pH significantly affects the accumulation of aluminum on the gills, but changes in water hardness does not have this effect.

Notably, both studies cited by USFWS are for sub-lethal effects, meaning that they cannot be used to calculate either an acute or chronic value. Therefore, they are excluded from criteria development calculations. Equally important, both studies are for species not present in North America. According to EPA guidance, "Data should be rejected if they were obtained using … species that do not have reproducing wild populations in North America" (1985 Guidelines, p. 22). Even assuming the data was otherwise suitable for use, none of the federally listed mussels in West Virginia are in the same genus as those studied in Kádár and Pynnönen. Therefore, the studies are not an appropriate surrogate for West Virginia endangered mussels as the behavior among genera can vary considerably.

Based on a more thorough review of the studies, they do not support the conclusions alleged by USFWS. Pynnönen was conducted with water of very low hardness (the "hard" water in the test was 35 mg/l). The proposed West Virginia aluminum criteria would be more conservative in that hardness range than the current criteria (the chronic criterion would be 324 µg/L, compared to the current warm water chronic criterion of 750 µg/L).

Regardless, Pynnönen indicates that pH is far more important than hardness for the species studied. The last page of the study states, "In circumneutral hard water, no significant Al accumulation was measured in the gills or kidney of *A. anatine* and *U. pictorum*. Within the pH range of 4-4.5, accumulation was recorded in both species." The study cited by USFWS explicitly agrees that accumulation is not a concern, regardless of hardness, in circumneutral waters. West Virginia has addressed the concerns of USFWS and EPA regarding pH effects by excluding use of the hardness-based criteria in waters with low pH.

Kádár is entirely unrelated to the impact of hardness on aluminum toxicity. The study is based on exposure of *A. cygnea* to two different concentrations of aluminum. The tissue concentrations in the higher aluminum exposure were actually less than the tissue concentrations in the lower concentration, presumably due to differences in aluminum speciation in the study. However, this hypothesis could not be proven, because the study did not collect data on aluminum speciation. No

information is provided in the study regarding the hardness of the test water, so it is not possible to determine whether low water hardness influenced the impacts of aluminum on shell opening. Notably, the studies were completed using aluminum from a stock solution of aluminum nitrate (pH 1.7), with the near neutral pH maintained by the addition of nitric acid. The study does not appear to consider whether the additional nitrates added to the water by this method could have affected the behavior or performance of the mussels. Moreover, the study did not discuss why the addition of nitric acid was necessary to maintain circumneutral pH. An upward pH drift is evidence of atypical water chemistry, considering that the aluminum was added from an acidic stock solution.

While DEP understands and appreciates USFWS concerns with endangered mussels, neither study indicates that West Virginia's hardness-based aluminum criteria will be detrimental to mussels. In fact, the new criteria are more stringent at the low hardness range presented in Pynnönen than the current criteria.

At EPA's request, DEP has waited three years to fully revise this aluminum criterion; nonetheless, an EPA-contracted study on North American mussels has still not been made available. The study, first completed in early 2015, needed to be repeated due to the fact that it did not include the neutral pH range. The study was repeated in late 2015, but DEP has not yet been provided the study for review. DEP received an EPA letter dated March 17, 2016 (Attachment C), which indicated some details of study methods and results, but did not contain any data which would conflict with West Virginia's revised criterion. With the proposed criterion in place, waters with pH less than 6.5 will continue to be held to the EPA-approved and fully protective aluminum criterion of 750ug/L in warm water streams, and 87ug/L in cold water (trout) streams. Taking into consideration all the latest scientific knowledge on aluminum toxicity, the research indicates that DEP's proposed criteria are sufficient to protect aquatic life, including federally listed endangered mussels.

November 21, 2013 Communication from US EPA

This communication set forth EPA's technical review of the West Virginia database and calculations for the aluminum criteria. Importantly, EPA references a 2010 GEI report. The West Virginia criteria under review are based upon a 2011 GEI study revision, which was corrected in 2011 in response to DEP comments on the calculated pooled slope. Therefore, EPA may have reviewed an outdated GEI report in preparing its comments. The 2011 GEI report that provides the basis of the West Virginia proposed criteria, *Updated Freshwater Aquatic Life Criteria for Aluminum, Revision 2*, is referenced and linked to in References section (GEI Consultants 2011).

Acute Criterion Data

EPA cites nine additional studies that it is considering beyond those included in the West Virginia analysis. As noted by EPA, a number of these studies are outside the pH range of 6.5-9.0 S.U utilized in the West Virginia criteria (studies in bold below). The following is the list of studies recommended by EPA:

Fort and Stover 1995 (*Ceriodaphnia dubia*)

Shephard 1983 (*Ceriodaphnia reticulate* and *Daphnia magna*)

Holtze 1983 (*Oncorhynchus mykiss* @ pH=5.5)

Tandjung 1982 (*Salvelinus fontinalis* @ pH=5.6)

Boyd 1979 (*Pimephales promelas*)

Palmer et al. 1989 (*Pimephales promelas*)

Kane and Rabeni 1987 (*Micropterus dolomieui*)

Jung and Jagoe 1995 (*Hylas cinerea* @ pH=5.5)

Shuhaimi-Othman et al. 2011 (*Stenocypris major*)

West Virginia has adopted a hardness-based criterion that is limited to the pH range of 6.5-9.0. For waters outside this pH range, the state does not propose a change to its EPA-approved aluminum criteria. Therefore, studies outside this pH range are irrelevant to West Virginia's hardness-based criteria, and the West Virginia criteria are protective of aquatic life in waters with pH less than 6.5.

DEP has reviewed EPA's list of studies and crosswalk table. Since DEP has already incorporated the brook trout studies (with an assumed hardness), EPA has identified only two studies that could affect the acute criterion that are not in DEP's database: [1]

Species Latin Name	**Species Common Name**	**Chemical**	**pH**	**Hardness (mg/l $CaCO_3$)**	**LC_{50} or EC_{50} (µg Al/L)**	**LC_{50} or EC_{50} Adjusted to a Hardness of 50 mg/L (µg Al/L)**	**SMAV at Hardness of 50 mg/l (µg Al/L)**	**Reference**
Stenocypris major	Ostracod	$Al_2(SO_4)_3$	6.51	15.63	3,102	15,249	15,249	Shuhaimi-Othman et al. 2011
Micropterus dolomieui	Smallmouth bass	$Al_2(SO_4)_3$	6.0-7.5	12.45	> 978	6568	3093	Kane and Rabeni 1987
Micropterus dolomieui	Smallmouth bass	$Al_2(SO_4)_3$	7.2-7.7	12.45	> 217	1457		Kane and Rabeni 1987

[1] As noted by EPA, Boyd (1979) does not present hardness data. Palmer et al (1989) has an overly low upper bound when compared to other studies for *P. promelas* and is an outlier. Fort and Stover (1995) was excluded by GEI due to technical issues, but if included, it would marginally increase the SMAV for *C. dubia*, making the criterion less stringent. Therefore, the exclusion of these studies is appropriate.

Kane and Rabeni (1987) is the only study for a recreationally important species (smallmouth bass) not included by GEI (2011). Notably, the cited study did not reach a LC_{50} endpoint with the highest concentrations to which the bass were exposed within the pH range of 6.5-9.0. The following appears in the abstract to this study:

> Acute bioassays (96 h) conducted at a pH of 5.1 and aluminum concentrations ⩾ 180 μg l^{-1} resulted in total mortality. The LC_{50} calculated for this species was 130 μg l^{-1}. At pH values of 6.1 and 7.5, mortality was low (⩽ 20%) regardless of aluminum concentrations. A 30-day chronic toxicity test was conducted at three pH levels (low 5.1, intermediate 5.5–5.7 and high 7.3), each with two aluminum concentrations (approx. 0 and 200 μg l^{-1}). Survival was significantly lower in the test at pH 5.1 with aluminum, and at pH 5.7 with aluminum treatments than in the other treatments. Fish in the pH 5.1 without aluminum treatment had intermediate survival, while fish exposed to pH 5.7 without aluminum, **pH 7.3 without aluminum and pH 7.3 with aluminum had high, and similar, survival**.

(Kane and Rabeni abstract) (emphasis added). Use of this study is not appropriate under the 1985 Guidelines. Even if it is assumed that the study reported a LC_{50}, the calculated GMAV would be >461 μg l^{-1} for water with a hardness of 12.45. The West Virginia criteria calculated based on a water hardness of 26 (the lowest hardness that can be used on the equation) are 510 μg/l and 204 μg/l for acute and chronic exposures, respectively. Therefore, West Virginia's aluminum criteria are protective of smallmouth bass.

The 2011 Shuhaimi-Othman ostracod study reports a LC_{50} of 3102 μg/l for water with a hardness of 15.63 mg/l. The study does not fall within the lowest four GMAVs once the hardness is adjusted to 50 mg/l, and therefore does not materially affect the calculated criterion. It can only be used to increase N, which again makes the criterion less stringent.

EPA also contends that a number of studies utilized by GEI (2011) should be excluded from the database. The following table shows the species in the GEI acute database. The species affected by the studies considered by EPA for removal are shown in bold below:

Rank	GMAV (μg/L)	Species	SMAV (μg/L)	SM Acute to Chronic Ratio
18	> 338,321	*Tanytarsus dissimilis* (midge)	> 338,321	-
17	> 53,794	*Lepomis cyanellus* (green sunfish)	> 53,794	-
16	**> 53,578**	***Perca flavescens* (yellow perch)**	**> 53,578**	-
15	**> 51,534**	***Ictalurus punctatus* (channel catfish)**	**> 51,534**	-
14	32,922	*Physa sp*. (snail)	32,922	-
13	> 24,315	*Acroneuia sp* (stonefly)	> 24,315	-
12	**23,669**	***Gammarus pseudolimnaeus* (amphipod)**	**23,669**	-
11	**> 18,189**	***Dugesia tigrina* (flatworm)**	**> 18,189**	-

10	> 14,428	*Hybognathus amarus* (Rio Grande silvery minnow)	> 14,428	-
9	9,205	*Samo salar* (Atlantic salmon)	9,205	-
8	9,190	*Crangonix pseudogracilis* (amphipod)	9,190	-
7	> 7,547	*Oncorhynchus mykiss* (rainbow trout)	> 7,547	-
		Oncorhynchus tshawytscha (chinook salmon)	> 884,95[1]	-
6	> 5,869	*Pimephales promelas* (fathead minnow)	> 5,869	10.64
5	**5,698**	***Tubifex***	**5,698**	**-**
4	**4,735**	***Daphnia magna* (cladoceran)**	**4,735**	**12.19**
3	**4,370**	***Asellus aquaticus* (isopod)**	**4,370**	**-**
2	3,600	*Salvelinus fontinalis* (brook trout)	3,600	-
1	> 2,604	*Ceriodaphnia dubia* (cladoceran)	> 2,164	0.959
		***Ceriodaphnia sp.* (cladoceran)**	**3,134**	**-**

[1] SMAV for chinook salmon excluded from GMAV. Rationale set forth in GEI report

Under the 1985 Guidelines, only the four GMAVs which have cumulative probabilities closest to 0.05 are selected for calculation of the FAV. When less than 59 GMAVs are available, these will always be the lowest four GMAVs (1985 Guidelines, p. 31). Of the additional studies cited by EPA for acute exposures, the only ones that are relevant to the calculated West Virginia criteria are those that could possibly affect the four lowest GMAVs; the inclusion or exclusion of other studies will only affect N.

To resolve this matter without engaging in an extended review of individual studies with EPA, DEP recalculated the acute criterion utilizing EPA's data decisions. The results are presented in the workbook entitled *DEP Response to USEPA Comments Aug 2015.xls* (Attachment F). DEP has adjusted the SMAV for *P. promelas* and *D. manga* based on EPA's data decisions. DEP has also included Kane and Rabeni (1987) and Shuhaimi-Othman (2011), and excluded the studies used by GEI but not by EPA for the species in bold (above). The recalculated acute criterion are discussed in the Criteria Calculation section below.

Chronic Criterion Data

While the EPA crosswalk table sets forth a number of chronic studies that are different between the GEI (2011) database and EPA's chronic database, it appears that only two studies can affect the chronic criterion calculation.[2] GEI considered ENSR (1992) for the aluminum hardness slope, but it was excluded from the chronic toxicity database. GEI utilized Biesinger and Christensen (1972) for D. magna, but this study was excluded by EPA.

DEP believes GEI's data decisions to be appropriate. GEI calculated its FACR as the geometric mean of the three available species mean acute-chronic ratios (ACRs). GEI followed the proper protocol by calculating the final ACR as the geometric mean of the ACRs. This is consistent with

[2] The remaining studies were conducted at a pH<6.5 and are therefore not applicable to the West Virginia chronic criterion, and/or do not report data that can be utilized to calculate a FACR.

EPA's calculation of the FACR in the 1988 criteria and is consistent with EPA's procedure set forth in Section VI.K of the 1985 Guidelines.

However, EPA states that the current EPA recommended ACR is 2. It appears EPA is referring to Section IV.K.4 of the 1985 Guidelines:

> If the most appropriate species mean acute-chronic ratios are less than 2.0, and especially if they are less than 1.0, acclimation has probably occurred during the chronic test. Because continuous exposure and acclimation cannot be assured to provide adequate protection in field situations, the Final Acute-Chronic Ratio should be assumed to be 2, so that the Final Chronic Value is equal to the Criterion Maximum Concentration (see Section XI.B)

While EPA's statement in this regard is unclear, EPA may be suggesting a FACR of 2, as the SMACR for *C. dubia* is less than 1. DEP believes GEI's approach to be the correct option under Section VI.K. The SMACR increases as the SMAV increases, so GEI utilized Section VI.K.1. Using FACR=2 makes the chronic criteria higher, not lower, and therefore less conservative. Likewise, if EPA's proposed FACR=2 is utilized, the inclusion or exclusion of studies into the chronic database becomes irrelevant.

Finally, EPA states that its current contractor recommendation is to lower the CCC to protect a commercially or recreationally important species. EPA did not identify the species that is the basis of the EPA contractor recommendation or how the criterion should be adjusted. Therefore, it is not possible for DEP to respond to this comment.

Criteria Calculation

EPA requested additional information on GEI's pooled slope calculation. This request may be associated with EPA's reference to the outdated 2010 GEI report, as the pooled slope has been corrected in the 2011 GEI report (GEI Consultants 2011).

For clarity, DEP has provided a workbook containing calculations relevant to the West Virginia aluminum criteria (Attachment F). The *GEI Pooled Slope Calculation* spreadsheet replicates the pooled slope calculation in GEI (2011). *The GEI Criteria (2011)* spreadsheet sets forth the calculation of the acute criterion in GEI (2011), and the spreadsheet entitled *DEP Criteria using Brook Trout* contains the revision of GEI's acute criterion to include brook trout.

The remaining tabs were prepared to incorporate EPA's recommendations regarding the West Virginia criteria calculations. In the spreadsheet entitled *EPA Comments - FACR*, DEP followed EPA's data recommendations for inclusion of the smallmouth bass study and exclusion of the studies identified in bold in the above table. The *D. magna* has been adjusted to remove Biesinger and Christensen (1972).[3] The primary effect on the acute criterion is due to the fact that the

[3] While excluded here, this study is important to the calculation of the pooled slope, which utilized D. magna. In using West Virginia's approach, it is also important to the FACR, as it is much lower than the FACR for D. magna in Kimball (manuscript), which

SMAVs are no longer as tightly grouped, and N has decreased from 18 to 14. This results in a slight decrease to the calculated acute criterion, but an increase to the chronic criterion. EPA's recommendations would yield a less stringent chronic criterion, which would be used for the calculation of effluent limitations. Therefore, DEP does not support EPA's database decisions or the use of FACR=2. The calculations in the fourth spreadsheet are presented for comparison purposes only.

Differences between experts on the inclusion and exclusion of individual studies in criteria calculations are common. EPA has not indicated that any of the decisions made in preparing the West Virginia criteria are clearly wrong. Overall the West Virginia database is robust, and includes as many species as possible. DEP asks that EPA review the West Virginia calculations in this regard and approve the criteria.

January 20, 2014 Letter from US EPA

In this correspondence, EPA cites only one new piece of information not addressed in the responses to previous communications from USFWS and EPA. EPA contends that Simon (2005, unpublished) demonstrates "significantly reduced" growth in mussels native to West Virginia at aluminum levels above 337 µg/L in circumneutral pH. This portion of the unpublished master's thesis has numerous technical issues and does not appear to support the conclusion cited by EPA.

First, Simon's conclusion that concentrations above 337 µg/L caused "significantly reduced" growth seems unfounded. Some of the control data appears to have been discarded, but this is not adequately described. The nearest concentration to 337 µg/L utilized in the test is 375 µg/L, and growth in this replicate (0.24±0.04 mm) is substantially greater than the growth reported for the control (0.13±0.10 mm). The highest mussel growth was reported at 1500 µg/L aluminum (0.27±0.04 mm), much higher than the 337 µg/L concentration alleged to have reduced growth.

The test results in Simon (2005) also fail to support a conclusion of "significantly reduced" growth at low aluminum concentrations. "Due to low control growth rates, a NOAEC and LOAEC were not possible to determine; however, after removing control data from the analysis, the LOAEC was 48,000 µg L-1 and 24,000 µg L-1 was the NOAEC" (Simon, p. 51) ("NOAEC" and "LOAEC" are defined as no- and lowest-observable-adverse-effects concentration, respectively). The report also indicates "no significant differences in growth among the lowest five test concentrations" up to 3000 µg/L aluminum. (*Id*.)

Likewise, Simon does not relate the toxicity of aluminum to hardness. The hardness of the test water and control water are not noted in the thesis and are anticipated to be constant in all test exposures. Therefore, the study is fundamentally irrelevant to a hardness-based criterion.

Finally, and perhaps most importantly, a study of the impacts of water column concentrations of aluminum on growth to juvenile mussels does not reliably reflect the exposure mechanism of

was discarded by GEI as an outlier. Biesinger and Christenson has been utilized in the calculation of hardness-based criteria by EPA in other jurisdictions and is valid for inclusion in the database.

immature mussels. Simon correctly notes that growth is more likely to be influenced by sediment and interstitial water (IW) concentrations of metals:

> The development of the juvenile mussel sediment/IW test is important in determining site toxicity because it focuses on the environment that they inhabit. Yeager et al. (1994) found that **juvenile mussels pedal-feed in the substrate, exposed mostly to the sediments and IW, with little exposure to the water column.**

(Simon, p. 13) (emphasis added).

March, 2016 Letter from US EPA

On March 17, 2016, EPA provided additional communication to the DEP regarding the proposed revisions to the aluminum water quality criteria. EPA's comments focused on two primary components: (1) the potential toxicity of aluminum to mussels; and (2) the potential relationship between aluminum toxicity and pH.

EPA's only guidance on the derivation of numeric water quality criteria is set forth in the 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (U.S. EPA 1985). West Virginia followed the 1985 Guidelines in preparing its revised aluminum criteria. None of EPA's comments on aluminum provided over the past several years have identified any failures by West Virginia to follow the requirements of the 1985 Guidelines. Instead, EPA has attempted to require DEP to deviate from 1985 Guidelines in the development of numeric criteria for aluminum.

If EPA believes the 1985 Guidelines are no longer applicable or sufficient, EPA must revise them accordingly so that States have the necessary information to prepare numeric criteria. Pursuant to 40 C.F.R. § 131.4(a), "States … are responsible for reviewing, establishing, and revising water quality standards." EPA may only provide recommended national criteria for consideration by States. EPA has not revised its recommended aluminum criteria since 1988. While EPA has stated its intention to revise the national recommended criteria for several years, no revisions have been published to date. EPA has allowed many States to maintain water quality standards with **no** aluminum criteria, and has allowed other States to adopt the same or similar aluminum criteria to those currently proposed by West Virginia. EPA has offered no credible reason why West Virginia should be evaluated differently than any other State regarding its water quality standards.

In developing the revised aluminum criteria, DEP carefully followed EPA's 1985 Guidelines. EPA repeatedly asked DEP to attempt to fill perceived voids in the available literature regarding aluminum toxicity despite having ample data under the 1985 Guidelines for development of numeric criteria. When DEP explained its data decisions and the reasons why certain studies were not appropriate for inclusion, EPA offered assertions of underprotection of endangered mussels without any peer-reviewed data for species native to the United States to support the assertion.

This approach continues in the March 17, 2016, communication. EPA has not identified any failure by West Virginia to comply with the requirements of the 1985 Guidelines. For the reasons set forth below, DEP continues to support its revised aluminum criteria, which have received Legislative approval and are now final regulations pending EPA approval.

Endangered Mussels

EPA asserts that USGS has completed a study on acute and chronic toxicity for the fatmucket (*Lampsilis siliquoidea*) mussel, and believes that DEP's criteria should consider this study despite its incompletion at the time West Virginia prepared its revised aluminum criteria. Notably, this study was not published or publicly available at the time EPA offered its most recent comment letter. EPA's March 17 letter to DEP states, "preliminary results for the acute aluminum tests for the fatmucket, *Lampsilis siliquoidea*, indicates an EC_{50} of >6,200 µg/l." Assuming the study is reliable, this indicates that aluminum is *not acutely toxic* to mussels. Instead, EPA focuses on a sublethal endpoint, decrease in dry weight. These results were both obtained at pH 6.0 in diluted well water.

DEP has substantial concerns with making decisions based on an unpublished manuscript which EPA did not provide to DEP for consideration. In addition, the pH of the study was below the range for which West Virginia proposes revised aluminum criteria. EPA alleges that the study results can be extrapolated across other pH ranges based on aquatic life studies in other genera, but this is inappropriate for a water quality characteristic such as pH, which is known to have chronic effects on mussels. DEP questions whether the mussels in the USGS study were adequately acclimated to a lower pH and hardness prior to toxicity testing to ensure that alleged aluminum toxicity was not aggravated by changes in these two parameters within a few days prior to commencing toxicity testing.

The availability and use of studies for calculating numeric criteria is discussed in detail in the 1985 Guidelines. The mussel studies that EPA continues to discuss are not appropriate for inclusion under the 1985 Guidelines. The USGS study is not available to the public and presumably has not completed the peer review process. DEP cannot determine whether the study is scientifically valid or applicable to West Virginia waters until it is available for detailed review. Regardless, even taken at face value, the study indicates that the revised aluminum criteria will not result in mussel mortality, as aluminum is not acutely toxic to mussels. Instead, it may result in a slight change in mussel body weight. As the study was done outside the pH range for the revised West Virginia criteria, it does not support EPA's allegation that the proposed hardness-based aluminum criteria are not fully protective.

Impact of pH

EPA contends that DEP should consider the impact of pH on aluminum toxicity. West Virginia has done this by limiting the pH range in which the hardness based criteria would apply. DEP believes this method is superior to EPA's method in that no criteria change is proposed at lower pH range where research has shown aluminum to have a greater toxicity to aquatic life.

DEP also believes this alleged pH effect is not unique to aluminum; rather, the toxicity of many elements may be affected by pH. This is the precise reason why pH criteria are imposed. If EPA believes that pH impacts must be considered through a multivariate statistical analysis, then EPA must revise the 1985 Guidelines to require States to take this into consideration. Likewise, EPA must take the lead and revise all its national recommended criteria that can be affected by pH accordingly. This cannot be imposed on West Virginia in a series of comments based on ongoing work by EPA that has not received public review or comment.

Conclusion

After three additional years since DEP originally proposed this criteria, EPA has not presented research that would indicate West Virginia's hardness-based aluminum criteria would not be fully protective of aquatic life. Instead, the proposed criteria are clearly more protective in the hardness range reported by the only published study alleging to evaluate hardness impacts on mussels. DEP looks forward to the publication of study results from the EPA-contracted study on aluminum toxicity in relation to North American mussels, but considering all of the latest scientific knowledge, DEP believes that the proposed criterion will be fully protective of all West Virginia aquatic life.

With regard to the additional studies evaluated by EPA, the chronic criterion (most important for setting effluent limitations) would become higher if EPA's data recommendations are followed. The data decisions made by West Virginia are appropriate and are protective of aquatic life.

EPA has stated that it intends to publish revised nationally recommended aluminum criteria that take into consideration the impacts of pH and hardness on aluminum criteria. Certainly, West Virginia will evaluate the nationally recommended aluminum criteria once they are published. However, EPA currently has no information available to West Virginia beyond the 1987 recommended criterion. In the meantime, hardness-based aluminum criteria have been approved in several States, including Colorado and New Mexico. West Virginia's hardness-based aluminum criteria are at least as protective as those approved by EPA in other States and are, indeed, infinitely more protective than the majority of states that have **no** aluminum criterion in water quality standards.

In conclusion, DEP respectfully requests EPA's approval of the following amended West Virginia aluminum aquatic life criterion in *Requirements Governing Water Quality Standards*, 47 C.S.R. 2 (shown below and in Section 3, Final Water Quality Standards Rule herein):

PARAMETER	B1, B4 (warmwater fisheries & wetlands)		B2 (trout waters)	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]
8.1 Dissolved Aluminum (ug/l) For water with pH <6.5 or >9.0	750xCF[5]	750xCF[5]	750xCF[5]	87xCF[5]
8.1.1 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the four-day average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+0.9121)} \times CF^5$		X		X
8.1.2 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the one-hour average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+1.8268)} \times CF^5$	X		X	

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[e] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 26 mg/l, even if the actual ambient hardness is less than 26 mg/l. The maximum hardness value for use in this equation shall not exceed 200 mg/l even if the actual hardness is greater than 200 mg/l.

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Selenium

While selenium is a naturally-occurring and essential micronutrient, it can become toxic to fish when it bioaccumulates in fish tissues. Because of the complexity of selenium toxicity, a more detailed approach to water quality standards is being recommended by U.S. EPA for this element, taking into consideration both water column concentrations and accumulation of selenium in fish muscular and reproductive tissues.

Bioaccumulation modeling shows that selenium accumulates in fish tissue due to dietary exposure, and selenium toxicity is primarily manifested as reproductive impairment due to maternal transfer. Research indicates that an appropriate approach to a selenium criterion is to use fish tissue and/or egg/ovary concentration to determine selenium toxicity in water. With this revised standard, when the existing four-day average (chronic) water column limit of 5 µg/l is exceeded, fish tissue and/or egg/ovary tissue concentrations may be assessed to make a final determination of exceedance. This approach is consistent with methods released in a recent EPA draft selenium criterion, which is expected to be released as a recommended nationwide criterion.

In preparation for the June 2015 submission of a selenium criterion for public comment, DEP primarily used *External peer review draft aquatic life ambient water quality criterion for selenium—freshwater* (EPA 2014 Draft), and *Updated Freshwater Aquatic Life Criteria for Selenium* (GEI Consultants 2015) However, DEP interpreted some of the available research differently than interpretations in EPA's 2014 Draft and GEI Consultants' data analysis. First, in a selenium study conducted on brown trout (Formation Environmental 2011), during which a tank overflow event killed a portion of study fish, DEP decided on the interpretation which concluded the same rate of deformity/death among fish that were subject to the overflow as fish remaining in the tanks, whereas EPA's 2014 Draft used the interpretation which assumed 100% of overflowed fish were deformed/dead. In addition, regarding a bluegill study which was used in EPA 2014 analysis, conducted by Hermanutz (1992), DEP decided to omit study data due to unexplained irregularities which resulted in fish tissue selenium concentrations in the 10 µg/L exposure group higher than in the 30 µg/L exposure group. In accordance with the EPA 2014 Draft, DEP also took into consideration the genus mean chronic values (GMCV) of 14 studies (referenced below), including invertebrates as well as fish species in this aquatic life criterion. Finally, DEP agreed that genus-specific median egg/ovary to whole-body conversion factors used in the EPA peer review draft (EPA 2014 Draft) were more appropriate than regression-based conversion factors which were used by GEI Consultants (2015).

On July 27, 2015, during the comment period on DEP's selenium criterion revision, EPA published revisions to its draft selenium criterion: *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater* (EPA 2015 Draft). This new draft interprets the Formation Environmental 2011 study similarly to DEP's interpretation, changing the GMCV for brown trout from 15.91 mg Se/kg dry weight Egg/ovary to 18.09, moving it from first to third most sensitive species. EPA's revised draft also added a white sturgeon study with a GMCV of 16.27, making

sturgeon the most selenium-sensitive species in the analysis. EPA also decided in its 2015 draft revision to use a geomean egg/ovary to whole-body conversion.

EPA Comment and Response

By letters dated July 30, 2015 and February 23, 2016, the EPA provided comments on West Virginia's revisions to 47CSR2, *Requirements Governing Water Quality Standards*. In this document, the DEP offers its responses to EPA's comments. DEP agrees with many of EPA's comments and has incorporated changes to DEP's proposed rule to reflect EPA's concerns. In other instances, DEP has provided additional information to respond to EPA's questions regarding DEP's rationale for its decisions.

EPA notes that West Virginia has not proposed a revision to its acute water quality criterion of 20 µg/L. DEP agrees with EPA that acute toxicity to selenium occurs at only very high levels, negating the need for an acute selenium criterion in the presence of a protective chronic criterion. Therefore, DEP has removed the acute criterion of 20 µg/L from its selenium criteria.

EPA encourages West Virginia to reconsider its chronic water quality criterion of 5 µg/L based on the EPA 2015 Draft. In this draft, EPA proposed two water column elements of 1.2µg/L for lentic waters, and 3.1µg/L for lotic waters. However, EPA's current national recommended chronic criterion for selenium remains 5µg/L, which was developed by EPA to protect bluegills, a recreationally important species. In addition, the chronic water column elements in EPA's proposed criteria are not developed based on the current EPA guidelines for developing water quality criteria, but instead are back-calculated from the body burden criteria using trophic transfer functions. EPA's new approach in the 2015 Draft constitutes a full departure from EPA's approach in its 2014 pre-draft selenium criteria. Furthermore, DEP is finishing up a two-year study on larval deformity rate in waters with elevated selenium compared to waters without selenium inputs. Preliminary results of this study show the 5ug/L water column concentration is protective of West Virginia aquatic life. Therefore, West Virginia believes the appropriate approach is to retain the nationally recommended water quality criterion of 5 µg/L for water column concentrations. Upon finalization of EPA's revisions to the national recommended selenium criteria, and completion of the West Virginia larval deformity rate study, DEP will reconsider the adoption of EPA's recommended water column criteria.

In regards to data analysis, the EPA 2015 Draft better reflects DEP's analysis of selenium research data. The 2015 draft revises EPA's interpretation of Formation Environmental brown trout study, adds an endangered species surrogate with the sturgeon study, and uses a geomean egg/ovary to whole-body conversion. Therefore, DEP has incorporated EPA's suggested concentration for fish whole-body and fish egg/ovary tissue into a selenium criterion for the Emergency Rule 47CSR2.

EPA also encourages West Virginia to adopt descriptive elements into its chronic selenium criteria to address fishless waters and waters with new or increased selenium inputs. While DEP agrees with EPA's approach to new discharges of selenium in waters previously unimpacted by selenium (new inputs), DEP believes additional inputs of selenium on already impacted waters (increased

inputs) should be handled differently. Specifically, when additional inputs are proposed on previously selenium-impacted waters, fish tissue concentrations should continue to take precedence over water column concentrations, as they reflect the bioaccumulation of selenium in those waters.

In regards to the EPA 2015 Draft descriptive element for fishless waters, EPA 2015 Draft defines fishless waters 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 (EPA 2015 Draft pg. xv).

EPA recommends that a water column concentration take precedence over fish tissue concentrations in fishless waters, but this approach is unreasonable for waters which are fishless due to insufficient flow or which have been extirpated for reasons unrelated to selenium. In these examples of fishless waters, basing selenium outputs on receiving water column selenium concentration could not result in the re-establishment of fish, because the cause of fishless water would not have been resolved. Rather, in the situations of insufficient flow or fish extirpation due to non-selenium related pollution, precedence should remain with fish tissue analysis downstream, where conditions do allow for fish populations. Because the "fishless waters" element better relates to implementation of the selenium criteria, DEP believes these decisions are best made on a case-by-case basis in National Pollution Discharge Elimination System (NPDES) permitting, rather than attempting to prescribe implementation aspects of the criterion in water quality standards.

DEP understands EPA's goal of ensuring that fish tissue concentrations do not increase above the chronic selenium criteria. However, a more detailed approach is appropriate in considering protective effluent limits for increased discharges and for fishless waters. The amount of water discharged, the location with respect to the nearest fish population, and the existing tissue and water column concentrations in the watershed may all influence the decisions made with regard to effluent limits for new or expanded selenium discharges. The goal is to ensure that water column concentrations do not increase above the level required to protect the segments where fish are or could be located.

EPA seeks clarification from DEP regarding its policy for implementation of selenium criteria in NPDES permitting, compliance and impairment determinations. In general terms, DEP will implement the criterion by using water column concentration as an indication of non-compliance, unless fish selenium data can be collected by the permitee from an appropriate selenium-enriched downstream water, in order to determine a specific bioaccumulation rate. While DEP anticipates a completed EPA criterion recommendation and implementation guidance in 2016, in the meantime, implementation of this revised selenium standard will be developed by DEP's Division of Water and Waste Management and Division of Mining and Reclamation's (DMR's) NPDES programs.

The permitting procedure will specify sufficient data requirements to determine an accurate selenium bioaccumulation rate. Moreover, DEP believes this revised selenium criterion is protective of aquatic life, that the criterion was developed with current and relevant research, and that it meets the requirements of Water Quality Standards: specifying the frequency, magnitude, and duration of selenium exposure to fully protect aquatic species.

Finally, in response to EPA's letter to DEP dated February 23, 2016 (Attachment C), additional changes were made to West Virginia's proposed selenium criterion. First, DEP made a correction to clarify that the new selenium criterion is based on instantaneous measurement, as opposed to four-day average concentration. In addition, West Virginia has adopted the EPA-proposed 11.3ug/g fish muscle (skinless, boneless filet), which may be used in lieu of the 8.0ug/g fish whole-body concentration. Like the whole-body element, the fish muscle element overrides any water column concentration, and is likewise overridden by any egg/ovary concentration.

In conclusion, DEP respectfully requests EPA's approval of the following amended West Virginia selenium aquatic life criterion in *Requirements Governing Water Quality Standards*, 47 C.S.R. 2 (shown below and in Section 3, Final Water Quality Standards Rule herein):

PARAMETER	B1, B4 (warmwater fisheries & wetlands)		B2 (trout waters)	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]
8.27 Selenium (ug/l) Water Column Concentration [f]	~~20~~	5	~~20~~	5
8.27.1 Selenium (ug/g) [g] (based on instantaneous measurement) 8.0 ug/g Fish Whole-Body Concentration or 11.3 ug/g Fish Muscle (skinless, boneless filet)Fish Whole-Body Concentration [g]		X		X
8.27.2 Selenium (ug/g) Fish Egg/Ovary Concentration [h] (based on instantaneous measurement)		15.8		15.8

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[f] Water column values take precedence over fish tissue values when new inputs of selenium occur in waters previously unimpacted by selenium, until equilibrium is reached between the water column and fish tissue.
[g] Overrides any water column concentration when water concentrations and either fish whole body or fish muscle (skinless, boneless filet) are measured, except in situations described in footnote [f]
[h] Overrides any fish whole-body, fish muscle (skinless, boneless filet), or water column concentration when fish egg/ovary concentrations are measured, except in situations described in footnote [f]

Selenium Criteria References

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Attachments to Scientific Justification

Attachment A - DEP letter to Henthorn Environmental, and the September 6, 2012 reply letter

Attachment B – USFWS letter dated July 19, 2013

Attachment C – EPA comments dated November 21, 2013, January 30, 2014, Feb 23, 2016 & March 17, 2016

Attachment D – Application for Stream Variance Martin Creek updated July 31, 2015

Attachment E – Application for Stream Variance Sandy Creek updated July 31, 2015

Attachment F, provided digitally – DEP Response to EPA Comments Aug 2015.xls (Excel workbook)

Entire document may be found on attached DVD

Attachment A - DEP letter to Henthorn Environmental, and the September 6, 2012 reply letter (starts next page)

west virginia department of environmental protection

Division of Water and Waste Management
601 57th Street, S.E.
Charleston, WV 25304
Telephone: (304) 926-0495 Fax: (304) 926-0463

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

August 2, 2012

Henthorn Environmental Services
517 Sixth Avenue
St. Albans, WV 25177

Re: Patriot Mining and Upshur Property Applications for Site-Specific Aluminum Criteria and Potential State Wide Criteria Change

Dear Mrs. Henthorn:

As a follow-up to our June 13th meeting, I want to summarize the issues that we discussed concerning the applications for site-specific aluminum criteria for Tenmile Creek and tributaries, unnamed tributary of Birds Creek, and Squires Creek and tributaries. At this time we have also had the opportunity to review the materials provided outlining a potential application that may be submitted concerning a state wide criteria change for aluminum, and while we do not consider this a formal application for a criteria change, we are able to provide feedback since both efforts are similar in nature. The following outlines our questions and concerns pertaining to the applications and potential criteria change:

1. pH
   It is known that pH has an impact on the concentration of toxic metal concentrations such as aluminum. Therefore, stream pH will need to be an important consideration and included in the determination of the site-specific and statewide aluminum criteria. A pH range that will limit the application of the new criteria will be necessary for this effort to move forward. This was the case for similar efforts in both New Mexico and Colorado.

2. Recalculation Procedure
   The GEI Consultants Report, "Updated Freshwater Aquatic Life Criteria for Aluminum" was included in the applications and the potential statewide criteria materials. This report presented an alternate dataset ("Recalculation Procedure") from the national dataset used to determine the national recommended aluminum criterion. Per previous communications, it was determined this alternate criterion was to apply to both warm and cold water streams. The Recalculation Procedure is intended to cause a site-specific criterion to appropriately differ from a national aquatic life criterion if justified by demonstrated pertinent toxicological differences between the aquatic species that occur at the site and those that were used in the derivation of the national criterion. Review of the alternate dataset shows removal of brook trout which the agency feels is inappropriate since this species is present in West Virginia cool water streams and was also used in the national dataset to determine the national recommended criterion. This removal could possibly be considered with warm water streams only, but that written request would need to be presented to the agency. We also have some questions concerning the inclusion of some non-resident species in the alternate dataset, most likely included to ensure the "Eight Family" rule is being achieved, and would like to further discuss the justification for inclusion.

3. Hardness
   There is concern with the lack of any guidance on appropriate hardness levels to be utilized in the hardness based equations outlined in the application for site specific criteria and the materials describing the state wide criteria application. At this time, we will include specific language that outlines appropriate natural hardness levels must be used vs. utilizing hardness levels from disturbed or impacted areas. We will review any language that may be submitted to address this concern and may potential utilize if these efforts were to move forward.

4. EPA Approval
   As discussed before, all additions, deletions, and revisions to the national dataset must receive prior approval by EPA.

If you believe further discussion is needed, the agency would be glad to convene a meeting. I can be contacted at (304) 926-0499 ext. 1110 or Kevin.R.Coyne@wv.gov.

Sincerely,

Kevin R Coyne
Assistant Director
Water Quality Standards Program
Division of Water and Waste Management

HENTHORN
Environmental Services
www.henthornenv.com · 517 Sixth Avenue · St. Albans, WV 25177 · (304) 727-1445

September 6, 2012

Kevin Coyne, Assistant Director
Water Quality Standards Program
WV Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Re: Applications for Site-Specific Aluminum Criteria and Potential State-Wide Aluminum Criteria Change

Dear Mr. Coyne:

This letter is in response to your correspondence dated August 2, 2012, regarding the above-referenced application. The DEP letter identifies four questions or concerns with the pending applications. This letter responds to each of the issues set forth in your correspondence. Because the applications for site-specific criteria and the state-wide criteria have the same basis, no differention is made between the applications in this response.

1. **pH** - The first section of the letter addresses literature regarding the effect of pH on the toxicity of certain metals, such as aluminum. The DEP letter indicates that the stream pH will need to be considered in the setting of hardness-based aluminum criteria, noting that similar efforts were made in both New Mexico and Colorado. As you are aware, West Virginia already has water quality criteria for pH, and therefore any stream with a pH outside the range of 6.0 to 9.0 would be considered impaired for this parameter. In the New Mexico effort, an additional limitation was placed for applicability of the hardness-based aluminum formula to a pH above 6.5. As the West Virginia and New Mexico criteria are based on similar work by GEI Consultants, Inc. ("GEI"), this appears to be an appropriate strategy in West Virginia.

2. **Recalculation Procedure** – In your letter, the GEI study is referred to as an application based upon the Recalculation Procedure. However, this is not correct. While GEI has indeed recalculated the aluminum criteria, this is based upon a full update of the ambient aquatic life criteria for aluminum derived according to *EPA's Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses* (EPA 1985). The Recalculation Procedure is a different process often used in applications for site-specific criteria. Therefore, the decision to exclude brook trout in the GEI study is not based upon "demonstrated pertinent toxicological differences between the aquatic species that occur at the site and those that were used in the derivation of the national criterion," as suggested in the DEP letter.

   Both the GEI study and previous electronic communications have explained the reason for the exclusion of brook trout in the calculation of the proposed aluminum criteria. As

correctly noted in your correspondence, GEI has not included the brook trout study by Decker and Menendez (1974) in the calculation of the final acute value ("FAV") in Table 3 of the GEI report. This is discussed in Section 5.3.1 of the GEI report (p. 15), where GEI states, "...water hardness was not reported in this study ... and so could not be included in the FAV derivation." The lack of hardness data was not an issue in the 1988 criteria calculations, because that FAV was not used for a hardness-dependent criterion. Therefore, the Decker and Menendez study was included in EPA's 1988 criteria calculations.

To further assess this issue, GEI recently evaluated whether the Decker and Menendez study would have affected the FAV, and therefore the final criteria, if it technically could have been included in the FAV calculation. In its evaluation, GEI assumed that the hardness for the Decker and Menendez study was 50 mg/l. This is a very conservative assumption considering the low hardness concentrations in the other reported brook trout studies. With this assumption, GEI performed a recalculation of the FAV and the resultant criteria.

The Decker and Menendez study reported an LC_{50} of 3600 mg/l, which would make it the second most sensitive species if it is included in the calculation of the FAV. The results of the analysis are presented in the following table. The top rows are the equations in the GEI study, and the bottom two rows set forth the new equations if the Decker and Menendez brook trout study is included.

Metal	Equation/Criterion		Hardness										
			25	30	40	50	60	70	80	90	100	200	220
Aluminum	Ac	$= e^{(1.3695\,[\ln(\text{hardness})] + 1.8308)}$	512	658	975	1,324	1,699	2,099	2,520	2,961	3,421	8,838	10,071
	Ch	$= e^{(1.3695\,[\ln(\text{hardness})] + 0.9161)}$	205	263	391	530	681	841	1,010	1,186	1,370	3,541	4,035
Aluminum	Ac	$= e^{(1.3695\,[\ln(\text{hardness})] + 1.8268)}$	510	655	971	1,319	1,693	2,090	2,510	2,949	3,407	8,803	10,030
	Ch	$= e^{(1.3695\,[\ln(\text{hardness})] + 0.9121)}$	204	262	389	528	678	837	1,006	1,182	1,365	3,527	4,019

As set forth in the table, the inclusion of the Decker and Menendez study, with a conservative assumption on hardness, barely changes the hardness-based equations for aluminum and the numbers that would be calculated at various hardness values. It is likely that the Decker and Menendez study was based upon a lower hardness than the assumed concentration of 50 mg/l. If this is true, applying the hardness slope to a lower hardness would increase the SMAV, which might remove brook trout from the bottom four GMAVs altogether.

This work, along with the discussion in the GEI study (p. 15), addresses the rationale and effect of brook trout study on the criteria. It also justifies the decision not to include the Decker and Menendez study in the FAV calculation, since no hardness value was reported.

3. **Hardness** – The DEP letter expresses concern regarding the lack of any guidance on appropriate hardness levels to be utilized in the proposed aluminum hardness-based equations. The DEP letter proposes that the criteria include specific language which states that appropriate natural hardness levels must be used, versus hardness levels from disturbed or impacted areas.

   West Virginia has adopted hardness-based criteria for numerous metals. These criteria have been successfully implemented by DEP for many years. DEP has a long history of utilizing the average hardness based upon actual stream measurements in calculating hardness-based criteria for West Virginia waters. DEP has utilized this procedure to evaluate waters for impairment and to set effluent limitations in NPDES permits. If the hardness of a stream changes over time, then the calculation would be revised accordingly. DEP has offered no explanation or rationale for a need to change this established methodology or any potential benefit for attempting to determine whether the hardness levels have changed due to anthropogenic activities.

   Moreover, the methodology provides additional protection in cases where the hardness of a stream, without anthropogenic effects, would be higher than the current hardness of the water body. If one were to utilize a historic hardness level that is higher than the current hardness level, then the calculated criterion would be artificially high and may result in harm to aquatic life. The use of a hardness that is representative of current stream conditions is necessary and appropriate.

4. **EPA Approval** – The letter notes that the proposed revisions to the national dataset must receive prior approval by EPA. As set forth previously herein, the proposed revisions to the aluminum criteria are not based upon the Recalculation Procedure. No species have been added or removed based upon their presence of absence in West Virginia. As set forth in the GEI study, "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."

   Moreover, the West Virginia and New Mexico criteria are based on similar work by GEI. EPA already has reviewed the dataset in the context of its review and approval of the New Mexico criteria. Regardless, under the Alaska Rule, EPA must review and approve the proposed aluminum criteria prior to their implementation in West Virginia. Therefore, EPA will review the GEI study as part of its consideration of the proposed criteria.

I trust that this response will allow the applications to proceed forward for further consideration by the Water Quality Standards Program. If you have any questions or would like to discuss this response, please do not hesitate to contact me.

Sincerely,

Jennie L Henthorn

Jennie L. Henthorn

Attachment B – USFWS letter dated July 19, 2013

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.

Aluminum at 500 µg/L at neutral pH for15 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 (pH4-5) 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 of at (304) 234-0238 or at the letterhead address.

Sincerely,

Barbara Douglas
for

John E. Schmidt
Field Supervisor

Literature Cited

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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 spinymussel (*Pleurobema collina*), northern riffleshell (*Epioblasma torulosa rangiana*), pink mucket pearlymussel (*Lampsilis abrupta*), rayed bean (*Villosa fabilis*), sheepnose (*Plethobasus cyphyus*), snuffbox (*Epioblasma triquetra*), spectaclecase (*Cumberlandia monodonta*), and tubercled-blossum pearlymussel (*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 spinymussel.

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 pearlymussel, 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.

9. Hughes River: Ritchie and Wirt Counties, including the lower one-half mile reach of its tributary Goose Creek: Snuffbox.

10. Kanawha River: Fayette, Kanawha, Mason, and Putnam Counties: Fanshell, pink mucket pearlymussel, sheepnose, spectaclecase, and tubercled-blossum pearlymussel.

11. Leading Creek: Gilmer and Lewis Counties, including the lower one-half mile reach of its tributary Fink Creek: Snuffbox.

12. Little Kanawha River: Braxton, Calhoun, Gilmer, Wirt, and Wood Counties, including the lower one-half mile reaches of its tributaries Leading Creek (Calhoun County., different stream than 5.d. above), Pine Creek, Sand Fork, Slate Creek, Straight Creek, Tanner Creek, Tucker Creek, and Walker Creek: Snuffbox.

13. Marsh Fork River including Dingess Branch and Millers Camp Branch and associated palustrine emergent and scrub-shrub wetlands: Raleigh County: Virginia spiraea.

14. McElroy Creek: Doddridge and Tyler Counties: Snuffbox.

15. Meadow River: Fayette, Greenbrier, and Nicholas Counties: Virginia spiraea.

16. Meathouse Fork of Middle Island Creek: Doddridge County, including the lower one-half mile reach of its tributary Toms Fork: Clubshell and snuffbox.

17. Middle Island Creek: Doddridge, Pleasants, and Tyler Counties, including the lower one-half mile reaches of its tributaries Arnold Creek, Bluestone Creek, Buckeye Creek, Indian Creek, McKim Creek, Point Pleasant Creek, and Sancho Creek: Clubshell, rayed bean, and snuffbox.

18. New River (Lower): Fayette County (Route 19 to Gauley Bridge): Virginia spiraea.

19. North Fork Hughes River: Ritchie and Wirt Counties, including the lower one-half mile reaches of its tributaries Addis Run, Bonds Creek, Devilhole Creek, and Gillespie Run: Snuffbox.

20. Ohio River: Cabell, Jackson, Mason Pleasants, Tyler, Wetzel, and Wood Counties: Fanshell, pink mucket pearlymussel, sheepnose, and snuffbox.

21. Potts Creek and South Fork of Potts Creek: Monroe County: James spinymussel.

22. Reedy Creek: Roane and Wirt Counties: Snuffbox.

23. South Fork Hughes River: Doddridge, Ritchie, and Wirt Counties, including the lower one-half mile reaches of its tributaries Bone Creek, Indian Creek, Leatherbark Creek, Otterslide Creek, Slab Creek, and Spruce Creek: Clubshell and snuffbox.

24. Spring Creek: Roane and Wirt Counties: Snuffbox.

25. Steer Creek: Calhoun and Gilmer Counties: Snuffbox.

26. Sugar Creek: Pleasants County: Snuffbox.

27. West Fork Little Kanawha River: Calhoun, Roane, and Wirt Counties: Snuffbox.

U.S. Army Corps of Engineers Pittsburgh District

28. Back Creek: Berkeley County: Harperella.

29. Cacapon River: Morgan County: Harperella.

30. Dunkard Creek: Monongalia County: Snuffbox.

31. Fish Creek: Marshall County: Snuffbox.

32. Fishing Creek: Wetzel County: Snuffbox. Note – the mouth of Fishing Creek at the Ohio River is regulated by the Huntington District.

33. Hackers Creek (of the West Fork River): Harrison and Lewis Counties: Clubshell and snuffbox.

34. Potomac River: Morgan County (from the mouth of the Cacapon River to the mouth of Sleepy Creek): Harperella.

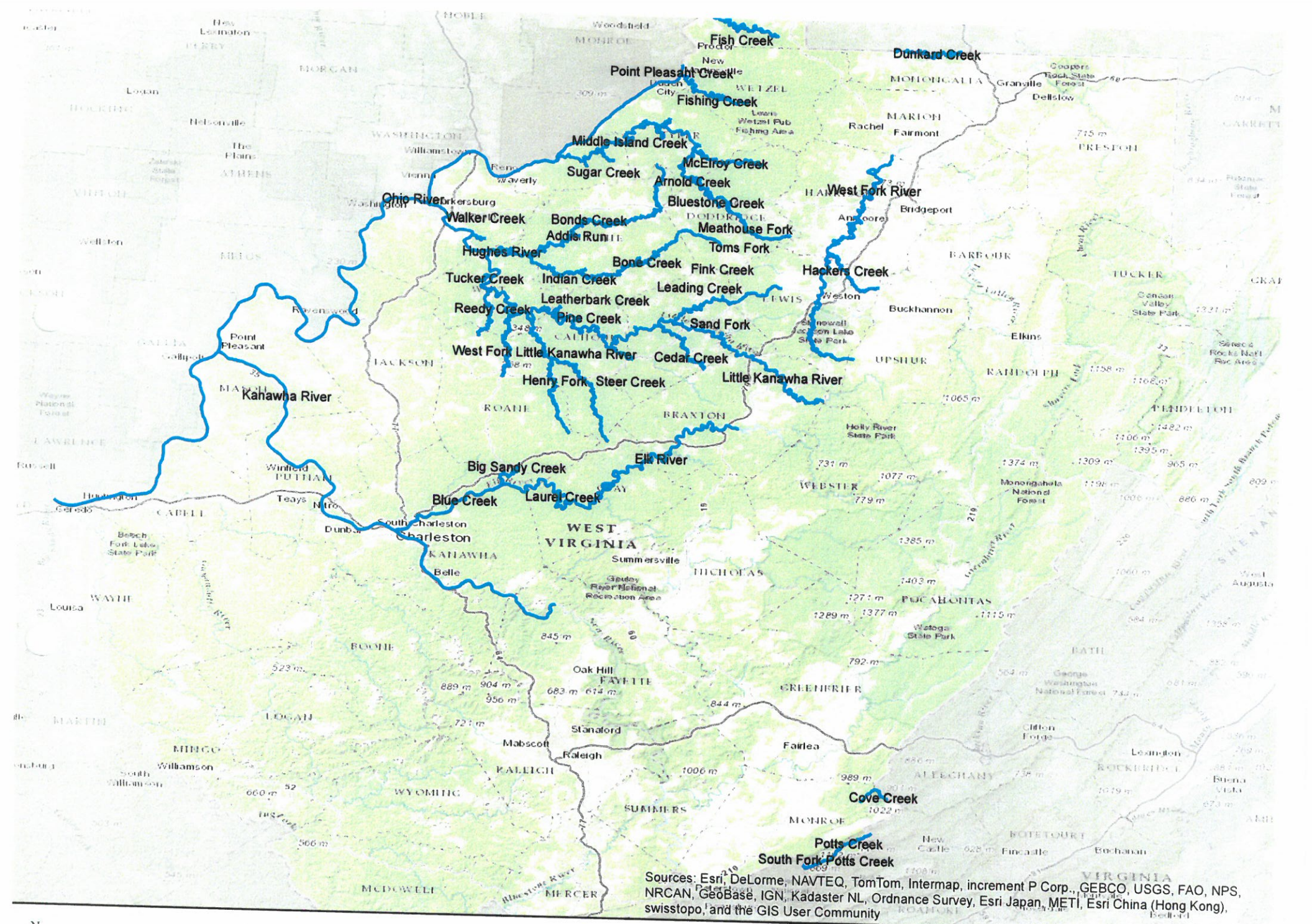
35. Sleepy Creek: Morgan County: Harperella.

36. West Fork River: Harrison, Lewis, and Marion Counties: Snuffbox.

37. Streams, springs, and wetlands connected to the groundwater system including caves, areas near sinkholes, and other groundwater/surface interfaces, from the Potomac River west to Opequon Creek, especially in the Rippon and Leetown Areas, and the Evitts Run Watershed: Jefferson and Berkeley Counties: Madison Cave isopod.

38. Wetlands: Berkeley and Hardy Counties: Northeastern bulrush.

Please also note that freshwater mussels which are not federally listed are protected and managed by the State of West Virginia, Division of Natural Resources (WVDNR). Non-listed freshwater mussels may occur in the streams listed above as well as additional streams throughout the State. For information on the distribution of freshwater mussel species and their protections contact the WVDNR at (304) 637-0245.


Fish Creek
Dunkard Creek
Point Pleasant Creek
Fishing Creek
Middle Island Creek
McElroy Creek
Sugar Creek
Arnold Creek
West Fork River
Ohio River
Bluestone Creek
Walker Creek
Bonds Creek
Meathouse Fork
Addis Run
Toms Fork
Hughes River
Bone Creek
Fink Creek
Hackers Creek
Tucker Creek
Indian Creek
Leading Creek
Leatherbark Creek
Reedy Creek
Pine Creek
Sand Fork
West Fork Little Kanawha River
Cedar Creek
Little Kanawha River
Henry Fork
Steer Creek
Kanawha River
Elk River
Big Sandy Creek
Laurel Creek
Blue Creek
Cove Creek
Potts Creek
South Fork Potts Creek
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
N
Federally Listed Mussel Streams
0 10 20 40 Miles

Attachment C – EPA Comment Letters

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

Additional studies EPA is considering beyond those included in the WV analysi (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 reticulate* 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 dolomieui*)
Jung and Jagoe 1995 (*Hylas 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 geomean 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 Al 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 *Ceriodaphinia 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 dolomieui*). 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.

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. Pynnönen (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

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.

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

FEB 2 3 2016

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

Dear Mr. Mandirola:

The purpose of this letter is to provide the U.S. Environmental Protection Agency (EPA) views on the statewide aluminum and selenium water quality criteria that the West Virginia Legislature will be considering during the 2016 legislative session. As you know, EPA is in the process of revising the existing Clean Water Act Section 304(a) criteria recommendations for both aluminum and selenium. EPA's revised criteria will reflect consideration of the latest scientific information on toxicity of these parameters. EPA encourages West Virginia Department of Environmental Protection (WVDEP) to consider the draft aquatic life ambient water quality criterion for selenium which EPA published in July 2015, and the latest aluminum toxicity research in order to ensure that West Virginia's criteria are based on sound scientific rationale and that the criteria are protective of aquatic life.

Our comments are on West Virginia's selenium and aluminum criteria adopted by Emergency Rule, as amended September 21, 2015, as we understand these are the values the State Legislature will be considering. Understanding that both WVDEP and EPA are still engaged in discussions, EPA has the following comments on these provisions:

Aluminum

The West Virginia Emergency Rule modified the aluminum criteria for the protection of aquatic life to a hardness-based equation to be applied at certain pH and hardness levels. At pH values outside the 6.5 to 9, and hardness levels outside of 26 mg/L to 200 mg/L, the criteria that was in place before the Emergency Rule would continue to apply.

With the exception of a slight modification of the applicable hardness range, West Virginia's Emergency Rule 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. EPA reiterated these comments in our July 30, 2015 letter on the proposed revisions to 47CSR2—Requirements Governing Water Quality Standards as proposed in the West Virginia State Register on June 18, 2015.

EPA's main concerns remain the same: WVDEP must justify how the proposed criteria are protective of mussels in West Virginia, as well as appropriately take into consideration potential pH and hardness effects on aluminum toxicity.

Regarding the level of protection that West Virginia's aluminum criteria provides for mussels in West Virginia's waters, we acknowledge WVDEP's concerns with using the Kadar, et. al. 2001 and Pynnönen 1990 studies cited by the USFWS (i.e., both studies were for sub-lethal effects and used species not present in North America). Although those studies will not be used in EPA's anticipated revision of the 304(a) recommended aquatic life criteria for aluminum, they do provide lines of evidence that indicate that more data are necessary to ensure that freshwater mussels are protected in West Virginia waters.

EPA's review of the 304(a) recommended aluminum criteria provided us with the opportunity to contract for a toxicity study to determine the sensitivity of freshwater mussels to aluminum. This study has been completed and is currently being reviewed for quality. Once EPA's review of the study data is complete, EPA will provide the results of the study to WVDEP. EPA anticipates the results of the study will be used in revising the 304(a) recommendation. Until the results of this study are available, it will be difficult for EPA to meet its obligations under the Endangered Species Act (ESA) to find that our approval of West Virginia's aluminum water quality criteria will not adversely affect federally listed threatened and endangered species in the State, most notably threatened and endangered mussels.

EPA also continues to be concerned that WVDEP is not addressing the effect of pH on the toxicity of aluminum. Several additional studies published since WV calculated its revised criteria identify pH as the driving parameter in aluminum toxicity. WV's revised criteria only apply to waters that fall within the 6.5 to 9 pH range. However, WV should consider available data that would allow the state to set water quality criteria for the protection of aquatic life at all pH levels.

Regarding hardness, EPA recommends WVDEP remove the hardness cap of 25 mg/l to 200 mg/l for aluminum. Available data on hardness levels in Ecoregions 67, 69 and 70 that are found in West Virginia indicates hardness levels below 25 mg/l. As with pH, data are available to WVDEP that would allow the state to set water quality criteria for the protection of aquatic life at all hardness levels.

Finally, EPA recommends WVDEP adopt aluminum criteria as a measure of total recoverable aluminum rather than dissolved aluminum. Total recoverable aluminum is more conservative because it includes monomeric (both organic and inorganic) forms, polymeric and colloidal forms, as well as particulate forms and aluminum sorbed to clays. EPA's revised 304(a) aluminum criteria recommendation will be expressed as total recoverable aluminum in the water column.

EPA has provided WVDEP with references for all the data EPA is using in its revision of its aquatic life aluminum criteria recommendation. EPA will also make the results of the recently completed mussel toxicity study available in the near future. EPA recommends that WVDEP review the information EPA has provided and develop a criterion that is protective of all aquatic species at all conditions in West Virginia surface waters. WVDEP could also consider EPA's proposed aluminum criterion, which is scheduled to be proposed in August 2016.

Selenium

West Virginia made a number of revisions to the Emergency Rule selenium criteria as a result of EPA's July 30, 2015 comments on 47CSR2—Requirements Governing Water Quality Standards as proposed in the West Virginia State Register on June 18, 2015. Our comments were primarily based on EPA's draft freshwater selenium criterion, which we published for comment on July 27, 2015 in the Federal Register (80 FR 44350). In its July 27, 2015 draft, EPA retains the paradigm it first presented in the agency's May 2014 peer review public draft (79 FR 27601), of a criterion with four elements: two fish tissue-based and two water column-based. EPA's draft selenium criterion document states "EPA recommends that states…adopt into water quality standards a selenium criterion that includes all four elements, and express the four elements as a single criterion composed of multiple parts, in a manner that explicitly affirms the primacy of the whole-body or muscle elements over the water column element, and the egg-ovary element over any other element. The magnitude of the fish egg-ovary element is derived from analysis of the available toxicity data. The magnitudes of the fish whole-body element and fish muscle elements are derived from the egg-ovary element coupled with data on concentration ratios among tissues. The magnitudes of the water column elements are derived from the egg-ovary elements coupled with bioaccumulation considerations. Inclusion of the fish whole-body or fish muscle element in the selenium criterion ensures the protection of aquatic life when fish egg or ovary tissue measurements are not available. Inclusion of the water column elements in the selenium criterion ensures protection when neither fish egg-ovary, fish whole-body or muscle tissue measurements are available, and provides consistent coverage for all waters."

EPA commends WVDEP for adopting two fish tissue-based elements consistent with EPA's draft selenium criterion (i.e., 8.0 µg/g for fish whole-body concentrations, 15.8 µg/g for fish egg/ovary concentrations). EPA's draft selenium criterion recommendation includes fish tissue-based elements in recognition of the fact that selenium is bioaccumulative, and toxicity to aquatic life is primarily driven by dietary (chronic) exposure. In light of that fact, EPA no longer recommends an acute criterion, as acute toxicity associated with selenium occurs only at very

high levels, making an acute criterion unnecessary when a protective chronic criterion is in place. WVDEP agreed with that recommendation and deleted its acute water column-based aquatic life selenium criterion of 20 µg/L. However, there are a number of revisions to WV's selenium criteria that need to be considered in order for the criteria to be fully protective of aquatic life in WV surface waters and consistent with EPA's recommendation.

The fish tissue-based elements WV has adopted are consistent with EPA's proposed 304(a) recommendations. However, EPA notes that footnote 2 for 47CSR2, Appendix E, Table 1 indicates that the duration and frequency chronic criterion in WV is a four-day average concentration not to be exceeded more than once every three years, unless otherwise noted. Fish tissue samples integrate selenium bioaccumulation over time. As indicated in EPA's July 2015 draft selenium criteria recommendation, in order to protect the designated aquatic life use and be consistent with EPA's draft 304(a) recommendation, selenium criterion fish tissue elements should be instantaneous measurements that are never to be exceeded. EPA also recommends that WVDEP consider adopting the muscle tissue criterion element consistent with EPA's draft recommended value of 11.3 mg/kg.

WVDEP is not revising the chronic selenium water column element of its criterion (5 µg/l). EPA again 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 recommended 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 account for the difference in bioaccumulation between waters with long residence times such as lakes, ponds, reservoirs, or wetlands, versus those with shorter residence times such as rivers and streams. As noted above, EPA's recommended water column elements are derived from the egg-ovary element coupled with bioaccumulation considerations and are intended to be protective absent fish egg-ovary or fish whole-body data. WVDEP has provided no data to indicate that 5 µg/l water column concentration is protective of the egg-ovary element or that the same level of protection is appropriate for both lentic and lotic waters in the state. In order to be fully protective, EPA strongly recommends that WVDEP revise its water column criterion to be consistent with EPA's water column element. EPA also recommends that WVDEP adopt EPA's intermittent exposure selenium criterion element. The intermittent exposure element will assure that the contribution of short-term exposures to the bioaccumulation risk is accounted for in all situations. Application of the intermittent exposure element of the selenium criterion to single day, high exposure events will provide protection from reproductive toxicity by protecting against selenium bioaccumulation in aquatic ecosystems resulting from short-term, high exposure events.

Thank you for this opportunity to provide comments on West Virginia's water quality criteria for selenium and aluminum. Please note that these comments only reflect EPA's position. EPA has an obligation under the ESA to consult with the USFWS to ensure that our federal action will not adversely impact threatened and endangered species in West Virginia and they may have additional concerns. If you have any questions concerning this letter, contact me at (215)814-5717, or Denise Hakowski at (215)814-5726.

Sincerely,

Evelyn S. MacKnight

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

cc: Laura Cooper (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.

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

MAR 17 2016

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

Dear Mr. Mandirola:

In a letter dated February 23, 2016, the U.S. Environmental Protection Agency (EPA) provided its views on the statewide aluminum water quality criteria that the West Virginia Legislature would be considering during the 2016 legislative sessions. As indicated in that letter, our main concerns are ensuring that West Virginia's aluminum criteria are protective of freshwater mussels in the State as well as appropriately taking into consideration potential pH and hardness effects on aluminum toxicity. We also indicated that we were reviewing a toxicity study which EPA commissioned that determined the sensitivity of freshwater mussels to aluminum. The purpose of this letter is to provide West Virginia with additional information regarding the toxicity of aluminum to freshwater mussel species, discuss how the results of that study will likely impact EPA's revised chronic aluminum criterion, and discuss the importance of the effect of pH on aluminum toxicity.

The objective of the aluminum toxicity tests with mussels that EPA commissioned was to evaluate acute and chronic toxicity of aluminum to a unionid mussel (fatmucket, *Lampsilis siliquoidea*) at pH 6.0 in diluted well water (hardness 100 mg/L as $CaCO_3$). USGS conducted these toxicity studies in accordance with ASTM International Standard Methods (ASTM 2015a, b, c) and with the USEPA method (USEPA 2000). The acute exposures with mussels were conducted for 4 days. The chronic exposures with mussels were conducted for 28 days and the endpoints were survival, dry weight, and biomass. The mussel toxicity tests were reviewed and determined to be acceptable studies and following external peer review will be used in the derivation of the upcoming EPA proposed revision to the national aluminum aquatic life criteria.

The preliminary results for the acute aluminum tests for the fatmucket, *Lampsilis siliquoidea*, indicates an EC50 of >6,200 µg/L aluminum. However, for the chronic toxicity studies, the results are very much in line with the reported results from Kadar et al. (2001) with effects at 250 µg/L and 500 µg/L aluminum and Simon (2005) who saw effects at 337 µg/L aluminum.

In the current USGS chronic toxicity test of aluminum to a unionid mussel (fatmucket, *Lampsilis siliquoidea*), mean dry weight was significantly reduced for mussels. **Based on measured concentrations, at pH 6.0, the LOEC for dry weight was 203 µg/L for mussels. The EC20 based on dry weight was 163 µg/L for mussels.** For the mussel, the EC20s for biomass were slightly (<4%) greater than the EC20s for dry weight. There were no significant differences in mean survival between the control and any treatment for the mussel.

For information on what toxicity studies EPA is considering in its calculation of a revised chronic aluminum criterion, we would refer WVDEP to "Appendix C: Acceptable Chronic Toxicity Data of Aluminum to Freshwater Aquatic Animals" which EPA forwarded to WVDEP in a December 23, 2015 email (and that we are including with this letter as an enclosure). The chronic mussel (*L. siliquoidea*) toxicity data from the USGS will likely be the fourth most sensitive species in the species sensitivity distribution in the upcoming EPA proposed revised national aluminum aquatic life criteria. Although the chronic mussel (*L. siliquoidea*) toxicity test was conducted at pH 6, the results are transferrable to other pH ranges if pH and hardness are considered via regression equations used in the aluminum criteria approach (see below).

For West Virginia's criteria to be scientifically sound and protective of the aquatic life designated use, WVDEP must address mussel sensitivity to aluminum appropriately. The U.S. Fish and Wildlife Service (USFWS) provided comments on July 19, 2013 on West Virginia's proposed revisions to the aluminum criteria in 47CSR2 "Requirements Governing Water Quality Standards". USFWS expressed concerns regarding aluminum toxicity to mussel species, including federally-listed endangered mussels, in West Virginia and cited two studies on impacts to mussels exposed to aluminum. EPA asked West Virginia to consider the concerns raised by USFWS in their July 29, 2013 letter, particularly since West Virginia has a high diversity of mussel species, with 62 mussel species present throughout the state, including 10 federally listed species. If WV does not consider mussel sensitivity in its aluminum criteria, the USFWS will likely identify lack of protection of endangered mussels as an issue during their evaluation of protectiveness of this criteria.

Finally, EPA notes that several additional studies published since WV calculated its revised criteria identify pH as a driving parameter in aluminum toxicity. Currently, EPA is evaluating different approaches for the proposed revision to the national aluminum aquatic life criteria. All of the approaches take into account the effects of pH and hardness on aluminum bioavailability. Because EPA now has additional studies with a wide scale of pH and hardness values (these studies were shared with WV on 12/23/15), multilinear regression equations can be developed that derive aluminum values across a range of pH and hardness values. Table 1 shows results for acute values across the pH range of 5.0-9.0 and hardness range of 25-400. Table 2 shows results for chronic values across the pH range of 5.0-9.0 and hardness range of 25-400. These results include the mussel studies. Table 3 shows results using WV's proposed standard.

At a hardness of 100, WV's acute standard for aluminum would be 3407 µg/L for pH $\geq$ 6.5 and $\leq$ 9.0 compared to the EPA aluminum values calculated through linear regression which range from 253 µg/L at pH 6.5 to 1278 µg/L at pH 9. At a hardness of 100, WV's chronic standard for aluminum would be 1365 µg/L for pH $\geq$ 6.5 and $\leq$ 9.0 compared to EPA aluminum values ranging from 145 µg/L at pH 6.5 to 730 µg/L at pH 9. This is one approach that EPA is considering to evaluate aluminum toxicity that includes pH and hardness effects and included mussel toxicity test results. WV should consider available data that would allow the state to set water quality criteria for the protection of aquatic life at all pH levels and protect endangered mussels.

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. Given the preliminary results of the USGS study, more recent data that WV has not yet considered and the importance of considering pH's effect on aluminum toxicity, EPA urges WV clearly describe how the state's criteria are protective of aquatic life and appropriately consider mussel sensitivity to aluminum.

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.

Sincerely,

Evelyn S. MacKnight

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

Enclosure

Table 1. Example Calculations for the CMC Acute Aluminum Values considering pH and hardness as modifying factors of toxicity.

Hardness	pH 5.0	pH 5.5	pH 6.0	pH 6.5	pH 7.0	pH 7.5	pH 8.0	pH 8.5	pH 9.0
25	69	95	132	182	251	348	480	664	918
50	81	112	155	215	297	410	567	784	1,083
100	96	133	183	253	**350**	484	669	924	1,278
200	113	156	216	299	413	571	789	1,091	1,508
300	125	172	238	329	455	629	869	1,201	1,661
400	133	184	255	352	487	673	931	1,287	1,779

Table 2. Example Calculations for the CCC Chronic Aluminum Values considering pH and hardness as modifying factors of toxicity.

Hardness	pH 5.0	pH 5.5	pH 6.0	pH 6.5	pH 7.0	pH 7.5	pH 8.0	pH 8.5	pH 9.0
25	39	54	75	104	144	199	275	380	525
50	46	64	89	123	170	234	324	448	619
100	55	76	105	145	**200**	276	382	528	730
200	65	89	123	171	236	326	451	623	861
300	71	98	136	188	260	359	497	686	949
400	76	105	146	201	278	385	532	735	1,016

Table 3. Values using the WV 2016 Proposed Dissolved Aluminum Standard Equations

	WV 2016 Proposed Dissolved Aluminum Standard	
	Acute	**Chronic**
Hardness (mg/L)	e(1.3695[ln(hardness)]+1.8268)	e(1.3695[ln(hardness)]+0.9121)
<25	750	750, 87 (trout waters)
25	510	204
50	1319	528
75	2298	920
100	**3407**	**1365**
150	5936	2378
200	8803	3572
>200	750	750, 87 (trout waters)

References

ASTM International. 2015a. Standard guide for conducting laboratory toxicity tests with freshwater mussels (ASTM E2455-06 (2013)). *Annual Book of ASTM Standards* Volume 11.06. West Conshohocken, PA.

ASTM International. 2015b. ASTM International standard guide for conducting acute toxicity tests with fishes, macroinvertebrates, and amphibians (E729-96 (2014)). Annual Book of ASTM International Standards Volume 11.06, ASTM International, West Conshohocken, PA.

ASTM International. 2015c. Standard test method for measuring the toxicity of sediment-associated contaminants with freshwater invertebrates (E1706-05 (2010)). *Annual Book of ASTM Standards*, Volume 11.06, West Conshohocken, PA.

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.

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.

U.S. Environmental Protection Agency. 2000. Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, second edition. EPA 600/R-99/064, Duluth, MN and Washington, DC.

Appendix C. Acceptable Chronic Toxicity Data of Aluminum to Freshwater Aquatic Animals

Appendix C. Acceptable Chronic Toxicity Data of Aluminum to Freshwater Aquatic Animals

Species	Test[a]	Chemical	Hardness (mg/L as $CaCO_3$)	pH	EC20 Endpoint	EC20 (µg/L)	Normalized Concentration[b] (µg/L)	Species Mean Chronic Value (µg/L)	Reference
Freshwater Species (6.5 ≤ pH < 9.0)									
Cladoceran (≤16 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	50	7.15	Reproduction - young/starting adult	1,780	3,846	-	McCauley et al. 1986
Cladoceran (≤16 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	50.5	7.61	Reproduction - young/starting adult	425.9	910.3	-	McCauley et al. 1986
Cladoceran (<24 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	26	7.3	Reproduction - young/female	1,560	6,975	-	ENSR 1992b
Cladoceran (<24 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	46	7.5	Reproduction - young/female	808.7	1,917	-	ENSR 1992b
Cladoceran (<24 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	96	7.9	Reproduction - young/female	651.9	682.0	-	ENSR 1992b
Cladoceran (<24 hr), *Ceriodaphnia dubia*	LC	Aluminum chloride	194	8.1	Reproduction - young/female	683.6	327.1	1,479	ENSR 1992b
Midge (1st instar larva, 3d), *Chironomus riparius*	LC	Aluminum nitrate	91	6.6 (6.5-6.7)	Growth - dry weight	1,952	2,168	2,168	OSU 2012f
Brook trout (eyed eggs), *Salvelinus fontinalis*	ELS	Aluminum sulfate	12.3	6.5	Growth - weight	159.1	1,636	1,636	Cleveland et al. 1989
Fathead minnow, *Pimephales promelas*	ELS	Aluminum sulfate	220	7.27-8.15	Biomass	6,194	2,577	2,577	Kimball 1978

[a] LC=Life cycle, ELS=Early life-stage

[b] Freshwater data normalized to a hardness of 100 mg/L using the GLEC derived acute slope of 1.112 at pH≥6.5 and 0.4443 at pH<6.5. Insufficient data were available to develop a consistent acute toxicity relationship between aluminum and pH. (See section, *Water quality parameters affecting toxicity*).

Species	Test[a]	Chemical	Hardness (mg/L as $CaCO_3$)	pH	EC20 Endpoint	EC20 (µg/L)	Normalized Concentration[b] (µg/L)	Species Mean Chronic Value (µg/L)	Reference
Freshwater Species (5.0 ≤ pH < 6.5)									
Oligochaete (<24 hr), *Aeolosoma sp.*	ELS	Aluminum nitrate	48	6.0 (5.9-6.1)	Reproduction - population count	1,259	1,745	1,745	OSU 2012e
Great pond snail (newly-hatched, <24 hr), *Lymnaea stagnalis*	ELS	Aluminum nitrate	117	6.1 (6.0-6.2)	Growth - wet weight	1,210	1,129	1,129	OSU 2012b
Amphipod (juvenile, 7-9 d), *Hyalella azteca*	ELS	Aluminum nitrate	95	6.1 (5.9-6.3)	Biomass	182.3	186.5	186.5	OSU 2012h
Midge (1st instar larva, <24 hr), *Chironomus riparius*	PLC	Aluminum sulfate	11.8	5.59	Adult midge emergence	29.55	76.36	-	Palawski et al. 1989
Midge (1st instar larva, <24 hr), *Chironomus riparius*	PLC	Aluminum sulfate	11.9	5.02	Adult midge emergence	84.42	217.3	128.8	Palawski et al. 1989
Atlantic salmon (embryo), *Salmo salar*	ELS	Aluminum sulfate	12.8-13.5	5.5	Growth - weight	53.08	129.2	129.2	McKee et al. 1989; Buckler et al. 1995
Brook trout (eyed eggs), *Salvelinus fontinalis*	ELS	Aluminum sulfate	12.8	5.7	Incomplete hatch	42.49	105.9	105.9	Cleveland et al. 1989
Fathead minnow (embryo, <24 hr), *Pimephales promelas*	ELS	Aluminum nitrate	96	6.20 (5.9-6.5)	Survival	428.3	436.1	436.1	OSU 2012g
Zebrafish (embryo, <36hpf), *Danio rerio*	ELS	Aluminum nitrate	83	6.10 (5.9-6.3)	Biomass	303.0	329.1	329.1	OSU 2013

[a] LC=Life cycle, ELS=Early life-stage

[b] Freshwater data normalized to a hardness of 100 mg/L using the GLEC derived acute slope of 1.112 at pH≥6.5 and 0.4443 at pH<6.5. Insufficient data were available to develop a consistent acute toxicity relationship between aluminum and pH. (See section, *Water quality parameters affecting toxicity*).

Attachment D – Application for Stream Variance Martin Creek updated July 31, 2015

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ATTACHMENTS

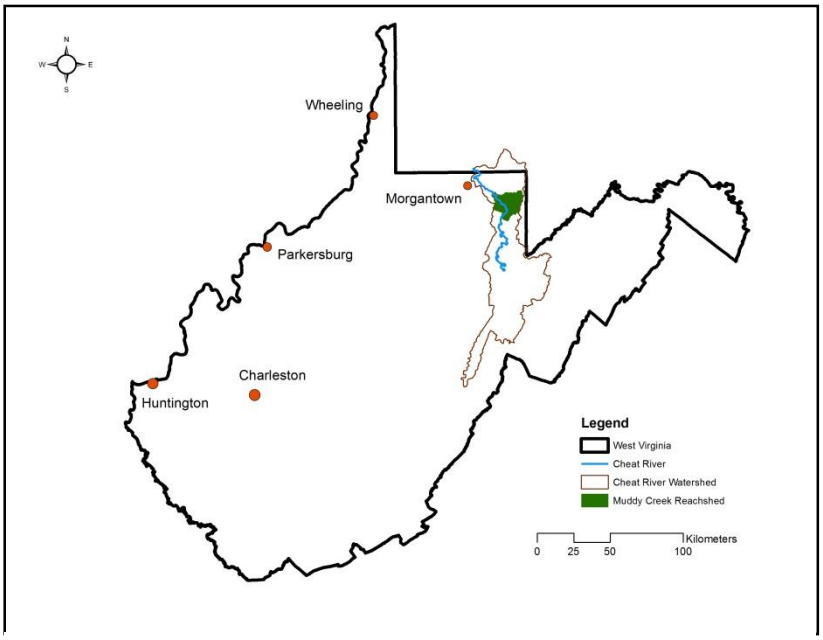
APPLICATION FOR STREAM VARIANCE IN FICKEY RUN, GLADE RUN, MARTIN CREEK, AND TRIBUTARIES THEREOF.

1.0 SUMMARY

WVDEP Office of Special Reclamation (OSR) is submitting this application for variance from water quality standards pursuant to 46 SCR 1, section 8.3. This variance is being requested based on human-caused conditions which prohibit the full attainment of any designated use. It is important to note that these streams have never been able to meet their designated use as a result of human-caused conditions (pre-law mining) that were in existence before the stream designations were assigned. A stream use inventory is currently ongoing and will be supplied once it has been completed. OSR is proposing the strategic placement of in-stream lime doser's in order to enhance overall stream quality.

2.0 INTRODUCTION

Muddy Creek meanders through the hills of Preston County, West Virginia and joins the Cheat River in Ruthbelle, an unincorporated community near Albright. AMD from abandoned mine lands, especially discharges emanating from the Upper Freeport coal seam, is the most damaging pollutant to Muddy Creek and the lower Cheat River watershed. The Cheat River watershed has a long history of coal mining; this activity dates as far back as the late 1700s, with a significant amount of activity occurring prior to the 1977 passage of the Federal Surface Mining Control and Reclamation Act (SMCRA).



Map 1. The Cheat River flows north draining approximately 1,422 square miles. Muddy Creek, heavily impacted by AMD, joins the Cheat River near Albright.

Beginning in the 1970's, whitewater paddlers on the Cheat River witnessed water quality become increasingly degraded from AMD discharging from coal mines, both abandoned and active. Rocks in the rivers were stained a bright orange color that became more common in the Cheat River Canyon each year. Rafters and kayakers complained of stinging eyes, nosebleeds, and other ailments after spending time in the Cheat's waters.

In the spring of 1994, mine water from a large underground coal mine complex blew out of an illegally sealed mine and into Muddy Creek. The resulting discharge impacted Muddy Creek and the Cheat River Canyon, killing fish for 16 miles downstream, and lowering the pH in Cheat Lake to 4.5. A second blowout in 1995 further degraded the Cheat and prompted American Rivers, Inc., a national river conservation organization, to name the Cheat as one of ten of the nation's most endangered rivers (1995). Muddy Creek contributes an estimated 6,000 tons of acidity and 67 tons of iron and aluminum per year to the Cheat River, primarily from three major tributary drainages: Fickey Run, Glade Run, and Martin Creek as well as from an upstream section of Muddy Creek, totaling nearly 30 miles of AMD impaired streams in the Muddy Creek drainage. Fickey Run is impaired by two Abandoned Mine Lands (AML) and three bond forfeiture sites, and Glade Run is impaired by five AML and three bond forfeiture sites (Lower Cheat River Watershed Based Plan, 2005). Both Fickey and Glade empty into Martin Creek which also receives AMD from two AML sites before it joins Muddy Creek. Within less than one mile upstream of the confluence with Martin Creek, Muddy Creek receives AMD from several AMD sources originating from the Dream Mountain abandoned mine area. Upstream of the confluence of Martin Creek and Muddy Creek, the creek supports healthy benthic macroinvertebrate and fish communities including sensitive organisms such as a variety of Ephemeropterans (mayflys) and native brook trout.

Photo 1. An aerial shot of AMD entering the Cheat River main stem from Muddy Creek during the first and most devastating mine blowout.

3.0 REGULATORY BASIS FOR VARIANCE APPLICATION

Streams have designated uses which are described in §47-2-6.2 and include: water supply public, propagation and maintenance of fish and other aquatic life, water contact recreation, agriculture and wildlife, and water supply industrial/water transport/cooling and power. Water use categories are supported by both numeric and narrative criteria. Procedural Rules for Site-Specific Revisions to Water Quality Standards are described in 46 CSR 6 and include rules for promulgation of designated use reclassifications, site-specific criteria, and variances. OSR is proposing the following:

7.2.d.8.2. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of

Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

It is also important to note that the attainment of the use cannot be remedied due to the metal loadings of the streams. A table has been included below showing that the metal loadings from the OSR sites only make up a small percentage of the total loadings as depicted by the corresponding TMDL's.

METAL LOADINGS

	TMDL LOADINGS			OSR LOADINGS	
STREAM	Fe	Al	SITE	Fe	Al
MARTIN CREEK	41.4	30.8	S-65-82	0.16	0.38
FICKEY RUN	12.7	10.83	UO-519	1.64	1.68
GLADE RUN	20.59	11.51	UO-204	0.11	0.1

4.0 REQUIRED INFORMATION

Pursuant to §46-6-3.1 a-g, the following information is required to be included in an application seeking reclassification of a designated use, a variance from numeric water quality criteria, or a site specific numeric criterion:

a. *A USGS 7.5 minute map showing those stream segments to be affected and showing all existing and proposed discharge points. In addition, the alphanumeric code of the affected stream, if known*:

A USGS 7.5 minute map showing the stream segments to be affected and showing all existing and proposed discharge points for Martin Creek (MC-17-A), Fickey Run (MC-17-A-0.5), and Glade Run MC-17-A-1 have been provided, please refer to Attachment 1 at the end of this application.

b. *Existing water quality data for the stream or stream segment. Where adequate data are unavailable, additional studies may be required by the Board*:

Available existing water quality data for Martin Creek, Fickey Run, Glade Run and associated tributaries has been provided, please see below.

FICKEY RUN AT MOUTH

Site_Descritption	Date	Mouth_Data	FlowGPM	FieldpH	FieldCon	AcidTPY	NetHotAcid	NetCalc_Acid	LabpH	Alk	Acidity	LabCon	D_Al	D_Ca	D_Fe	D_Mg	D_Mn	SO4
Fickey Mouth	8/4/2005	Yes	385.3	2.00	2000	511.2395904	603.15	1166.81241	2.92	0.00	603.15	2670	47.90	286.50	142.40	71.40	10.60	1320.00
Fickey Mouth	12/5/2005	Yes	2536	3.13	988	1684.9184	302	282.3557718	NS	0.00	302.00	NS	25.20	136.70	36.60	34.70	3.99	368.00
Fickey Mouth	5/3/2006	Yes	1109	2.74	1895	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fickey Mouth	8/23/2006	Yes	118.0	2.80	2770	288.825768	1112.58	845.5283537	2.66	0.00	1112.58	3090	48.31	323.35	179.12	82.04	9.96	2080.00
Fickey Mouth	9/15/2006	Yes	252.1	2.60	2530	443.9576425	800.44	432.1821102	2.79	0.00	800.44	2590	1.25	206.78	107.19	59.97	6.89	1550.00
Fickey Mouth	9/27/2006	Yes	NS	2.90	2500	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fickey Mouth	11/9/2006	Yes	732.0	2.88	2200	1068.74196	663.65	380.6463687	3.14	0.00	663.65	2090	30.13	167.51	51.35	41.58	5.39	978.00
Fickey Mouth	12/12/2006	Yes	331.0	3.18	2400	472.113906	648.33	434.0771688	3.14	0.00	648.33	2350	32.30	249.43	78.44	45.86	6.32	1105.00
Fickey Mouth	12/22/2006	Yes	557.0	2.95	2200	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fickey Mouth	1/23/2007	Yes	1520.5	3.27	1800	1287.294833	384.83	289.7918856	3.15	0.00	384.83	1837	22.87	177.66	47.54	39.66	4.70	756.00
Fickey Mouth	3/13/2007	Yes	2433.00	3.35	1200	4276.085088	798.88	248.180987	2.95	0.00	798.88	1590	21.48	120.53	37.43	31.00	3.44	660.00
Fickey Mouth	5/14/2007	Yes	671.00	2.91	2400	1190.156726	806.23	580.5298166	3.28	0.00	806.23	2290	34.51	177.32	117.16	55.07	7.41	1255.00
Fickey Mouth	5/16/2007	Yes	1541.00	2.86	2400	2471.184584	728.92	543.1796028	3.41	0.00	728.92	2230	32.76	199.82	104.60	44.85	6.59	1225.00
Fickey Mouth	6/14/2007	Yes	267.00	2.70	2900	652.648392	1111.08	335.9390176	3.37	0.00	1111.08	2960	41.65	200.50	0.64	59.47	1.69	1600.00
Fickey Mouth	6/26/2007	Yes	320.00	2.70	2700	694.03136	985.84	768.2720443	3.59	0.00	985.84	3180	44.82	225.76	150.27	69.87	9.35	652.00
Fickey Mouth	7/17/2007	Yes	369.00	2.83	2600	498.461436	614.02	606.7591351	3.33	0.00	614.02	2520	37.21	247.25	116.30	52.94	8.01	1640.00
Fickey Mouth	8/15/2007	Yes	349.73	2.85	2500	534.3447729	694.49	238.7869782	3.03	0.00	694.49	2630	18.37	163.07	21.00	70.85	5.42	1620.00
Fickey Mouth	3/13/2008	Yes	1598.00	3.05	1600	1426.489856	405.76	297.4203932	2.96	0.00	405.76	1679	22.65	96.75	45.23	34.98	3.23	696.00
Fickey Mouth	4/23/2008	Yes	1097.00	2.90	1900	926.166384	383.76	409.9010505	3.65	0.00	383.76	1790	23.96	171.23	76.57	39.77	4.81	1008.00
Fickey Mouth	4/24/2008	Yes	875.00	2.90	1900	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fickey Mouth	5/29/2008	Yes	1385.00	3.30	1500	1133.39259	371.97	294.5430197	3.85	0.00	371.97	1699	15.54	86.26	65.98	21.68	3.53	689.00
Fickey Mouth	6/24/2008	Yes	538.00	2.80	2100	881.699148	744.93	496.3823941	3.12	0.00	744.93	2240	31.52	115.35	86.44	40.14	5.77	1180.00
Fickey Mouth	7/28/2008	Yes	1129.00	3.78	2050	926.606428	373.06	218.8365529	3.45	0.00	373.06	1996	17.32	190.62	40.73	25.80	2.87	832.00
Fickey Mouth	11/12/2008	Yes	220.00	2.81	5470	509.44872	1052.58	696.9879089	3.42	0.00	1052.58	3200	35.73	205.40	150.98	63.19	9.15	1885.00
Fickey Mouth	12/30/2008	Yes	2098.00	3.14	1440	1103.543804	239.09	220.9015419	3.33	0.00	239.09	1466	19.00	115.10	27.13	24.06	3.55	626.00
Fickey Mouth	4/17/2009	Yes	2614.00	3.17	1330	1409.866128	245.16	193.2679294	3.06	0.00	245.16	1357	14.62	63.04	27.52	20.28	2.49	508.00
Fickey Mouth	5/15/2009	Yes	877.00	2.92	1620	828.29142	429.3	381.4499822	2.91	0.00	429.30	1894	28.28	120.40	58.46	34.39	4.20	908.00
Fickey Mouth	6/26/2009	Yes	963.00	2.94	1910	992.797146	468.61	408.0767648	2.97	0.00	468.61	1923	24.73	143.96	76.38	39.98	4.78	1065.00
Fickey Mouth	7/21/2009	Yes	519.00	2.75	2300	750.128346	656.97	625.6178666	3.01	0.00	656.97	2250	30.60	179.05	132.64	46.95	6.28	1455.00

GLADE RUN AT MOUTH

Site_Description	Date	Mouth_Data	FlowGPM	FieldpH	FieldCon	AcidTPY	NetHotAcid	NetCalc_Acid	LabpH	Alk	Acidity	LabCon	D_Al	D_Ca	D_Fe	D_Mg	D_Mn	SO4
Glade Mouth	8/10/2005	Yes	109.0	4.10	1173	12.13388	50.6	35.45757191	4.40	0.00	50.60	1471	4.20	194.00	0.60	85.80	3.60	828.00
Glade Mouth	12/5/2005	Yes	15374	3.75	636	4307.671808	127.36	94.80853269	NS	0.00	127.36	NS	13.30	88.21	1.66	46.27	4.17	370.00
Glade Mouth	1/30/2006	Yes	5200.0	3.60	850	2135.9624	186.71	110.6846847	3.73	0.00	186.71	1008	14.65	84.02	2.80	50.40	5.08	479.00
Glade Mouth	3/27/2006	Yes	1077.0	3.70	1140	541.313124	228.46	135.2953772	3.61	0.00	228.46	1224	19.10	100.39	3.01	62.07	6.13	640.00
Glade Mouth	5/3/2006	Yes	6181	3.32	1209	#VALUE!	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Glade Mouth	6/1/2006	Yes	1669.0	3.60	1280	1068.016466	290.87	129.4888513	3.47	0.00	290.87	7520	18.01	136.36	2.03	69.75	6.29	750.00
Glade Mouth	7/27/2006	Yes	902.0	3.30	1540	792.311388	399.27	165.4454367	3.41	0.00	399.27	1573	21.70	150.98	2.36	79.24	7.43	924.00
Glade Mouth	8/23/2006	Yes	286.0	3.40	1600	207.787008	330.24	184.3358059	3.26	0.00	330.24	1758	24.55	209.67	4.00	97.52	9.53	1038.00
Glade Mouth	8/29/2006	Yes	203.0	3.30	1670	122.060246	273.31	177.7491164	3.25	0.00	273.31	1794.00	23.35	200.77	2.16	94.95	9.45	1125.00
Glade Mouth	9/27/2006	Yes	NS	3.50	1360	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Glade Mouth	11/9/2006	Yes	2038.0	3.55	1300	1510.121316	336.81	120.4595193	3.48	0.00	336.81	1204	16.40	99.87	2.20	50.50	5.15	640.00
Glade Mouth	12/6/2006	Yes	869.0	3.61	1700	620.990876	324.82	161.948743	3.49	0.00	324.82	1431	22.42	131.22	4.45	74.35	7.26	738.00
Glade Mouth	1/23/2007	Yes	2014.00	3.67	1300	985.232688	222.36	116.0213941	3.59	0.00	222.36	1149	16.00	96.51	2.67	55.02	5.11	556.00
Glade Mouth	1/25/2007	Yes	3098.00	3.75	1400	1671.389588	245.23	125.8780673	3.56	0.00	245.23	1230	17.77	106.16	2.97	62.18	5.67	554.00
Glade Mouth	5/14/2007	Yes	1308.00	3.46	1300	1047.417624	363.99	165.9146925	3.46	0.00	363.99	1511	22.12	126.86	4.52	76.88	7.47	764.00
Glade Mouth	5/16/2007	Yes	1294.00	3.44	1400	1061.99874	373.05	149.0293356	3.54	0.00	373.05	1466	19.74	123.15	3.18	73.84	6.98	728.00
Glade Mouth	5/31/2007	Yes	1608.00	3.40	1500	1021.482	288.75	136.6352828	3.93	0.00	288.75	1581	17.25	124.18	3.43	67.18	6.44	862.00
Glade Mouth	6/14/2007	Yes	803.00	3.40	1600	514.221928	291.08	330.0023643	3.70	0.00	291.08	1594	18.34	139.92	72.26	75.39	8.06	852.00
Glade Mouth	6/26/2007	Yes	260.00	3.39	1600	55.09504	96.32	48.64987608	3.80	0.00	96.32	1452	2.03	154.27	5.35	55.86	1.47	650.00
Glade Mouth	6/27/2007	Yes	682.00	3.30	1900	505.199684	336.71	145.9892318	3.58	0.00	336.71	1780	18.18	130.93	2.56	76.29	7.19	970.00
Glade Mouth	9/13/2007	Yes	914.65	3.50	1480	334.8149497	166.39	133.5336827	3.64	0.00	166.39	1461	17.70	133.97	2.84	67.49	6.48	816.00
Glade Mouth	10/8/2007	Yes	308.10	3.40	1900	226.3037634	333.87	163.3620865	3.36	0.00	333.87	1746	22.07	148.45	2.61	79.70	7.62	986.00
Glade Mouth	2/23/2008	Yes	2438.00	3.60	1000	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Glade Mouth	3/10/2008	Yes	6064.00	3.71	1100	2587.314752	193.94	125.3373002	3.74	0.00	193.94	967	19.51	21.34	0.95	9.36	2.56	471.00
Glade Mouth	4/17/2008	Yes	3035.00	3.80	1300	1000.74876	149.88	128.1864609	3.72	0.00	149.88	1221	18.22	120.32	2.73	67.53	6.45	636.00
Glade Mouth	4/23/2008	Yes	2438.00	3.60	1000	639.126576	119.16	96.6067626	3.80	0.00	119.16	1001	12.76	95.10	1.60	49.48	4.88	489.00
Glade Mouth	5/19/2008	Yes	11423.00	3.90	600	2429.375102	96.67	43.57294596	4.04	0.00	96.67	702	5.69	41.23	0.86	22.71	1.85	389.00
Glade Mouth	5/29/2008	Yes	4194.00	3.80	300	1292.766948	140.11	65.96102801	4.06	0.00	140.11	942	8.20	58.25	2.63	30.26	2.99	469.00
Glade Mouth	6/23/2008	Yes	1587.85	3.50	1300	632.4216008	181.04	120.2408255	3.73	0.00	181.04	1327	15.81	113.05	2.32	57.02	5.71	607.00
Glade Mouth	8/12/2008	Yes	1775.00	3.55	1341	792.1683	202.86	71.44211307	3.40	0.00	202.86	1221	8.38	75.64	1.79	44.48	3.30	620.00
Glade Mouth	11/12/2008	Yes	343.00	3.47	1830	226.779938	300.53	133.1064755	3.61	0.00	300.53	1627	16.87	136.42	3.43	68.87	7.29	870.00
Glade Mouth	12/15/2008	Yes	4525.00	3.90	836	1059.6102	106.44	57.78842215	3.85	0.00	106.44	784	7.46	66.41	1.60	27.40	3.17	386.00
Glade Mouth	12/30/2008	Yes	4510.00	3.68	1063	1099.75448	110.84	95.24832048	3.77	0.00	110.84	977	12.48	84.51	2.70	39.96	4.53	481.00
Glade Mouth	5/20/2009	Yes	2780.00	3.62	1210	1008.58956	164.91	114.8542476	3.74	0.00	164.91	1212	15.80	91.94	2.23	44.45	5.01	688.00
Glade Mouth	6/26/2009	Yes	2467.00	3.64	1110	667.5702	123	105.035922	3.76	0.00	123.00	1125	14.02	104.13	2.39	54.95	5.11	642.00

MARTIN CREEK AT MOUTH

Site_Description	Date	Mouth_Data	FlowGPM	FieldpH	FieldCon	AcidTPY	NetHotAcid	NetCalc_Acid	LabpH	Alk	Acidity	LabCon	D_Al	D_Ca	D_Fe	D_Mg	D_Mn	SO4
Martin mou	5/28/2002	Yes	7910	3.13	1552	5394.62	310	229.3996	NS	0.00	310.00	NS	22.58	NS	19.70	NS	7.77	904.00
Martin mou	6/17/2002	Yes	3724	3.02	1623	2359.526	288	268.8475	NS	0.00	288.00	NS	26.83	NS	20.71	NS	9.11	1084.00
Martin mou	7/8/2002	Yes	1933	2.83	2347	2117.795	498	451.0819	NS	0.00	498.00	NS	37.41	NS	54.46	NS	12.88	1595.00
Martin mou	7/29/2002	Yes	3181	3.00	2042	2589.334	370	266.8958	NS	0.00	370.00	NS	23.90	NS	30.99	NS	0.61	295.00
Martin mou	8/13/2002	Yes	2011	2.85	2448	3238.514	732	228.8936	NS	0.00	732.00	NS	3.05	NS	43.97	NS	12.95	1072.00
Martin mou	9/9/2002	Yes	599	2.73	2716	971.2186	737	310.004	NS	0.00	737.00	NS	5.22	8.68	60.30	56.78	14.51	1642.00
Martin mou	9/30/2002	Yes	1890	2.93	2394	1787.94	430	269.8128	NS	0.00	430.00	NS	23.59	9.44	21.40	51.50	12.48	1261.00
Martin mou	10/22/2002	Yes	3336	2.96	1843	2656.79	362	275.46	NS	0.00	362.00	NS	22.74	8.36	29.40	38.18	8.55	1084.00
Martin mou	11/4/2002	Yes	9390	2.95	1621	7953.33	385	296.1832	NS	0.00	385.00	NS	28.87	24.48	24.03	34.68	8.43	1010.00
Martin mou	11/11/2002	Yes	9332	3.08	1303	5502.147	268	224.6356	NS	0.00	268.00	NS	24.10	10.28	13.47	42.55	7.19	707.00
Martin mou	12/9/2002	Yes	7008	2.82	1757	6598.733	428	300.5556	NS	0.00	428.00	NS	24.29	141.32	26.20	84.02	10.87	1175.00
Martin mou	1/7/2003	Yes	7703	3.12	1488	3287.64	194	194.3823	NS	0.00	194.00	NS	18.88	60.44	14.84	48.91	6.50	686.00
Martin mou	2/4/2003	Yes	27780	3.26	968	5518.775	90.3	98.99794	NS	0.00	90.30	NS	8.16	6.08	7.05	1.32	4.02	300.00
Martin mou	3/3/2003	Yes	18344	3.03	1342	16505.93	409	210.5305	NS	0.00	409.00	NS	18.91	49.36	18.64	41.52	4.89	710.00
Martin mou	3/31/2003	Yes	6435	3.09	1526	3326.895	235	260.7366	NS	0.00	235.00	NS	25.20	NS	24.89	NS	7.38	670.00
Martin mou	4/22/2003	Yes	9494	3.15	1680	5869.191	281	270.1539	NS	0.00	281.00	NS	25.11	6.60	30.31	18.34	7.74	1026.00
Martin mou	5/12/2003	Yes	24285	3.13	1077	8227.758	154	145.143	NS	0.00	154.00	NS	14.39	73.20	7.61	19.20	4.26	330.00
Martin mou	9/15/2003	Yes	2495	3.04	1643	1471.052	268	299.6215	NS	0.00	268.00	NS	34.20	34.40	18.20	44.98	8.40	431.20
Martin mou	3/11/2004	Yes	15824	3.21	1037	1660.919	47.71	152.2707	NS	0.00	47.71	NS	15.50	82.60	10.40	39.80	4.11	476.00
Martin mou	5/27/2004	Yes	4984	3.32	1330	871.1534	79.45	186.0942	NS	0.00	79.45	NS	18.29	125.03	18.54	59.86	5.99	706.35
Martin mou	7/26/2004	Yes	3138	2.79	2195	1111.963	161.07	481.8517	NS	0.00	161.07	NS	34.33	233.38	68.64	114.06	14.40	1061.00
Martin mou	7/29/2005	Yes	2199.7	3.30	1570	773.9073	159.92	110.4896	3.21	0.00	159.92	1644	9.19	99.00	10.60	38.00	3.29	731.00
Martin mou	12/5/2005	Yes	11570	3.60	717	4066.277	159.75	113.3098	NS	0.00	159.75	NS	13.30	100.30	7.51	43.65	3.71	402.00
Martin mou	5/3/2006	Yes	8400	3.22	1319	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Martin mou	8/23/2006	Yes	556.0	3.00	2010	537.1316	439.12	319.8059	2.89	0.00	439.12	2250	27.02	256.68	39.12	94.09	8.20	1214.00
Martin mou	9/27/2006	Yes	708.0	3.00	1700	632.3389	405.97	270.7942	3.22	0.00	405.97	1937	21.87	195.46	32.04	75.89	7.41	942.00
Martin mou	11/9/2006	Yes	2620.0	3.27	1600	2287.732	396.9	165.5323	3.22	0.00	396.90	1483	17.38	125.12	12.55	48.78	4.68	726.00
Martin mou	1/23/2007	Yes	6186.0	3.60	1300	2941.084	216.11	135.5177	3.37	0.00	216.11	1298	15.33	117.21	11.00	52.36	4.58	351.00
Martin mou	5/14/2007	Yes	1932.00	3.26	1600	1713.124	403.05	233.167	3.47	0.00	403.05	1637	21.57	144.27	27.77	69.24	6.31	802.00
Martin mou	6/12/2007	Yes	760.00	2.90	1800	665.2554	397.88	310.1114	4.10	0.00	397.88	2180	25.35	163.06	35.00	74.69	6.92	1018.00
Martin mou	6/14/2007	Yes	851.00	3.00	1800	750.8833	401.07	208.2162	3.57	0.00	401.07	2090	22.58	167.07	7.30	69.55	7.27	980.00
Martin mou	8/15/2007	Yes	1047.46	3.21	1780	698.5595	303.14	31.83498	3.30	0.00	303.14	1775	0.10	32.79	0.10	7.10	0.10	938.00
Martin mou	3/13/2008	Yes	6257.00	3.42	1200	2788.87	202.6	109.3554	3.45	0.00	202.60	1204	11.21	77.36	8.68	45.51	2.65	485.00
Martin mou	4/23/2008	Yes	3861.00	3.30	1300	1377.504	162.17	153.0789	3.79	0.00	162.17	1257	13.30	118.28	17.29	44.96	4.30	527.00
Martin mou	4/25/2008	Yes	4545.00	3.30	1300	CNBD	CNBD	CNBD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Martin mou	5/29/2008	Yes	6516.00	3.60	1000	1615.577	112.7	106.4832	3.68	0.00	112.70	1139	11.03	88.01	10.07	37.00	3.12	498.00
Martin mou	6/24/2008	Yes	3090.00	2.90	1500	1868.022	274.79	221.9134	3.39	0.00	274.79	1630	17.34	115.91	19.84	50.32	5.22	768.00
Martin mou	8/7/2008	Yes	6641.00	3.41	1248	1918.027	131.28	95.92403	3.52	0.00	131.28	1178	6.89	75.39	12.63	32.52	2.40	532.00
Martin mou	11/12/2008	Yes	1191.79	3.12	3710	1049.352	400.22	232.6843	3.43	0.00	400.22	2170	17.61	151.14	31.84	61.35	6.40	1050.00
Martin mou	11/12/2008	Yes	1030.00	3.12	3710	906.2187	399.92	228.5427	3.38	0.00	399.92	2180	17.57	150.40	30.37	62.32	6.41	1054.00
Martin mou	11/14/2008	Yes	1682.00	3.14	3460	984.5284	266.06	212.2153	3.06	0.00	266.06	2000	17.15	141.20	25.81	60.08	6.37	958.00
Martin mou	12/30/2008	Yes	5520.00	3.49	1124	1622.681	133.62	108.0802	3.40	0.00	133.62	1082	11.81	90.43	7.31	35.38	3.69	484.00
Martin mou	5/15/2009	Yes	7609.00	3.36	1200	3154.95	188.47	156.5845	3.27	0.00	188.47	1383	15.82	109.64	14.62	48.54	4.24	700.00
Martin mou	6/26/2009	Yes	4435.00	3.33	1320	1720.647	176.35	161.0886	3.30	0.00	176.35	1343	14.68	116.04	18.09	51.62	4.23	734.00
Martin mou	8/17/2009	Yes	681.00	3.00	1960	532.4453	355.39	309.5377	2.79	0.00	355.39	2000	22.64	152.36	45.81	59.69	6.08	1195.00
Martin mou	11/6/2009	Yes	3193.00	2.13	1240	1201.628	171.06	179.5246	3.42	0.00	171.06	1399	15.71	144.41	24.62	46.00	4.01	726.00

MARTIN CREEK @ MOUTH (EXISTING CONDITIONS)

OJECT_NA	PERMIT	AMPLE_NC	SITE_DESC	AMPLE_DATI	CFS	FPH	T_FE	D_AL
T & T FUELS, INC.	EM-113	31	MARTIN CREEK @ MOUTH (26 BRIDGE)	12-May-15	7.8245	3.26	9.63	14.8
T & T FUELS, INC.	EM-113	31	MARTIN CREEK @ MOUTH (26 BRIDGE)	05-Apr-15	18.566	3.68	6.93	9
T & T FUELS, INC.	EM-113	31	MARTIN CREEK @ MOUTH (26 BRIDGE)	17-Mar-15	19.212	4	9.09	

c. *General land uses (e.g., mining, agricultural, recreation, residential, commercial, industrial, etc.) as well as specific land uses adjacent to the waters for the length of the segment proposed to be revised*:

A Total Maximum Daily Load (TMDL) was developed for the Cheat River watershed, the land use coverage are as follows:

Martin Creek 46.6% deciduous forest, 39.4% pasture, 13.2% mine lands, 0.2% residential, 0.6% commercial.

Fickey Run 49.9% deciduous forest, 33.6% pasture, 16.5% mine lands.

Glade Run 33.9% deciduous forest, 49.5% pasture, 15.1% mine lands, 0.3% residential, 1.2% commercial.

d. The existing and designated uses of the receiving waters into which the segment in question discharges and the location where those downstream uses begin to occur:

Martin Creek, Fickey Run, Glade Run, and tributaries thereof is designated as follows:

- Category A (Water Supply, Public), the closest downstream drinking water intake is greater than 5 miles downstream of our bond forfeiture site,
- Category B (Warm Aquatic Life), and
- Category C (Water Contact Recreation);

however, it is important to note that these streams have never been able to meet their designated use as a result of human-caused conditions (pre-law mining) that were in existence before the stream designations were assigned.

e. *General physical characteristics of the stream segment including, but not limited to, width, depth, bottom composition, and slope*:

Fickey Run is located in Preston County and the watershed is approximately 1.72 square miles. The widths of the stream vary along its reach, 1 foot to 6 feet with the average width of 3 feet. The average instream water depth is approximately .2 foot deep. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. Martin Creek as a stream gradient is approximately 15,155 feet and has an overall slope of 2.94%.

Martin Creek is located in Preston County and the watershed is approximately 7.1 square miles. The widths of the stream vary along its reach, 1 foot to 9 feet with the average width of 6.4 feet. The average instream water depth is approximately .29 foot deep. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. Martin Creek as a stream gradient is approximately 14,245 feet and has an overall slope of 4%.

Glade Run is located in Preston County and the watershed is approximately 3.74 square miles. The widths of the stream vary along its reach, 1.3 foot to 4.1 feet with the average width of 3.17 feet. The average instream water depth is approximately .32 foot deep. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. Martin Creek as a stream gradient is approximately 19,691 feet and has an overall slope of 1.68%.

f. *The average flow rate in the segment, the amount of flow at a designated control point, and a statement regarding whether the flow of the stream is ephemeral, intermittent, or perennial*:

Martin Creek is a perennial stream with a watershed area of approximately 7.1 square miles. Average flow data for this stream is approximately 896.26 cfs.

Fickey Run is a perennial stream with a watershed area of approximately 1.72 square miles. Average flow data for this stream is approximately 160.54 cfs

Glade Run is a perennial stream with a watershed area of approximately 3.74 square miles. Average flow data for this stream is approximately 403.14 cfs

g. *An assessment of aquatic life in the stream segment in question and in the adjacent upstream and downstream segments*:

Friends of the Cheat watershed group and its partners began gathering information and developing a remediation plan in 2004. The following data is comprised of over 7 years of study. Biological assessment sight locations can be found on the Attachment 1 map located at the end of this application. WVU Division of Forestry and Natural Resources identified 32,161 individual benthic macroinvertebrates comprising 64 taxonomic families. The upper most sampling location within the Muddy Creek watershed, Upper Muddy Creek, had the greatest family richness (37 taxa; $\bar{x}$ = 30.8) during the study period. The second richest site was Muddy Creek at Million Dollar Bridge, located just upstream of the confluence with Martin Creek, with an average richness of 17.3. Study sites located just downstream of the Gary Conner passive treatment project and the Allen Conner - Messenger passive treatment project (Upper UNT of Glade Run and Glade Run above Tribs, respectively) had an average pre-treatment richness of 4.7 and 7.0 respectively (Table 10). Post-treatment richness for Glade Run above Tribs decreased to 5.0 while the Upper UNT of Glade Run experienced an increase in taxa richness to 8.0. In fact, none of the benthic macroinvertebrate biometrics improved at Glade Run above Tribs in spring 2012 after AMD treatment. However, just below the Gary Conner passive treatment system, at the Upper UNT of Glade Run sampling location, benthic macroinvertebrate metrics improved significantly after AMD treatment. Post-treatment WVSCI scores for Upper UNT of Glade Run still indicate impairment because scores fall below the impairment threshold of 68.0 (WV DEP 2010; Table 10).

Glade Run Mouth, a study site at the mouth of Glade Run downstream of the Gary Conner and Allen Conner - Messenger passive treatment systems (the uppermost study site receiving the cumulative benefit of both passive treatment systems) only showed improvement for the % Ephemeroptera metric. All other post-treatment biometrics were within the pre-treatment 95% confidence intervals, indicating no significant improvement in bioscores (Table 10, Table 11).

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	Taxa Rich	%2Dom	WVSCI	Taxa Rich	%2Dom	WVSCI
Glade above Tribs	7.00±1.60	87.20±4.43	25.70±3.20	5.00	97.89	13.87
Upper UNT Glade	4.67±1.20	97.52±1.81	12.75±3.03	8.00	71.09	26.19
Glade Run Mouth	7.67±3.87	95.93±2.93	19.96±8.84	9.00	96.28	17.23

Martin ab Fickey	6.67±2.80	95.30±2.85	18.64±5.14	5.00	96.60	11.77
Martin Mouth	4.00±2.21	85.80±10.03	23.88±14.83	8.00	53.33	49.12
Muddy ab Crab Orchard	4.00±2.21	70.24±29.57	33.22±18.13	8.00	80.27	32.81
Muddy ab Sypolt	8.33±4.01	71.28±15.96	51.58±13.49	9.00	65.17	36.46
Muddy Mouth	9.83±7.73	72.41±18.03	47.19±19.64	7.00	77.78	39.26
Cheat at Decision Right	13.17±8.42	51.59±8.91	60.35±19.75	17.00	65.25	68.54
Cheat at Jenkinsburg	13.00±3.89	63.36±14.02	75.14±5.30	12.00	48.11	65.06

Table 10. Family Richness (Taxa Rich), Percent of assemblage as the top two dominant families (%2Dom), and West Virginia Stream Condition Index (WVSCI) for the Gary Conner and Allen Conner - Messenger treatment continuums before and after AMD treatment. ("ab" = above)

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% EPT	EPT Richness	% Ephem	% EPT	EPT Richness	% Ephem
Glade above Tribs	10.40±0.70	0.50±0.67	0.30±0.63	1.68	1.00	0.00
Upper UNT Glade	1.06±1.74	0.50±0.44	0.12±0.23	3.13	1.00	0.00
Glade Run Mouth	2.78±2.43	2.83±2.55	0.35±0.60	1.29	1.00	1.29
Martin ab Fickey	4.04±3.53	2.00±1.13	0.57±1.12	0.00	0.00	0.00
Martin Mouth	14.93±14.77	1.50±1.58	6.80±13.33	40.00	3.00	26.67
Muddy ab Crab Orchard	29.58±29.39	2.33±1.65	3.81±4.32	4.48	2.00	0.00
Muddy ab Sypolt	40.08±20.42	4.67±2.36	10.59±7.02	12.36	3.00	10.11
Muddy Mouth	27.11±21.41	5.17±4.37	7.80±9.38	33.33	2.00	31.48
Cheat at Decision Right	51.94±17.38	7.33±5.23	34.69±18.03	39.67	9.00	3.28
Cheat at Jenkinsburg	72.96±14.21	8.17±1.92	55.32±15.57	59.43	7.00	15.57

Table 11. Percent of assemblage as Ephemeroptera, Plecoptera, and Trichoptera (%EPT), number of families within the orders of Ephemeroptera, Plecoptera, and Trichoptera (EPT Richness), and percent of assemblage as Ephemeroptera (% Ephem) for the Gary Conner and Allen Conner - Messenger treatment continuums before and after AMD treatment. ("ab" = above)

The Fickey Mouth site only experienced a slight improvement in taxa richness post-treatment. All other biometrics (%EPT, EPT Richness, %Ephemeroptera, %2Dominant Taxa) remained extremely degraded with no change or with post-treatment results within the pre-treatment 95% confidence interval (WVSCI) (Table 12, Table 13).

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% EPT	EPT Richness	% Ephem	% EPT	EPT Richness	% Ephem
Fickey Mouth	0.00±0.00	0.00±0.00	0.00±0.00	0.00	0.00	0.00
Martin Mouth	14.93±14.77	1.50±1.58	6.80±13.33	40.00	3.00	26.67

Muddy ab Crab Orchard	29.58±29.39	2.33±1.65	3.81±4.32	4.48	2.00	0.00
Muddy ab Sypolt	40.09±20.42	4.67±2.36	10.59±7.02	12.36	3.00	10.11
Muddy at Mouth	27.11±21.41	5.17±4.37	7.79±9.38	33.33	2.00	31.48
Cheat at Decision Right	51.94±17.38	7.33±5.23	34.69±18.03	39.67	9.00	3.28
Cheat at Jenkinsburg	72.96±14.22	8.20±1.92	55.32±15.57	59.43	7.00	15.57

Table 12. Percent of assemblage as Ephemeroptera, Plecoptera, and Trichoptera (%EPT), number of families within the orders of Ephemeroptera, Plecoptera, and Trichoptera (EPT Richness), and percent of assemblage as Ephemeroptera (% Ephem) for the Fickey Doser treatment continuums before and after AMD treatment. ("ab" = above)

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	Taxa Rich	%2Dom	WVSCI	Taxa Rich	%2Dom	WVSCI
Fickey Mouth	1.70±0.65	99.0±1.92	13.6±11.53	3.00	0.00	15.87
Martin Mouth	4.00±2.21	85.80±10.03	23.88±14.83	8.00	53.33	49.12
Muddy ab Crab Orchard	4.00±2.21	70.24±29.58	33.22±18.13	8.00	80.27	32.81
Muddy ab Sypolt	8.33±4.01	71.28±15.96	51.58±13.49	9.00	65.17	36.46
Muddy at Mouth	9.83±7.73	72.41±18.03	47.19±19.64	7.00	77.78	39.26
Cheat at Decision Right	13.17±8.43	51.60±8.90	60.36±19.75	17.00	65.25	68.54
Cheat at Jenkinsburg	13.00±3.89	63.40±14.02	75.10±5.30	12.00	48.11	65.06

Table 13. Family Richness (Taxa Rich), Percent of assemblage as the top two dominant families 2Dom), and West Virginia Stream Condition Index (WVSCI) for the Fickey Doser treatment continuums before and after AMD treatment. ("ab" = above)

At the mouth of Martin Creek, the uppermost study site that captures the influence of all three treatment systems, %EPT, % Ephemeroptera, Family Richness, %2Dominant Taxa, and WVSCI all increased significantly post-treatment. There was a slight improvement in EPT Richness (Table 10, Table 11) and a significant decrease in the percent of generally tolerant organisms (%Gen Tol) in the assemblage post-treatment as well (Table 14).

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% Gen Tol	% Acid Tol	% Alum Tol	% Gen Tol	% Acid Tol	% Alum Tol
Glade above Tribs	93.8±3.67	0.00±0.00	0.00±0.00	97.92	1.69	0.00
Upper UNT Glade	96.9±1.96	0.75±1.48	0.00±0.00	85.19	3.12	0.00
Glade Run Mouth	92.73±4.95	1.58±2.03	0.09±0.13	94.83	0.00	0.00
Martin ab Fickey	91.37±4.16	3.09±3.37	0.00±0.00	95.36	0.00	0.00
Martin Mouth	75.95±20.10	4.20±7.47	0.58±0.73	34.00	6.67	0.00
Muddy ab Crab Orchard	61.56±31.29	3.43±5.83	2.75±4.53	44.88	3.59	0.89

Muddy ab Sypolt	37.23±18.29	13.75±15.49	10.24±15.72	66.41	1.12	1.12
Muddy Mouth	48.86±29.39	12.65±13.26	0.74±1.10	46.48	1.85	0.00
Cheat at Decision Right	39.48±20.49	9.56±7.24	3.77±3.54	44.62	27.86	5.90
Cheat at Jenkinsburg	15.4±11.93	5.70±4.49	5.30±5.74	23.62	3.04	11.32

Table 14. Percent of assemblage as generally tolerant organisms (%Gen Tol), perecent of assemblage as organisms tolerant to acidity (%Acid Tol) (Leuctrids, Capniids, Nemourids), and percent of assemblage as organisms tolerant to aluminum floc (Hydropsychids) along the Gary and Allen Conner treatment continuums before and after AMD treatment. ("ab" = above)

Figures 3a-d display benthic macroinvertebrate metrics along the Muddy Creek stream continuum in regard to distance from the mouth of Muddy Creek. Figure 3a displays % Ephemeroptera (%E) along the stream continuum; interestingly, unimpaired communities were more highly variable over the 6 years compared to impaired sites in terms of %E possibly because there is higher relative biodiversity to begin with at unimpaired sites. The percent of mayflies is relatively high for pre-treatment (~40%) for Muddy at Million Dollar Bridge and Upper Muddy Creek but near the confluence of Martin Creek there is a dramatic decline in both the mean % Ephemeroptera and the 95% confidence intervals which translates as less mayflies and less assemblage diversity as a whole at sites on Muddy Creek near the confluence of Martin Creek and downstream. However, the increase in %E outside the 95% confidence interval at the downstream most site on the Muddy Creek main stem is an exception (Figure 3a).

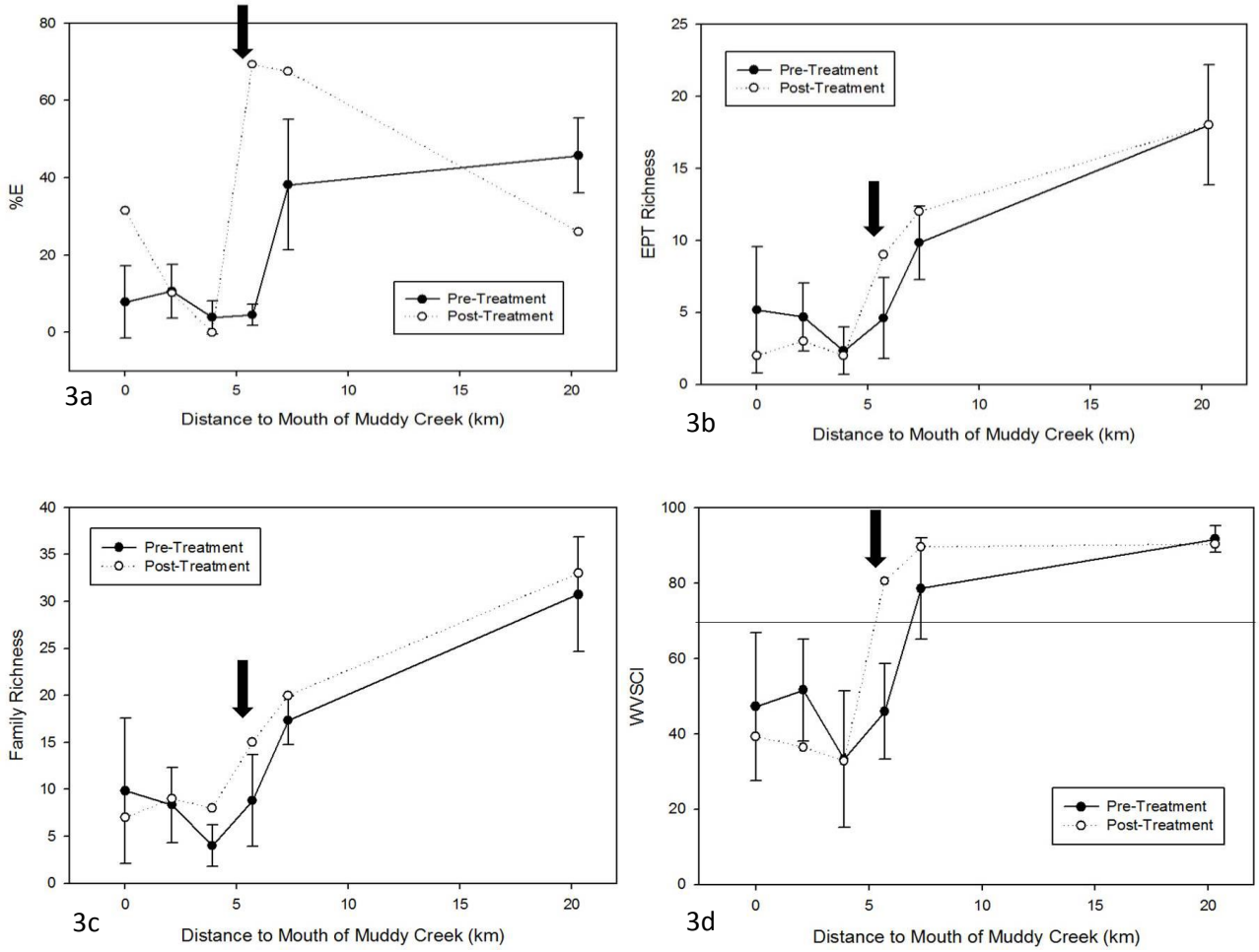


Figure 3a-d. Percent of assemblage comprised of Ephemeroptera (a), the number of families within the orders Ephemeroptera, Plecoptera, and Trichoptera (b), the total number of families comprising an assemblage (c), and the West Virginia Stream Condition Index (WVSCI) scores (d) for sites along the Muddy Creek stream continuum. Error bars represent 95% confidence intervals about the mean for pre-treatment data from 2006-2011.The horizontal line in (d) represents the impairment threshold for WVSCI (68.0) as defined by the West Virginia Department of Environmental Protection. The sites displayed in Figures 3a-d are as follows from left to right along the x-axis of each figure: Muddy Creek at Mouth, Muddy Creek above Sypolt Run, Muddy Creek above Crab Orchard Run, Muddy Creek above Martin Creek, Muddy Creek at Million Dollar Bridge, and Upper Muddy Creek. Martin Creek enters Muddy Creek 5.6 km (3.2 miles) from the mouth of Muddy Creek.

Some of the highest percentages of EPT were observed for sites upstream of the confluence with Martin Creek. When traveling downstream, a severe decline occurs and some of the lowest observances for %EPT were seen in sites downstream from Martin Creek on the main stem of Muddy Creek, except for the Mouth of Muddy Creek which experienced a post-treatment percentage near the mean for pre-treatment. However, when examining EPT Richness (Figure 3b) it can be seen that upstream of Martin Creek EPT richness is slightly elevated relative to the mean and 95% confidence intervals at two of the three upstream sampling locations. Downstream of the confluence with Martin Creek, post-treatment EPT richness declines steeply and is relatively lower than the pre-treatment mean. Post-treatment values of %EPT and EPT richness remained severely depressed at the mouth of Muddy Creek.

Family richness showed a similar pattern to EPT post-treatment (Figure 3c). Upstream of the confluence with Martin Creek, family richness was high. Below the confluence, family richness declined severely, except for Muddy Creek above Crab Orchard Run, which experienced a relative improvement in family richness. Tables 14 – 16 display the percentage of each assemblage that is comprised of generally tolerant organisms (%Gen Tol). Study sites above Martin Creek (5.6 km from Mouth of Muddy Creek) all experience a relatively low composition of generally tolerant taxa post-treatment, while sites below Martin Creek still contained numerous tolerant taxa.

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% Gen Tol	% Acid Tol	% Alum Tol	% Gen Tol	% Acid Tol	% Alum Tol
Fickey Mouth	81.6±31.89	0.00±0.00	0.00±0.00	70.33	0.00	0.00
Martin Mouth	75.95±20.10	4.20±7.47	0.58±0.73	34.00	6.67	0.00
Muddy ab Crab Orchard	61.56±31.29	3.43±5.83	2.75±4.53	44.88	3.59	0.89
Muddy ab Sypolt	37.23±18.29	13.75±15.49	10.24±15.72	66.41	1.12	1.12
Muddy at Mouth	48.86±29.39	12.65±13.26	0.74±1.10	46.48	1.85	0.00
Cheat at Decision Right	39.48±20.49	9.56±7.24	3.77±3.54	44.62	27.86	5.90
Cheat at Jenkinsburg	15.4±11.93	5.70±4.49	5.30±5.74	23.62	3.04	11.32

Table 15. Percent of assemblage as generally tolerant organisms (%Gen Tol), perecent of assemblage as organisms tolerant to acidity (%Acid Tol) (Leuctrids, Capniids, Nemourids), and percent of assemblage as organisms tolerant to aluminum floc (Hydropsychids) along the Fickey Doser treatment continuum before and after AMD treatment. ("ab" = above)

	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% Gen Tol	% Acid Tol	% Alum Tol	% Gen Tol	% Acid Tol	% Alum Tol
Upper Muddy	12.97±6.01	7.79±6.53	4.32±4.12	7.11	24.27	3.98
Million Dollar Bridge	20.34±14.03	11.54±6.57	6.00±3.02	12.29	2.87	1.83
Muddy ab Martin	54.16±18.77	12.31±10.02	16.75±17.78	15.64	5.75	4.93
Muddy ab Crab Orchard	61.56±31.29	3.43±5.83	2.75±4.53	44.88	3.59	0.89

Muddy ab Sypolt	37.23±18.29	13.75±15.49	10.24±15.72	66.41	1.12	1.12
Muddy at Mouth	48.86±29.39	12.65±13.26	0.74±1.10	46.48	1.85	0.00
Cheat at Decision Right	39.48±20.49	9.56±7.24	3.77±3.54	44.62	27.86	5.90
Cheat at Jenkinsburg	15.4±11.93	5.70±4.49	5.30±5.74	23.62	3.04	11.32

Table 16. Percent of assemblage as generally tolerant organisms (%Gen Tol), perecent of assemblage as organisms tolerant to acidity (%Acid Tol) (Leuctrids, Capniids, Nemourids), and percent of assemblage as organisms tolerant to aluminum floc (Hydropsychids) along the Muddy Creek continuum before and after AMD treatment from the upper most sampling site to the downstream most sampling site. ("ab" = above)

WVSCI scores from the headwaters of Muddy Creek to the Mouth of Muddy Creek take on the same general pattern. There were relatively healthy assemblages upstream of Martin Creek at most study sites, and relatively degraded assemblages at sites below Martin Creek with none of them attaining the non-impaired threshold of 68.0 (Figure 3d).

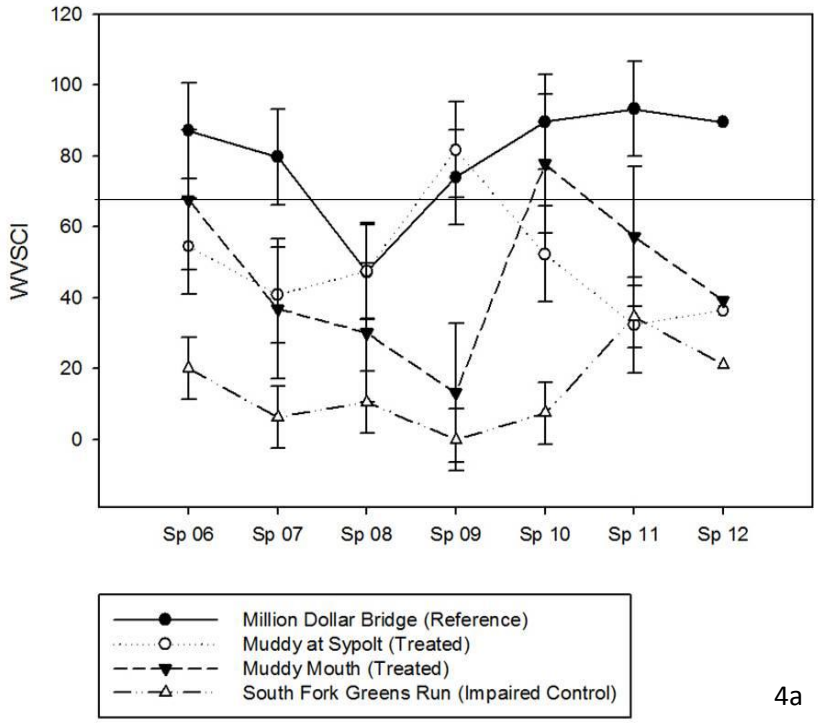
Time series data displayed for the four key study sites show how extremely variable benthic macroinvertebrate assemblages were over the seven years. However, the un-impaired reference site (Muddy at Million Dollar Bridge) and impaired control site (South Fork of Greens Run) were always distinctly different (separated in Figures 4a-d). The study sites that were downstream from AMD were highly variable with large 95% confidence intervals (Table 16-18). These figures indicate that the final round of monitoring in Spring 2012 after AMD treatment did not result in noticeable improvement in benthic macroinvertebrate communities.

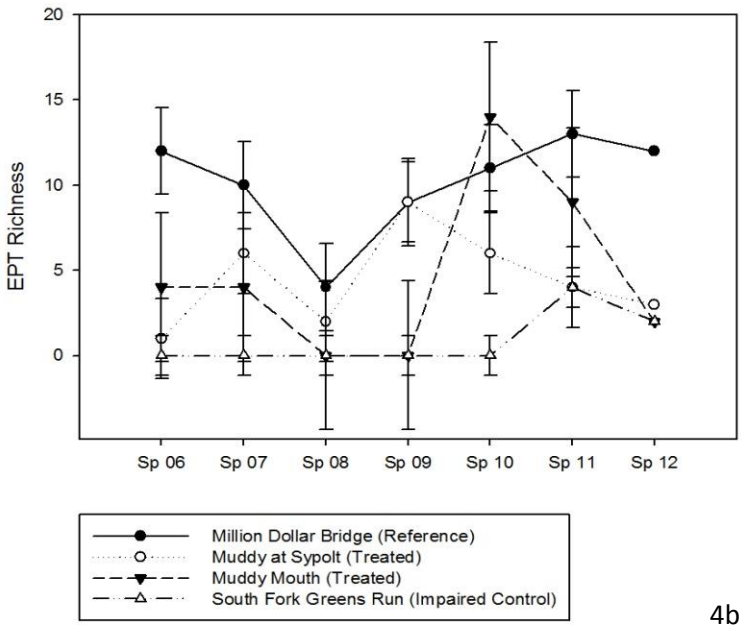
	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	% EPT	EPT Richness	% Ephem	% EPT	EPT Richness	% Ephem
Upper Muddy	72.99±8.92	18.00±4.16	45.72±9.73	60.89	18.00	26.00
Million Dollar Bridge	65.99±13.62	9.83±2.55	38.18±16.90	79.56	12.00	67.51
Muddy ab Martin	37.61±12.85	4.60±2.81	4.45±2.77	82.47	9.00	69.32
Muddy ab Crab Orchard	29.58±29.39	2.33±1.65	3.81±4.32	4.48	2.00	0.00
Muddy ab Sypolt	40.09±20.42	4.67±2.36	10.59±7.02	12.36	3.00	10.11
Muddy at Mouth	27.11±21.41	5.17±4.37	7.80±9.38	33.33	2.00	31.48
Cheat at Decision Right	51.94±17.38	7.33±5.23	34.69±18.03	39.67	9.00	3.28
Cheat at Jenkinsburg	73.00±14.22	8.20±1.92	55.30±15.57	59.43	7.00	15.57

Table 17. Percent of assemblage as Ephemeroptera, Plecoptera, and Trichoptera (%EPT), number of families within the orders of Ephemeroptera, Plecoptera, and Trichoptera (EPT Richness), and percent of assemblage as Ephemeroptera (% Ephem) for the Muddy Creek continuum before and after AMD treatment from the upper most sampling site to the downstream most sampling site. ("ab" = above)

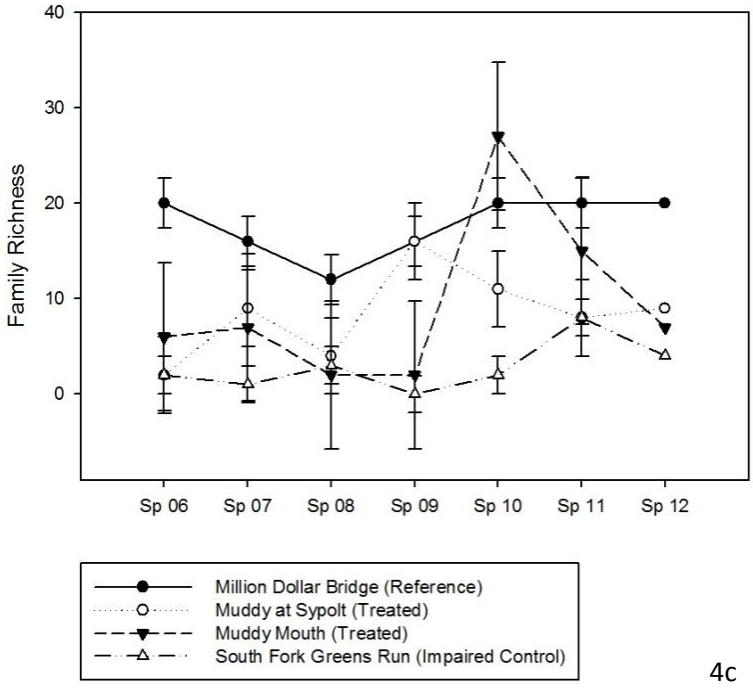
	Pre-Treatment Mean ± 95%CI			Post-Treatment Spring 2012 Data		
Site Name	Taxa Rich	%2Dom	WVSCI	Taxa Rich	%2Dom	WVSCI
Upper Muddy	30.75±6.11	42.56±5.04	91.64±3.55	33.00	43.72	90.34
Million Dollar Bridge	17.33±2.61	51.20±11.74	78.55±13.46	20.00	72.33	89.58
Muddy ab Martin	8.80±4.86	63.71±13.71	45.92±12.60	15.00	77.26	80.54
Muddy ab Crab Orchard	4.00±2.21	70.24±29.58	33.22±18.13	8.00	80.27	32.81
Muddy ab Sypolt	8.33±4.01	71.28±15.96	51.28±13.49	9.00	65.17	36.46
Muddy at Mouth	9.83±7.73	72.41±18.03	47.19±19.64	7.00	77.78	39.26
Cheat at Decision Right	13.17±8.43	51.60±8.91	60.36±19.75	17.00	65.25	68.54
Cheat at Jenkinsburg	13.00±3.89	63.40±14.02	75.10±5.30	12.00	48.11	65.06

Table 18. Family Richness (Taxa Rich), Percent of assemblage as the top two dominant families (%2Dom), and West Virginia Stream Condition Index (WVSCI) for the Muddy Creek continuum before and after AMD treatment from the upper most sampling site to the downstream most sampling site. ("ab" = above)

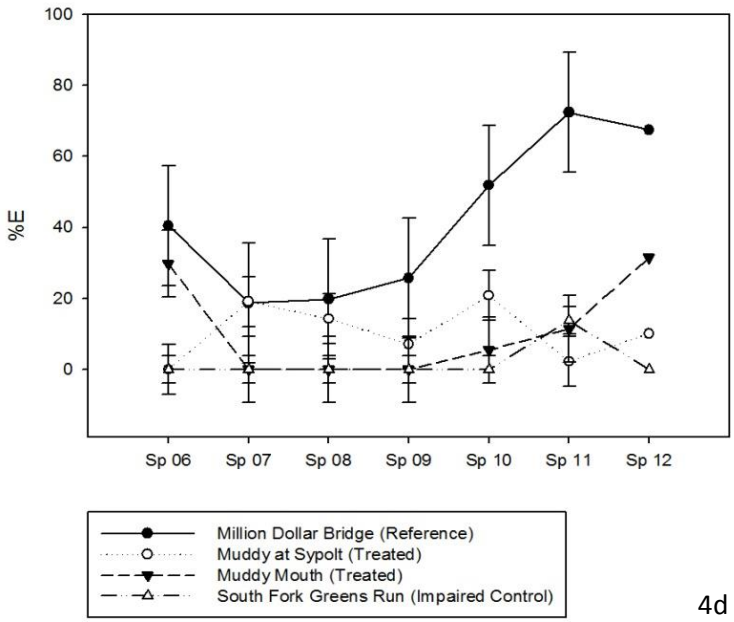



EPT Richness
20
15
10
5
0
Sp 06
Sp 07
Sp 08
Sp 09
Sp 10
Sp 11
Sp 12
Million Dollar Bridge (Reference)
Muddy at Sypolt (Treated)
Muddy Mouth (Treated)
South Fork Greens Run (Impaired Control)

4b


Family Richness
40
30
20
10
0
Sp 06
Sp 07
Sp 08
Sp 09
Sp 10
Sp 11
Sp 12
Million Dollar Bridge (Reference)
Muddy at Sypolt (Treated)
Muddy Mouth (Treated)
South Fork Greens Run (Impaired Control)

4c



4d

Figure 4a-d. West Virginia Stream Condition Index (WVSCI) scores (a), the number of families within the orders Ephemeroptera, Plecoptera, and Trichoptera (b), the total number of families within each assemblage (c), and percent of the assemblage comprised of Ephemeroptera for a reference site, two treated sites, and an impaired, untreated control site. Error bars represent pre-treatment 95% confidence intervals about the mean for each parameter. The horizontal line in (a) represents the impairment threshold for WVSCI (68.0) as defined by the West Virginia Department of Environmental Protection.

The percent of assemblage comprised of the top two dominant taxa (%2Dom) and percent of assemblage comprised of generally tolerant taxa (%Gen Tol) show the greatest variation in treated sites relative to reference and control sites. However, when observing Figure 4a there is a distinct separation in WVSCI scores; with treated sites experiencing a decreased score relative to the little change experienced in reference and impaired control sites. This relationship also holds true for Family Richness (Figure 4b) and EPT Richness (Figure 4c) in that there is little decline or change in impaired and control study sites, but Muddy Creek main stem sites that experience treatment do not respond positively to treatment. There may be a slight improvement in % E (Figure 4d) at the Mouth of Muddy Creek.

5.0 ADDITIONAL REQUIRED INFORMATION

The following information is provided to support preparation of an information sheet (as is required under W.Va. C.S.R. 46-6-5.3), which summarizes the information in the application pertinent to the Board's Decision.

a. *The designated use categories outlined in 46 CSR 1 which apply to the stream*:

Martin Creek, Fickey Run, Glade Run, and tributaries thereof are designated as follows:

- Category A (Water Supply, Public), the closest downstream drinking water intake is less than 5 miles downstream of our bond forfeiture site,
- Category B (Warm Aquatic Life), and
- Category C (Water Contact Recreation);

b. *The existing numeric water quality criterion which applies to the stream and for which the applicant seeks a variance, and the alternative numeric water quality criterion desired by the applicant*:

The existing numeric water quality criterion for these streams and tributaries thereof are as follows: Iron = 1.5 mg/l, Aluminum = 1.0 mg/l, pH = 6-9 su. The existing numeric water quality standards in the stream have never been able to be obtained as a result of human-caused conditions (pre-law mining) that were in existence before the criterions were assigned. The current worst case scenarios for the Martin Creek watershed are 179.12 mg/l dissolved Fe, 48.31 mg/l dissolved Al, and 2.13 pH. The worst case scenario was derived from water samples gathered from TWI from 2005 through 2009. The purpose of this variance is not to meet existing numeric water quality criterion but to show overall improvement to the Martin Creek watershed as a whole and to improve water quality in Muddy Creek downstream of the confluence with Martin Creek. This will be achieved with the addition of in-stream dosers at strategic locations that will raise the pH and reduce metal loading.

c. *Identification of the specific criterion outlined in section 3.1 a-f above which render the existing numeric water quality criterion unattainable*:

As mentioned above, the current worst case scenarios for the Martin Creek watershed are 179.12 mg/l dissolved Fe, 48.31 mg/l dissolved Al, and 2.13 pH

d. *Identification of the specific circumstances which render the discharger unable to meet the existing numeric water quality criteria which apply to the stream*:

AMD from abandoned mine lands, especially discharges emanating from the Upper Freeport coal seam, is the most damaging pollutant to Martin Creek watershed. The Martin Creek watershed has a long history of coal mining; this activity dates as far back as the late 1700s, with a significant amount of activity occurring prior to the 1977 passage of the Federal Surface Mining Control and Reclamation Act (SMCRA).

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Attachment E – Application for Stream Variance Sandy Creek updated July 31, 2015

TABLE OF CONTENTS

ATTACHMENTS

APPLICATION FOR STREAM VARIANCE IN MAPLE RUN, LEFT FORK LITTLE SANDY CREEK, LEFT FORK OF SANDY CREEK UPSTREAM OF STEVENSBURG, AND TRIBUTARIES THEREOF.

1.0 SUMMARY

WVDEP Office of Special Reclamation (OSR) is submitting this application for variance from water quality standards pursuant to 46 SCR 1, section 8.3. This variance is being requested based on human-caused conditions which prohibit the full attainment of any designated use. It is important to note that these streams have never been able to meet their designated use as a result of human-caused conditions (pre-law mining) that were in existence before the stream designations were assigned. A stream use inventory is currently ongoing and will be supplied once it has been completed. OSR is proposing the strategic placement of in-stream lime doser's in order to enhance overall stream quality.

2.0 INTRODUCTION

Sandy Creek is a subwatershed in the lower section of the Tygart Valley River basin. The Lower Tygart basin lies within the Allegheny Plateau section of the Appalachian Plateau Physiographic Province (USACE, 1996).

> A wide variety of stream types ranging from steep gradients and rocky channels in the mountainous areas, to low gradient streams in the lowlands, are common in the Tygart River basin. The Tygart River originates on Cheat Mountain near Spruce in Pocahontas County, and flows northward. The lower Tygart [—of which Sandy Creek watershed is a part—] extends from the Buckhannon River to the confluence with the West Fork River at Fairmont ([River mile (RM)] 50.4 to RM 0.0). Key tributaries in this segment include the Buckhannon River, Sandy Creek, Three Fork Creek, and Fords Run. (USACE, 1996,p. V-2)

The Sandy Creek watershed drains over 57,000 acres and flows into Tygart Lake (WVDEP, 2003a).

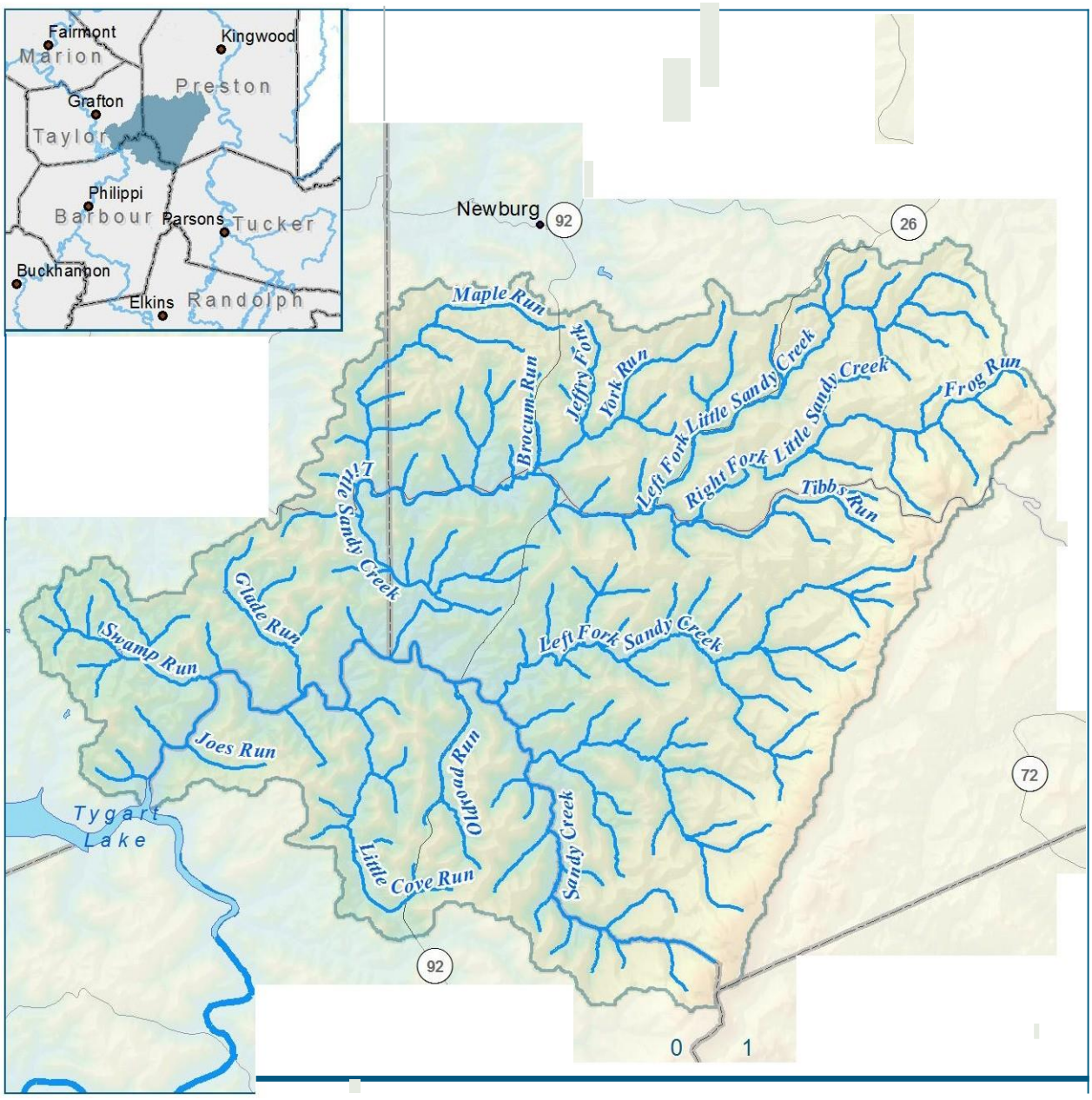
As documented by the West Virginia Department of Environmental Protection (WVDEP):

> Sandy Creek arises from the western slope of Laurel Mountain near the junction of Preston and Barbour Counties. As it flows northwestward forming the boundary between Preston and Barbour Counties, it incorporates the nearly equivalent flow of the Left Fork. (WVDEP, 1987, p. 5)

Historically, various sources have documented AMD-related impairments in the watershed. For example:

> As a result of past coal mining activity 29 miles of the watershed has been severely degraded because of abandoned mines draining highly acidic and mineralized waters. Potential usage of its waters has been eliminated by this pollution. This chronic acid mine drainage causes damage to municipal water supplies, barges, boats, instream facilities, culverts, bridges, industrial water users, agricultural water supplies, aquatic life, water-based recreation, and waterfront property values. (WVDEP, 1987, p. 3)

Sandy Creek watershed was documented in the 1982 Tygart Valley River Subbasin Abandoned Mine Drainage Assessment as contributing 49.5% of the total acid load to the Tygart between Philippi, WV and the mouth at Fairmont, WV. Water quality data collected during the assessment found 9325 lbs/day of acid being discharged into Tygart Reservoir from Sandy Creek. (WVDEP, 1987, p. 3)



Since the mid-1990s, Left Fork Sandy Creek has been—and continues to be—a focus of attention for a coalition of watershed residents; angered at the AMD pollution caused by the forfeited F & M coal mine, the coalition brought suit against the mine and its insurance company. Through this action, the group secured $4 million for treatment of AMD on this tributary. This fund is currently jointly managed by the Office of Special Reclamation (OSR) within the WVDEP Division of Land Restoration and the Laurel Mountain/Fellowsville Area Clean Watershed Association (Christ, 2011).

According to the Laurel Mountain/Fellowsville Area Clean Watershed Association, a significant population of freshwater mussels existed in Left Fork Sandy Creek before the pollution associated with the F & M mine.

> Sandy Creek drains an area of 90.3 square miles, and flows directly into the tailwaters of Tygart Lake. [The West Virginia Department of Natural Resources (WVDNR)] (1982) reported that 49.5% of the acid load in the lower Tygart River originates in the Sandy Creek watershed, and identified a number of problem areas in the Maple Run and Little Sandy Creek subbasins that contribute to water quality problems in Sandy Creek.
> WVDNR (1982) reported acid loads of 4496 lb/day at the mouth of Little Sandy Creek, and 3929 lb/day at the mouth of Maple Run in May 1981. Sandy Creek near its mouth exhibited 10 mg/l of acidity and 10 mg/l of alkalinity, with an acid load of 0 lb/day at this time. [The United States Army Corps of Engineers (USACE)] reported a mean annual pH value of 4.3 for 1973 and a mean annual pH of 4.2 in 1983. The mouth of Sandy Creek was sampled in March 1995 by WVDEP. Acidity exceeded alkalinity by 4 mg/l on this date, but the flow was too high to measure and loadings could not be determined (USACE, 1996, p. V-7).

WVDEP provides additional information about Maple Run:

> Water collection data within the Little Sandy Creek drainage area reveals that Maple Run makes up an average 20% of the flow of Little Sandy Creek. Samples collected along Maple Run show the mainstem to be contaminated with acid mine drainage throughout its entirety with the sources of pollution concentrated in the upper half of the watershed.
>
> Six sources of AMD were located within the Maple Run Drainage Area (WVDEP, 1987, p. 18).

3.0 REGULATORY BASIS FOR VARIANCE APPLICATION

Streams have designated uses which are described in §47-2-6.2 and include: water supply public, propagation and maintenance of fish and other aquatic life, water contact recreation, agriculture and wildlife, and water supply industrial/water transport/cooling and power. Water use categories are supported by both numeric and narrative criteria. Procedural Rules for Site-Specific Revisions to Water Quality Standards are described in 46 CSR 6 and include rules for promulgation of designated use reclassifications, site-specific criteria, and variances. WVDEP Office of Special Reclamation is proposing the following:

7.2.d.11.1. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Maple Run, Left Fork Little Sandy Creek, Left Fork Sandy Creek for the portion upstream of Stevensburg, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place:

Stream	pH	Total Iron	Dissolved Aluminum
Maple Run	3.3-9.0	2 mg/l	12 mg/l
Left Fork Little Sandy Creek	2.5-9.0	14 mg/l	33 mg/l
Left Fork Sandy Creek portion upstream of Stevensburg*	6.0-9.0	1.42 mg/l	0.43 mg/l

*WQBEL's

Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated and reported upon during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

It is also important to note that the attainment of the use cannot be remedied due to the metal loadings of the streams. A table has been included below showing that the metal loadings from the OSR sites only make up a small percentage of the total loadings as depicted by the corresponding TMDL's.

METAL LOADINGS

	TMDL LOADINGS			OSR LOADINGS	
STREAM	Fe	Al	SITE	Fe	Al
LITTLE SANDY	450.67	47.81	S-1018-88	0.03	0.03
MAPLE RUN		1.05	S-1036-91	0.22	0.06
SANDY	2185.79		S-57-84	0.03	0.22

4.0 REQUIRED INFORMATION

Pursuant to §46-6-3.1 a-g, the following information is required to be included in an application seeking reclassification of a designated use, a variance from numeric water quality criteria, or a site specific numeric criterion:

a. *A USGS 7.5 minute map showing those stream segments to be affected and showing all existing and proposed discharge points. In addition, the alphanumeric code of the affected stream, if known*:

A USGS 7.5 minute map showing the stream segments to be affected and showing all existing and proposed discharge points for Maple Run (MC-5), Left

Fork Little Sandy (MC-12-B),and Left Fork Sandy Creek (MT-18-E-3) have been provided; please refer to Attachment 1 at the end of this application.

b. *Existing water quality data for the stream or stream segment. Where adequate data are unavailable, additional studies may be required by the Board*:

LEFT FORK OF LITTLE SANDY (EXISTING CONDITIONS)

STREAM_NAME	SAMPLE_DATE	Al Dissolved	Fe Total	PH
Left Fork/Little Sandy	7/12/2012	32.6	14.1	2.59
Left Fork/Little Sandy	9/13/2012	29.8	13	2.78
Left Fork/Little Sandy	10/24/2012	21.8	11.7	3.05
Left Fork/Little Sandy	12/5/2012	5.67	5.04	3.55
Left Fork/Little Sandy	1/16/2013	1.53	3.22	4.38
Left Fork/Little Sandy	2/6/2013	6.77	11.8	3.2
Left Fork/Little Sandy	2/27/2013	4.13	6.1	3.56
Left Fork/Little Sandy	3/26/2013	7.42	12.1	3.37
Left Fork/Little Sandy	4/24/2013	7.17	7.48	3.34
Left Fork/Little Sandy	5/16/2013	5.22	8.05	3.49
Left Fork/Little Sandy	7/2/2013	4.31	3	3.58
Left Fork/Little Sandy	7/22/2013	13.6	8.87	2.85

MAPLE RUN (EXISTING CONDITIONS)

STREAM_NAME	SAMPLE_DATE	Al Dissolved	Fe Total	PH
Maple Run	7/12/2012	10.8	1.55	3.74
Maple Run	9/12/2012	12.2	0.75	3.6
Maple Run	10/18/2012	11.3	1.01	3.76
Maple Run	11/30/2012	9.65	1.69	3.61
Maple Run	1/15/2013	3.15	0.76	4.85
Maple Run	2/14/2013	4.67	1.45	3.83
Maple Run	2/27/2013	3.07	1.26	4.81
Maple Run	3/12/2013	3.25	1.23	4.6
Maple Run	4/3/2013	3.9	1	
Maple Run	5/15/2013	4.66	0.85	4.22
Maple Run	7/3/2013	2.85	0.66	4.37
Maple Run	7/22/2013	7.79	1.4	3.36

LEFT FORK SANDY CREEK (portion upstream of Stevensburg)(EXISTING CONTIONS)

STREAM_NAME	MILE_POINT	SAMPLE_DATE	l Dissolve	Fe Total	PH
Left Fork/Sandy Creek	4.6	07-Aug-12	0.05	0.23	6.67
Left Fork/Sandy Creek	4.6	18-Sep-12	0.06	0.48	6.84
Left Fork/Sandy Creek	4.6	24-Oct-12	0.06	0.04	6.75
Left Fork/Sandy Creek	4.6	05-Dec-12	0.04	0.16	6.45
Left Fork/Sandy Creek	4.6	16-Jan-13	0.05	0.51	6.3
Left Fork/Sandy Creek	4.6	06-Feb-13	0.04	0.12	6.1
Left Fork/Sandy Creek	4.6	27-Feb-13	0.05	0.16	6.13
Left Fork/Sandy Creek	4.6	20-Mar-13	0.03	0.18	6.15
Left Fork/Sandy Creek	4.6	24-Apr-13	0.027	0.23	6.96
Left Fork/Sandy Creek	4.6	26-Jun-13	0.049	0.08	6.54
Left Fork/Sandy Creek	4.6	30-Jul-13	0.071	0.08	6.59
Left Fork/Sandy Creek	4.6	19-Aug-13	0.075	0.39	6.8

Please refer to the following pages for historical water data as provided in the Sandy Creek of the Tygart Valley River Watershed-based plan prepared by Downstream Strategies on behalf of Save the Tygart Watershed Association. Also water data has been supplied as provide from DWWM.

c. *General land uses (e.g., mining, agricultural, recreation, residential, commercial, industrial, etc.) as well as specific land uses adjacent to the waters for the length of the segment proposed to be revised*:

A Total Maximum Daily Load (TMDL) was developed for the Tygart Valley River watershed, the land use coverage are as follows:

Maple Run, Left Fork Little Sandy, and Left Fork of Sandy Creek were calculated together and show 4% crop, 76% Forest, 17% Pasture, and 3% other.

d. The existing and designated uses of the receiving waters into which the segment in question discharges and the location where those downstream uses begin to occur:

Maple Run, Left Fork Little Sandy, Left Fork of Sandy Creek above Stevensburg, and tributaries thereof is designated as follows:

- Category A (Water Supply, Public), the closest downstream drinking water intake is greater than 5 miles downstream of our bond forfeiture site,
- Category B (Warm Aquatic Life), and
- Category C (Water Contact Recreation);

however, it is important to note that these streams have never been able to meet their designated use as a result of human-caused conditions (pre-law mining) that were in existence before the stream designations were assigned.

e. *General physical characteristics of the stream segment including, but not limited to, width, depth, bottom composition, and slope*:

Maple Run is located in Preston County and the watershed is approximately 4.75 square miles. The widths of the stream vary along its reach, 1 foot to 18 feet with the average width of 10 feet. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. Maple Run as a stream gradient is approximately 27,682 feet and has an overall slope of 1.39%.

Left Fork Little Sandy is located in Preston County and the watershed is approximately 7.91 square miles. The widths of the stream vary along its reach,

3 feet to 19 feet with the average width of 13.8 feet. The average instream water depth is approximately .36 foot deep. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. Left Fork Little Sandy as a stream gradient is approximately 38,358 feet and has an overall slope of 2.09%.

Left Fork of Sandy Creek above Stevensburg is located in Preston County and the watershed is approximately 2.77 square miles. The widths of the stream vary along the proposed reach, 4 feet to 13.5 feet with the average width of 7.6 feet. Stream bed substrate is comprised of mainly boulder and cobble; however, bedrock is more prominent in the upper reaches and gravel components increase towards the lower reaches. This section of Left Fork of Sandy Creek as a stream gradient is approximately 16,517 feet and has an overall slope of 6.2%.

f. *The average flow rate in the segment, the amount of flow at a designated control point, and a statement regarding whether the flow of the stream is ephemeral, intermittent, or perennial*:

Maple Run is a perennial stream with a watershed area of approximately 4.75 square miles. Average flow data for this stream is approximately 0.01cfs.

Left Fork Little Sandy is a perennial stream with a watershed area of approximately 7.91 square miles. Average flow data for this stream is approximately .12cfs

Left Fork Sandy Creek is a perennial stream with a watershed area of approximately 2.77 square miles. Average flow data for this stream is approximately 4.54cfs.

g. *An assessment of aquatic life in the stream segment in question and in the adjacent upstream and downstream segments*:

WVDEP describes ecological conditions in the watershed:

> The two streams, Sandy Creek and Little Sandy Creek, had impaired benthic communities. Three smaller streams not included on the 303(d) list were sampled as well and found supporting unimpaired benthic communities.
>
> The site on Sandy Creek is upstream of its confluence with Left Fork and almost 10 miles upstream from Tygart Lake. The water quality appeared to be unimpaired, but the habitat was likely limiting the benthic macroinvertebrate colonization potential. The substrate where the benthic sample was collected consisted of 90% gravel or smaller particles and the larger particles were over 75% embedded with sand and/or silt.
>
> Eight riffle/run kick samples were collected and both the average riffle depth and the average run depth were recorded as 0.1 meter. However, the recorder also indicated on the [rapid

bioassessment protocol] habitat assessment that shallow habitats less than 0.5 meters were entirely missing. Black fly larvae (*Simuliidae*) and midges (*Chironomidae*) comprised over 86 percent of the total number of organisms collected. The sample site had very little riffle/run habitat, yet only a few miles in either direction, where the stream's gradient is much steeper, such habitat was abundant. *Sandy Creek should be sampled at several locations to determine the extent of mine drainage impacts.* The available data indicate that upstream of Little Sandy Creek, the mainstem may not have been negatively impacted by mine drainage.

Little Sandy Creek was sampled less than half a mile from its mouth, near the point where Preston, Taylor, and Barbour counties meet. The pH was 3.5 and the net acidity was 89 mg/L on the day of sampling. This site had the highest concentration of aluminum measured in the entire Tygart Valley River watershed (10.0 mg/L). The iron concentration was also in violation of the state water quality standard. These data indicate this stream should remain on the 303(d) list. There was no riffle/run habitat, therefore the benthos were collected from woody snags and submerged aquatic plants. None of the organisms collected were from the [*Ephemeroptera, Plecotera,* and *Trichoptera*] orders (i.e., orders considered somewhat sensitive to pollution). (WVDEP, 2003a, p. 77-78, emphasis added)

5.0 ADDITIONAL REQUIRED INFORMATION

The following information is provided to support preparation of an information sheet (as is required under W.Va. C.S.R. 46-6-5.3), which summarizes the information in the application pertinent to the Board's Decision.

a. *The designated use categories outlined in 46 CSR 1 which apply to the stream*:

Maple Run, Left Fork Little Sandy, Left Fork of Sandy Creek, and tributaries thereof is designated as follows:

- Category A (Water Supply, Public), the closest downstream drinking water intake is greater than 5 miles downstream of our bond forfeiture site,
- Category B (Warm Aquatic Life), and
- Category C (Water Contact Recreation);

b. *The existing numeric water quality criterion which applies to the stream and for which the applicant seeks a variance, and the alternative numeric water quality criterion desired by the applicant*:

The existing numeric water quality criterion for these streams and tributaries thereof are as follows: Iron = 1.5 mg/l, Aluminum = 1.0 mg/l, pH = 6-9 su. The existing numeric water quality standards in the stream have never been able to be obtained as a result of human-caused conditions (pre-law mining) that were in existence before the criterions were assigned. The current worst case scenarios for the Sandy Creek watershed are 21.1 mg/l Fe, 34.3 mg/l Al, and 2.59 pH. The purpose of this variance is not to meet existing numeric water

quality criterion but to show overall improvement to the Sandy Creek watershed as a whole.

c. *Identification of the specific criterion outlined in section 3.1 a-f above which render the existing numeric water quality criterion unattainable*:

As mentioned above, the current worst case scenarios for the Sandy Creek watershed are 21.1 mg/l Fe, 34.3 mg/l Al, and 2.59 pH.

d. *Identification of the specific circumstances which render the discharger unable to meet the existing numeric water quality criteria which apply to the stream*:

Historically, various sources have documented AMD-related impairments in the watershed. For example:

> As a result of past coal mining activity 29 miles of the watershed has been severely degraded because of abandoned mines draining highly acidic and mineralized waters. Potential usage of its waters has been eliminated by this pollution. This chronic acid mine drainage causes damage to municipal water supplies, barges, boats, instream facilities, culverts, bridges, industrial water users, agricultural water supplies, aquatic life, water-based recreation, and waterfront property values. (WVDEP, 1987, p. 3)
> Sandy Creek watershed was documented in the 1982 Tygart Valley River Subbasin Abandoned Mine Drainage Assessment as contributing 49.5% of the total acid load to the Tygart between Philippi, WV and the mouth at Fairmont, WV. Water quality data collected during the assessment found 9325 lbs/day of acid being discharged into Tygart Reservoir from Sandy Creek. (WVDEP, 1987, p. 3).

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3. Final Water Quality Standards Legislative Rule

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 2
REQUIREMENTS GOVERNING WATER QUALITY STANDARDS

§47-2-1. General.

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

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

1.3. Filing Date. --

1.4. Effective Date. --

§47-2-2. Definitions.

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

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

2.2. Lakes

2.2a. “Cool water lakes” are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of cool water fish species or support cool water fish species, such as walleye and trout. “Cool water lakes” do not include those waters that receive stockings of trout, but that do not support year-round trout populations. (See Appendix F for a representative list.)

2.2.b. “Warm water lakes” are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of warm water fish species or support warm water fish species, such as bass and catfish.

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

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

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

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

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

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

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

2.10. "Outstanding national resource waters" are those waters whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or State resource.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.1. Certain characteristics of sewage, industrial wastes and other wastes cause pollution and are objectionable in all waters of the state. Therefore, the Secretary does hereby proclaim that the following general conditions are not to be allowed in any of the waters of the state.

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

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

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

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

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

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

3.2.f. Distinctly visible color;

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

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

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

§47-2-4. Antidegradation Policy.

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

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

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

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

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

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

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

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

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

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

subsection 7.1 of 60CSR5, those waters whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource.

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

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

§47-2-5. 7.1.ds.

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

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

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

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

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

5.2.d. Mixing zones, including zones of initial dilution, shall not interfere with fish spawning or nursery areas or fish migration routes; shall not overlap public water supply intakes or bathing areas;

cause lethality to or preclude the free passage of fish or other aquatic life; nor harm any threatened or endangered species, as listed in the Federal Endangered Species Act, 15 U.S.C. §1531 et seq.

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

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

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

5.2.h. Mixing zones shall not:

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

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

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

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

5.2.h.5. Overlap one another.

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

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

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

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

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

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

5.2.l. In order to facilitate a determination or assessment of a mixing zone pursuant to this section, the Secretary may require a permit applicant or permittee to submit such information as deemed necessary.

§47-2-6. Water Use Categories.

6.1. These rules establish general Water Use Categories and Water Quality Standards for the waters of the State. Unless otherwise designated by these rules, at a minimum all waters of the State are

designated for the Propagation and Maintenance of Fish and Other Aquatic Life (Category B) and for Water Contact Recreation (Category C) consistent with Federal Act goals. Incidental utilization for whatever purpose may or may not constitute a justification for assignment of a water use category to a particular stream segment.

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

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

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

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

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

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

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

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

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

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

6.1.d. In establishing a less restrictive use or uses, or subcategory of use or uses, and the water quality criteria based upon such uses, the Secretary shall follow the requirements for revision of water quality standards as required by W. Va. Code §22-11-7b and section 303 of the Federal Act and the regulations thereunder. Any revision of water quality standards shall be made with the concurrence of

EPA. The Secretary's administrative procedural regulations for applying for less restrictive uses or criteria shall be followed.

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

6.2.a. All community domestic water supply systems;

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

6.2.c. All private domestic water systems;

6.2.d. All other surface water intakes where the water is used for human consumption. (See Appendix B for partial listing of Category A waters; see section 7.2.a.2, herein for additional requirements for Category A waters.) The manganese human health criterion shall only apply within the five-mile zone immediately upstream above a known public or private water supply used for human consumption.

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

This category includes:

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

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

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

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

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

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

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

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

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

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

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

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

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

§47-2-7. West Virginia Waters.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.2.d.2. Potomac River

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

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

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

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

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

7.2.d.7. Monongahela River

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

7.2.d.8. Cheat River

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

7.2.d.8.2. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries.

The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

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

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

7.2.d.11. Tygart River

7.2.d.11.1. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Maple Run, Left Fork Little Sandy Creek, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: For Maple Run, pH range of 3.3-9.0, 2 mg/L total iron, and 12 mg/L dissolved aluminum; for Left Fork Little Sandy Creek, pH range of 2.5-9.0, 14 mg/L total iron, and 33 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated and reported upon during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

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

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

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

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

7.2.d.16. Ohio River Tributaries.

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

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

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

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

7.2.d.19.1. For the Kanawha River main stem, Zone 1, the minimum flow shall be 1,960 cfs at the Charleston gauge.

7.2.d.19.2. Pursuant to 46 CSR 6, a Copper Water Effect Ratio (WER) of 5.62 shall be applied to The Sanitary Board of the City of Charleston, West Virginia wastewater treatment plant discharge of total recoverable copper to Kanawha River, Zone 1.

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

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

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

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

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

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

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

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

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

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

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

7.2.d.29. New River

7.2.d.29.1. In Marr Branch, a tributary of the New River, a site-specific dissolved zinc criteria defined by the equation CMC=CCC=e0.8541*ln(hardness)+1.151 x CF shall apply for both chronic and acute exposures

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

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

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

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

7.2.d.34. Guyandotte River

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

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

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

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

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

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

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

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

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

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

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

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

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

8.2. Criteria for Toxicants

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

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

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

8.3. Criteria for Nutrients

8.3.a. Lakes

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX A
CATEGORY B-2 - TROUT WATERS

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

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

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

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

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

River Basin	County	Stream
Kanawha River		
KGC	Pocahontas-Webster-Nicholas	Cranberry River
KGC	Pocahontas	South Fork Cranberry River
KGW	Pocahontas	Tea Creek
KGW	Pocahontas-Webster	Williams River (Above Dyer)
KN	Raleigh	Glade Creek
KN	Summers	Meadow Creek
KN	Fayette	Mill Creek
KN	"	Laurel Creek (Above Cotton Hill)
KN	Raleigh	Pinch Creek
KN	Monroe	Rich Creek
KN	"	Turkey Creek
KN	Fayette	Dunloup Creek (Downstream from Harvey Sewage Treatment Plant)
KN	Mercer	East River (Above Kelleysville)
KN	"	Pigeon Creek
KN	Monroe	Laurel Creek
KNG	Monroe	Kitchen Creek (Above Gap Mills)
KNG	Greenbrier	Culverson Creek
KNG	"	Milligan Creek
KNG	Greenbrier-Monroe	Second Creek (Rt. 219 Bridge to Nickell's Mill)
KNG	Greenbrier	North Fork Anthony Creek
KNG	"	Spring Creek
KNG	"	Anthony Creek (Above Big Draft)
KNG	Pocahontas	Watoga Lake
KNG	"	Beaver Creek
KNG	"	Knapp's Creek
KNG	"	Hills Creek
KNG	"	North Fork Deer Creek (Above Route 28/5)
KNG	"	Deer Creek
KNG	"	Sitlington Creek
KNG	"	Stoney Creek
KNG	"	Swago Creek
KNG	"	Buffalo Fork (Impoundment)
KNG	"	Seneca (Impoundment)

KNG	"	Greenbrier River (Above Hosterman)
KNG	"	West Fork-Greenbrier River (Above the impoundment at the tannery)
KNG	"	Little River-East Fork
KNG	"	Little River-West Fork
KNG	"	Five Mile Run
KNG	"	Mullenax Run
KNG	"	Abes Run
KNB	Mercer	Marsh Fork
KNB	"	Camp Creek
OG	Wyoming	Pinnacle creek
BST	McDowell	Dry Fork (Above Canebrake)

APPENDIX B

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

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

M	Monongalia	Morgantown Water Comm.	Colburn Creek & Monongahela River
M	"	Morgantown Ordinance Works	Monongahela River
M	Preston	Preston County PSD	Deckers Creek
M	Monongalia	Blacksville # 1 Mine	Impoundment
M	"	Loveridge Mine	Impoundment
M	"	Consolidation Coal Co.	Impoundment
M	Preston	Mason Town Water	Block Run
MC	Preston	Fibair Inc.	Impoundment
MC	Monongalia	Cheat Neck PSD	Cheat Lake
MC	"	Lakeview County Club	Cheat Lake-Lake Lynn
River Basin	County	Operating Company	Source
Monongahela River			
MC	Monongalia	Union District PSD	Cheat Lake-Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	Preston	Hopemount State Hosp.	Snowy Creek
MC	"	Rowlesburg Water	Keyser Run & Cheat River
MC	"	Albright	Cheat River
MC	Tucker	Parsons Water	Shavers & Elk Lick Fork
MC	"	Thomas Municipal	Thomas Reservoir
MC	"	Hamrick PSD	Dry Fork
MC	"	Douglas Water System	Long Run
MC	"	Davis Water	Blackwater River
MC	"	Hambleton Water System	Roaring Creek
MC	"	Canaan Valley State	Blackwater River Park
MC	Pocahontas	Cheat Mt. Sewer	Shavers Lake
MC	"	Snowshoe Co. Water	Shavers Fork
MC	Randolph	Womelsdorf Water	Yokum Run
MW	Harrison	Lumberport Water	Jones Run
MW	"	Clarksburg Water Bd.	West Fork River
MW	"	Bridgeport Mun. Water	Deecons & Hinkle Creek
MW	"	Salem Water Board	Dog Run
MW	"	West Milford Water	West Fork River
MW	Lewis	W.V. Water-Weston District	West Fork River

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

River Basin		County	Operating Company	Source
Ohio River				
O	Zone 1	Hancock	Chester Water & Sewer	Ohio River
O	"	Brooke	City of Weirton	Ohio River
O	Zone 1	Brooke	Weirton Steel Division	Ohio River
O	"	Ohio	Wheeling Water	Ohio River
O	"	Tyler	Sistersville Mun. Water	Ohio River
O	"	Pleasants	Pleasants Power Station	Ohio River
O	"	Cabell	Huntington Water Corp.	Ohio River
O	"	Marshall	Mobay Chemical Co.	Ohio River
O	"	Wood	E. I. DuPont	Ohio River

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

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

KE	Webster	W.V. Water-Webster Springs	Elk River
KE		Holly River State Park	Holly River
Gauley River			
KG	Nicholas	Craigsville PSD	Gauley River
KG	"	Summersville Water	Impoundment/ Muddlety Creek
KG	"	Nettie-Leivasy PSD	Jim Branch
KG	Webster	Cowen PSD	Gauley River
KG	Nicholas	Wilderness PSD	Anglins Creek & Meadow River
KG	"	Richwood Water	North Fork Cherry River
KN	Fayette	Ames Heights Water	Mill Creek
KN	"	Mt. Hope Water	Impounded Mine (Surface)
KN	Fayette	Ansted Municipal Water	Mill Creek
River Basin	County	Operating Company	Source
New River			
KN	Fayette	Fayette Co. Park	Impoundment
KN	"	New River Gorge Campground	Impoundment
KN	"	Fayetteville Water	Wolfe Creek
KN	Raleigh	Beckley Water	Glade Creek
KN	"	Westmoreland Coal Co.	Farley Branch
Bluestone River			
KNB	Summers	Jumping Branch-Nimitz	Mt. Valley Lake
KNB	"	Bluestone Conf. Center	Bluestone Lake
KNB	"	Pipestem State Park	Impoundment
KNB	Mercer	Town of Athens	Impoundment
KNB	"	Bluewell PSD	Impoundment
KNB	"	Bramwell Water	Impoundment
KNB	"	Green Valley-Glenwood PSD	Bailey Reservoir
KNB	"	Kelly's Tank	Spring
KNB	"	W.V. Water Princeton	Impoundment/ Brusch Creek
KNB	"	Lashmeet PSD	Impoundment
KNB	"	Pinnacle Water Assoc.	Mine
KNB	"	W.V. Water Bluefield	Impoundment

River Basin	County	Operating Company	Source
Greenbrier River			
KNG	Summers	W.V. Water Hinton	Greenbrier River & New River
KNG	"	Big Bend PSD	Greenbrier River
KNG	Greenbrier	Alderson Water Dept.	Greenbrier River
KNG	"	Ronceverte Water	Greenbrier River
KNG	"	Lewisburg Water	Greenbrier River
KNG	Pocahontas	Denmar State Hospital Water	Greenbrier River
KNG	"	City of Marlinton Water	Knapp Creek
KNG	"	Cass Scenic Railroad	Leatherbark Creek
KNG	"	Upper Greenbrier PSD	Greenbrier River
KNG	"	The Hermitage	Greenbrier River
Guyandotte River			
OG	Cabell	Salt Rock PSD	Guyandotte River
OG	Lincoln	West Hamlin Water	Guyandotte River
OG	Logan	Logan Water Board	Guyandotte River
OG	"	Man Water Works	Guyandotte River
OG	"	Buffalo Creek PSD	Buffalo Creek/ Mine/Wells
OG	Logan	Chapmanville	Guyandotte River
OG	"	Logan PSD	Whitman Creek/ Guyandotte River
OG	Mingo	Gilbert Water	Guyandotte River
OG	Wyoming	Oceana Water	Laurel Fork
OG	"	Glen Rogers PSD	Impoundment
OG	Wyoming	Pineville Water	Pinnacle Creek
OG	Raleigh	Raleigh Co. PSD-Amigo	Tommy Creek
OMG	Cabell	Milton Water Works	Guyandotte River
OMG	"	Culloden PSD	Indian Fork Creek
Guyandotte River			
OMG	Putnam	Hurricane Municipal Water	Impoundment
OMG	Putnam	Lake Washington PSD	Lake Washington

Big Sandy River

BS	Wayne	Kenova Municipal Water	Big Sandy River
BS	"	Fort Gay Water	Tug Fork
BST	Mingo	Kermit Water	Tug Fork
BST	"	Matewan Water	Tug Fork
BST	"	A & H Coal Co., Inc.	Impoundment
BST	"	Williamson Water	Impoundment
BST	McDowell	City of Welch	Impoundment/Wells
BST	"	City of Gary	Impoundment/Mine

APPENDIX C
CATEGORY E-3 - POWER PRODUCTION

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

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

APPENDIX D
CATEGORY C - WATER CONTACT RECREATION

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

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

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

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

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.1 Dissolved Aluminum (ug/l) For water with pH <6.5 or >9.0	750xCF[5]	750xCF[5]	750xCF[5]	87xCF[5]			
8.1.1 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the four-day average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+0.9121)} \times CF^5$		X		X			
8.1.2 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the one-hour average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+1.8268)} \times CF^5$	X		X				
8.2. Acute and chronic aquatic life criteria for ammonia shall be determined using the National Criterion for Ammonia in Fresh Water[d] from USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014, December 1999)	X	X	X	X			
8.3 Antimony (ug/l)					4300	14	
8.4 Arsenic (ug/l)					10	10	100
8.4.1 Dissolved Trivalent Arsenic (ug/l)	340	150	340	150			

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.5 Barium (mg/l)						1.0	
8.6 Beryllium (ug/l)	130		130			4.0	
8.7 Cadmium (ug/l) Hardness (mg/l $CaCO_3$) — Soluble Cd 0 - 35 — 1.0 36 - 75 — 2.0 76 - 150 — 5.0 > 150 — 10.0						X	
8.7.1 10 ug/l in the Ohio River (O Zone 1) main stem (see section 7.1.d, herein)						X	
8.7.2 The four-day average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(0.7409[\ln(hardness)]-4.719)} \times CF$[5]		X		X			
8.7.3 The one-hour average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(1.0166[\ln(hardness)]-3.924)} \times CF$[5]	X		X				
8.8 Chloride (mg/l)	860	230	860	230	250	250	
8.9.1 Chromium, dissolved hexavalent (ug/l):	16	11	16	7.2		50	
8.9.2 Chromium, trivalent (ug/l) The one-hour average concentration of dissolved trivalent chromium determined by the following equation: $CrIII = e^{(0.8190[\ln(hardness)]+3.7256)} \times CF$[5]	X		X				

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.9.3 The four-day average concentration of dissolved trivalent chromium determined by the following concentration: $CrIII = e^{(0.8190[ln(hardness)]+0.6848)} \times CF^{5}$		X		X			
8.10 Copper (ug/l)						1000	
8.10.1 The four-day average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.8545[ln(hardness)]-1.702)} \times CF^{5}$		X		X			
8.10.2 The one-hour average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.9422[ln(hardness)]-1.700)} \times CF^{5}$	X		X				
8.11 Cyanide (ug/l) (As free cyanide $HCN+CN^{-}$)	22	5.0	22	5.0	5.0	5.0	
8.12 Dissolved Oxygen[c]: not less than 5 mg/l at any time.	X				X	X	X
8.12.1 Ohio River main stem - the average concentration shall not be less than 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time or place outside any established mixing zone - provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.	X						
8.12.2 Not less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.			X				

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.13 Fecal Coliform: Maximum allowable level of fecal coliform content for Water Contact Recreation (either MPN or MF) shall not exceed 200/100 ml as a monthly geometric mean based on not less than 5 samples per month; nor to exceed 400 /100 ml in more than ten percent of all samples taken during the month.					X	X	
8.13.1 Ohio River main stem (zone 1) - During the non-recreational season (November through April only) the maximum allowable level of fecal coliform for the Ohio River (either MPN or MF) shall not exceed 2000/100 ml as a monthly geometric mean based on not less than 5 samples per month.					X	X	
8.14 Fluoride (mg/l)						1.4	
8.14.1 Not to exceed 2.0 for category D1 uses.							X
8.15 Iron[c] (mg/l)		1.5		1.0		1.5	
8.16 Lead (ug/l)						50	
8.16.1 The four-day average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-4.705)} \times CF$[5]		X		X			
8.16.2 The one-hour average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-1.46)} \times CF$[5]	X		X				

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.17 Manganese (mg/l) (see §6.2.d)						1.0	
8.18 Mercury The total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury.					0.5	0.5	
8.18.1 Total mercury in any unfiltered water sample (ug/l):	2.4		2.4		0.15	0.14	
8.18.2 Methylmercury (water column) (ug/l):		.012		.012			
Nickel (ug/l)					4600	510	
8.19.1 The four-day average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+0.0584)} \times CF^{5}$		X		X			
8.19.2 The one-hour average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+2.255)} \times CF^{5}$	X		X				
8.20 Nitrate (as Nitrate-N) (mg/l)						10	
8.21 Nitrite (as Nitrite-N) (mg/l)	1.0		.060				
8.22 Nutrients							
Chlorophyll –a (µg/l) (see §47-2-8.3)							
Total Phosphorus (µg/l) (see §47-2-8.3)							

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.23 Organics							
Chlordane[b] (ng/l)	2400	4.3	2400	4.3	0.46	0.46	0.46
DDT[b] (ng/l)	1100	1.0	1100	1.0	0.024	0.024	0.024
Aldrin[b] (ng/l)	3.0		3.0		0.071	0.071	0.071
Dieldrin[b] (ng/l)	2500	1.9	2500	1.9	0.071	0.071	0.071
Endrin (ng/l)	180	2.3	180	2.3	2.3	2.3	2.3
Toxaphene[b] (ng/l)	730	0.2	730	0.2	0.73	0.73	0.73
PCB[b] (ng/l)		14.0		14.0	0.045	0.044	0.045
Methoxychlor (ug/l)		0.03		0.03	0.03	0.03	0.03
Dioxin (2,3,7,8- TCDD)[b] (pg/l)					0.014	0.013	0.014
Acrylonitrile[b] (ug/l)					0.66	0.059	
Benzene[b] (ug/l)					51	0.66	
1,2-dichlorobenzene (mg/l)					17	2.7	
1,3-dichlorobenzene (mg/l)					2.6	0.4	
1,4-dichlorobenzene (mg/l)					2.6	0.4	
2,4-dinitrotoluene[b] (ug/l)					9.1	0.11	
Hexachlorobenzene[b] (ng/l)					0.77	0.72	
Carbon tetrachloride[b] (ug/l)					4.4	0.25	
Chloroform[b] (ug/l)					470	5.7	
Bromoform[b] (ug/l)					140	4.3	

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Dichlorobromomethane[b] (ug/l)					17	0.55	
Methyl Bromide (ug/l)					1500	47	
Methylene Chloride[b] (ug/l)					590	4.6	
1,2-dichloroethane[b] (ug/l)					99	0.035	
1,1,1- trichloroethane[b] (mg/l)						12	
1,1,2,2-tetrachloroethane (ug/l)					11	0.17	
1,1-dichloroethylene[b] (ug/l)					3.2	0.03	
Trichloroethylene[b] (ug/l)					81	2.7	
Tetrachloroethylene[b] (ug/l)					8.85	0.8	
Toluene[b] (mg/l)					200	6.8	
Acenaphthene (ug/l)					990	670	
Anthracene (ug/l)					40,000	8,300	
Benzo(a) Anthracene[b] (ug/l)					0.018	0.0038	
Benzo(a) Pyrene[b] (ug/l)					0.018	0.0038	
Benzo(b) Fluoranthene[b] (ug/l)					0.018	0.0038	
Benzo(k) Fluoranthene[b] (ug/l)					0.018	0.0038	
Chrysene[b] (ug/l)					0.018	0.0038	
Dibenzo(a,h)Anthracene[b] (ug/l)					0.018	0.0038	
Fluorene (ug/l)					5300	1100	
Indeno(1,2,3-cd)Pyrene[b] (ug/l)					0.018	0.0038	

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Pyrene (ug/l)					4000	830	
2-Chloronaphthalene (ug/l)					1600	1000	
Phthalate esters[6] (ug/l)		3.0		3.0			
Vinyl chloride[b] (chloroethene) (ug/l)					525	2.0	
alpa-BHC (alpha- Hexachloro-cyclohexane)[b] (ug/l)					0.013	.0039	
beta-BHC(beta- Hexachloro-cyclohexane)[b] (ug/l)					0.046	0.014	
gamma-BHC (gamma- Hexachloro-cyclohexane)[b] (ug/l)	2.0	0.08	2.0	0.08	0.063	0.019	
Chlorobenzene (mg/l)					21	0.68	
Ethylbenzene (mg/l)					29	3.1	
Heptachlor[b] (ng/l)	520	3.8	520	3.8	0.21	0.21	
2-methyl-4,6-Dinitrophenol (ug/l)					765	13.4	
Fluoranthene (ug/l)					370	300	
8.23.1 When the specified criteria for organic chemicals listed in §8.23 are less than the practical laboratory quantification level, instream values will be calculated from discharge concentrations and flow rates, where applicable.							
8.24 pH[c] No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	X	X	X	X	X	X	X

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.25 Phenolic Materials							
8.25.1 Phenol (ug/l)					4,600,000	21,000	
8.25.2 2-Chlorophenol (ug/l)					400	120	
8.25.3 2,4-Dichlorophenol (ug/l)					790	93	
8.25.4 2,4-Dimethylphenol (ug/l)					2300	540	
8.25.5 2,4-Dinitrophenol (ug/l)					14,000	70	
8.25.6 Pentachlorophenol[b] (ug/l)					8.2	0.28	
8.25.6.a The one-hour average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-4.869)	X		X				
8.25.6.b The 4-day average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-5.134).		X		X			
8.25.7 2,4,6-Trichlorophenol[b] (ug/l)					6.5	2.1	
8.26 Radioactivity: Gross Beta activity not to exceed 1000 picocuries per liter (pCi/l), nor shall activity from dissolved strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3 pCi/l.	X		X		X	X	X

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.26.1 Gross total alpha particle activity (including radium-226 but excluding radon and uranium shall not exceed 15 pCi/l and combined radium-226 and radium-228 shall not exceed 5pCi/l; provided that the specific determination of radium-226 and radium-228 are not required if dissolved particle activity does not exceed 5pCi/l; the concentration of tritium shall not exceed 20,000 pCi/l; the concentration of total strontium-90 shall not exceed 8 pCi/l in the Ohio River main stem.	X		X		X	X	X
8.27 Selenium (ug/l) Water Column Concentration [f]		5		5		50	
8.27.1 Selenium (ug/g) [g] (based on instantaneous measurement) 8.0 ug/g Fish Whole-Body Concentration or 11.3 ug/g Fish Muscle (skinless, boneless filet)		X		X			
8.27.2 Selenium (ug/g) Fish Egg/Ovary Concentration [h] (based on instantaneous measurement)		15.8		15.8			

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.28 Silver (ug/l) Hardness Silver 0-50 1 51-100 4 101-200 12 >201 24				X		X	
8.28.1 0-50 1 51-100 4 101-200 12 201-400 24 401-500 30 501-600 43		X					
8.28.2 The one-hour average concentration of dissolved silver determined by the following equation: $Ag=e^{(1.72[ln(hardness)]-6.59)} \times CF$[5]	X		X				

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29 Temperature Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 87°F at any time during months of May through November and not to exceed 73°F at any time during the months of December through April. During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water more than 5°F above natural temperature. In lakes and reservoirs, the temperature of the epilimnion should not be raised more than 3°F by the addition of heat of artificial origin. The normal daily and seasonable temperature fluctuations that existed before the addition of heat due to other natural causes should be maintained.	X						
8.29.1 For the Kanawha River Main Stem (K-1): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 90°F in any case.	X						
8.29.2 No heated effluents will be discharged in the vicinity of spawning areas. The maximum temperatures for cold waters are expressed in the following table: Daily Mean °F / Hourly Max °F Oct-Apr 50 / 55 Sep-&May 58 / 62 Jun-Aug 66 / 70			X				

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29.3 For Ohio River Main Stem (01) (see section 7.1.d, herein): Dates — Period Ave. — Inst. Max. Jan 1-31 — 45°F — 50°F February — 45 — 50 March 1-15 — 51 — 56 March 16-31 — 54 — 59 April 1-15 — 58 — 64 April 16-30 — 64 — 69 May 1-15 — 68 — 73 May 16-31 — 75 — 80 June 1-15 — 80 — 85 June 16-30 — 83 — 87 July 1-31 — 84 — 89 August 1-31 — 84 — 89 Sept 1-15 — 84 — 87 Sept 16-30 — 82 — 86 Oct 1-15 — 77 — 82 Oct 16-31 — 72 — 77 Nov 1-30 — 67 — 72 Dec 1-31 — 52 — 57	X						
8.30 Thallium (ug/l)					6.3	1.7	
8.31 Threshold odor[c] Not to exceed a threshold odor number of 8 at 104°F as a daily average.		X		X	X	X	
8.32 Total Residual Chlorine (ug/l - measured by amperometric or equivalent method)	19	11					
8.32.1 No chlorinated discharge allowed			X				

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.33 Turbidity No point or non-point source to West Virginia's waters shall contribute a net load of suspended matter such that the turbidity exceeds 10 NTU's over background turbidity when the background is 50 NTU or less, or have more than a 10% increase in turbidity (plus 10 NTU minimum) when the background turbidity is more than 50 NTUs. This limitation shall apply to all earth disturbance activities and shall be determined by measuring stream quality directly above and below the area where drainage from such activity enters the affected stream. Any earth disturbing activity continuously or intermittently carried on by the same or associated persons on the same stream or tributary segment shall be allowed a single net loading increase.		X		X	X	X	
8.33.1 This rule shall not apply to those activities at which Best Management Practices in accordance with the State's adopted 208 Water Quality Management Plan are being utilized, maintained and completed on a site-specific basis as determined by the appropriate 208 cooperative or an approved Federal or State Surface Mining Permit is in effect. This exemption shall not apply to Trout Waters.		X			X	X	
8.34 Zinc (ug/l) The four-day average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF^{5}$		X		X			

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.34.1 The one-hour average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[ln(hardness)]+0.884)} \times CF$[5]	X		X				

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[3] These criteria have been calculated to protect human health from toxic effects through fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[4] These criteria have been calculated to protect human health from toxic and/or organoleptic effects through drinking water and fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[5] The appropriate Conversion Factor (CF) is a value used as a multiplier to derive the dissolved aquatic life criterion is found in Appendix E, Table 2.
[6] Phthalate esters are determined by the summation of the concentrations of Butylbenzyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Di-n-Butyl Phthalate and Di-n-Octyl Phthalate.
[a] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.
[b] Known or suspected carcinogen. Human health standards are for a risk level of 10^{-6}.
[c] May not be applicable to wetlands (B4) - site-specific criteria are desirable.
[d] The early life stage equation in the National Criterion shall be used to establish chronic criteria throughout the state unless the applicant demonstrates that no early life stages of fish occur in the affected water(s).
[e] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 26 mg/l, even if the actual ambient hardness is less than 26 mg/l. The maximum hardness value for use in this equation shall not exceed 200 mg/l even if the actual hardness is greater than 200 mg/l.
[f] Water column values take precedence over fish tissue values when new inputs of selenium occur in waters previously unimpacted by selenium, until equilibrium is reached between the water column and fish tissue.
[g] Overrides any water column concentration when water concentrations and either fish whole body or fish muscle (skinless, boneless filet) are measured, except in situations described in footnote [f]
[h] Overrides any fish whole-body, fish muscle (skinless, boneless filet), or water column concentration when fish egg/ovary concentrations are measured, except in situations described in footnote [f]

APPENDIX E

TABLE 2

Conversion Factors

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

APPENDIX F
COOL WATER LAKES

This list contains lakes to be managed for cool water fisheries and is not intended to exclude any waters which meet the definition in Section 2.2.

River Basin	County	Lake
Potomac River		
PC	Hardy Lost River	Trout Pond (Impoundment)
PC	Hardy Lost River	Rock Cliff Lake (Impoundment)
PSB	Pendleton	Hawes Run (Impoundment)
PNB	Mineral	New Creek Dam 14(Impoundment)
Monongahela River		
MC	Monongalia	Coopers Rock (Impoundment)
MC	Monongalia	Cheat Lake
MC	Tucker	Thomas Park (Impoundment)
MC	Randolph	Spruce Knob Lake (Impoundment)
MT	Taylor	Tygart Lake
MW	Lewis	Stonecoal Lake
Kanawha River		
KC	Raleigh	Stephens Lake (Impoundment)
KG	Nicholas	Summersville Reservoir (Impoundment)
KG	Greenbrier	Summit Lake (Impoundment)
KNG	Pocahontas	Watoga Lake
KNG	Pocahontas	Buffalo Fork (Impoundment)
KNG	Pocahontas	Seneca (Impoundment)
KCG	Pocahontas	Handley Pond
Guyandotte River		
OG	Wyoming/Mingo	RD Bailey Lake

4. Materials for Revision of 47CSR2

House Bill 117, authorizing promulgation of 47 C.S.R. 2

Amended rule with strikethrough/underline revisions, as revised during 2016 Legislative session

WEST VIRGINIA LEGISLATURE

2016 FIRST EXTRAORDINARY SESSION

ENROLLED

Committee Substitute

for

House Bill 117

BY MR. SPEAKER (MR. ARMSTEAD) AND DELEGATE MILEY

BY REQUEST OF THE EXECUTIVE

[Passed June 2, 2016; in effect from passage.]

AN ACT to amend and reenact article three, chapter sixty-four of the Code of West Virginia, 1931, as amended, relating generally to administrative rules of the Department of Environmental Protection; legislatively mandating or authorizing for the promulgation of certain legislative rules by various executive or administrative agencies of the state; authorizing certain of the agencies to promulgate certain legislative rules in the form that the rules were filed in the State Register; authorizing certain of the agencies to promulgate certain legislative rules with various modifications presented to and recommended by the Legislative Rule-Making Review Committee; repealing certain legislative, procedural or interpretive rules promulgated by certain agencies, boards and commissions which are no longer authorized or are obsolete; repealing certain legislative, procedural and interpretive rules promulgated by certain agencies and boards under the Department of Environmental Protection; repealing the Department of Environmental Protection legislative rule relating to requiring the submission of emission statements for volatile organic compound emissions and oxides; repealing the Department of Environmental Protection legislative rule relating to bona fide future use; repealing the Department of Environmental Protection legislative rule relating to abandoned wells; repealing the Department of Environmental Protection legislative rule relating to the Environmental Excellence Program; repealing the Department of Environmental Protection legislative rule relating to oil and gas operations – solid waste; repealing the Department of Environmental Protection legislative rule relating to the Recycling Assistance Fund Grant Program; repealing the Department of Environmental Protection legislative rule relating to commercial hazardous waste management facility siting fees; repealing the Department of Environmental Protection legislative rule relating to groundwater protection standards; repealing the Department of Environmental Protection legislative rule relating to Underground Storage Tank Insurance Trust Fund; repealing the Department of Environmental Protection legislative rule relating to hazardous waste management; repealing the Department of Environmental Protection

legislative rule relating to solid waste management; repealing the Department of Environmental Protection legislative rule relating to waste tire management; repealing the Department of Environmental Protection legislative rule relating to sewage sludge management; repealing the Department of Environmental Protection legislative rule relating to Hazardous Waste Emergency Response Fund regulations; repealing the Department of Environmental Protection interpretive rule relating to initial inspection, certification and spill prevention response plan requirements; repealing the Department of Environmental Protection legislative rule relating to the Office of the Environmental Advocate; repealing the Department of Environmental Protection legislative rule relating to coal refuse; repealing the Department of Environmental Protection procedural rule relating to administrative procedures and civil administrative penalty assessment – Water Resources Protection Act; repealing the Department of Environmental Protection procedural rule relating to procedures and practice before the Department of Energy; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to the control of annual nitrogen oxide emissions; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to the control of air pollution from combustion of solid waste; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to the control of air pollution from hazardous waste treatment, storage and disposal facilities; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to emission standards for hazardous air pollutants; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to control of ozone season nitrogen oxides emissions; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to control of annual sulfur dioxide emissions; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to surface mining reclamation; authorizing the Department of Environmental Protection to promulgate a

legislative rule relating to administrative proceedings and civil penalty assessment; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to above ground storage tank fee assessments; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to above ground storage tank administrative proceedings and civil penalty assessment; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to requirements governing water quality standards; authorizing the Department of Environmental Protection to promulgate a legislative rule relating to above ground storage tanks, authorizing the Department of Environmental Protection to promulgate a legislative rule relating to horizontal well development; repealing the Commercial Hazardous Waste Management Facility Siting Board legislative rule relating to certification requirements; repealing the Environmental Quality Board legislative rule relating to requirements governing water quality standards; repealing the Environmental Quality Board procedural rule relating to requests for information; repealing the Environmental Quality Board procedural rule relating to rules governing the notice of open meetings under the Open Governmental Proceedings Act; repealing the Miner Training, Education and Certification Board legislative rule relating to certification of blasters for surface coal mines and surface areas of underground mines; repealing the Miner Training, Education and Certification Board legislative rule relating to standards for certification of blasters for surface coal mines and surface areas of underground mines; repealing the Miner Training, Education and Certification Board procedural rule relating to temporary suspension of certificates issued to persons pending full hearing before the board of appeals; repealing the Water Resources Board legislative rule relating to the State National Pollutant Discharge Elimination System Program; repealing the Water Resources Board legislative rule relating to requirements governing the State National Pollutant Discharge Elimination System; repealing the Air Quality Board procedural rule relating to requests for

information; and repealing the Oil and Gas Inspectors Examining Board procedural rule relating to matters pertaining to the rules and regulations dealing with the Oil and Gas Inspectors Examining Board.

Be it enacted by the Legislature of West Virginia:

That article 3, chapter 64 of the Code of West Virginia, 1931, as amended, be amended and reenacted to read as follows:

ARTICLE 3. AUTHORIZATION FOR DEPARTMENT OF ENVIRONMENTAL PROTECTION TO PROMULGATE LEGISLATIVE RULES AND REPEAL OF UNAUTHORIZED AND OBSOLETE LEGISLATIVE RULES OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

§64-3-1. Department of Environmental Protection.

(a) The legislative rule effective on July 7, 1993, authorized under the authority of section five, article twenty, chapter sixteen of this code, relating to the Department of Environmental Protection (requiring the submission of emission statements for volatile organic compound emissions and oxides, 45 CSR 29), is repealed.

(b) The legislative rule effective on July 1, 1993, authorized under the authority of section one, article one, chapter twenty-two-b of this code, relating to the Department of Environmental Protection (bona fide future use, 38 CSR 21), is repealed.

(c) The legislative rule effective on July 1, 1993, authorized under the authority of section thirteen, article one, chapter twenty-two of this code, relating to the Department of Environmental Protection (abandoned wells, 38 CSR 22), is repealed.

(d) The legislative rule effective on July 1, 2008, authorized under the authority of section four, article twenty-five, chapter twenty-two of this code, relating to the Department of Environmental Protection (Environmental Excellence Program, 60 CSR 8), is repealed.

(e) The legislative rule effective on June 12, 1987, authorized under the authority of

section three, article one, chapter twenty-two of this code, relating to the Department of Environmental Protection (oil and gas operations – solid waste, 35 CSR 2), is repealed.

(f) The legislative rule effective on May 1, 2000, authorized under the authority of section five-a, article eleven, chapter twenty of this code, relating to the Department of Environmental Protection (Recycling Assistance Fund Grant Program, 58 CSR 5), is repealed.

(g) The legislative rule effective on June 1, 1994, authorized under the authority of section six, article five, chapter twenty-two-c of this code, relating to the Department of Environmental Protection (commercial hazardous waste management facility siting fees, 33 CSR 21), is repealed.

(h) The legislative rule effective on April 25, 1984, authorized under the authority of article eighteen, chapter twenty-two of this code, relating to the Department of Environmental Protection (groundwater protection standards, 33 CSR 23), is repealed.

(i) The legislative rule effective on July 1, 1999, authorized under the authority of section six, article seventeen, chapter twenty-two of this code, relating to the Department of Environmental Protection (Underground Storage Tank Insurance Trust Fund, 33 CSR 32), is repealed.

(j) The legislative rule effective on June 1, 1996, authorized under the authority of section one, article eighteen, chapter twenty-two of this code, relating to the Department of Environmental Protection (hazardous waste management, 47 CSR 35), is repealed.

(k) The legislative rule effective on June 2, 1996, authorized under the authority of section five, article fifteen, chapter twenty-two of this code, relating to the Department of Environmental Protection (solid waste management, 47 CSR 38), is repealed.

(l) The legislative rule effective on June 2, 1996, authorized under the authority of section three, article one, chapter twenty-two of this code, relating to the Department of Environmental Protection (waste tire management, 47 CSR 38G), is repealed.

(m) The legislative rule effective on May 1, 1996, authorized under the authority of section

twenty, article fifteen, chapter twenty-two of this code, relating to the Department of Environmental Protection (sewage sludge management, 47 CSR 38D), is repealed.

(n) The legislative rule effective on April 14, 1997, authorized under the authority of section five, article five-g, chapter twenty of this code, relating to the Department of Environmental Protection (Hazardous Waste Emergency Response Fund regulations, 47 CSR 40B), is repealed.

(o) The interpretive rule effective on November 20, 2014, authorized under the authority of section twenty-three, article thirty, chapter twenty-two of this code, relating to the Department of Environmental Protection (initial inspection, certification and spill prevention response plan requirements, 47 CSR 62), is repealed.

(p) The legislative rule effective on July 1, 1997, authorized under the authority of section three, article one, chapter twenty-two of this code, relating to the Department of Environmental Protection (Office of the Environmental Advocate, 60 CSR 1), is repealed.

(q) The legislative rule effective on June 13, 1985, authorized under the authority of article six, chapter twenty of this code, relating to the Department of Environmental Protection (coal refuse, 38 CSR 2B), is repealed.

(r) The procedural rule effective on May 16, 2005, authorized under the authority of section six, article one, chapter twenty-two of this code, relating to the Department of Environmental Protection (administrative procedures and civil administrative penalty assessment – Water Resources Protection Act, 60 CSR 6), is repealed.

(s) The procedural rule effective on January 30, 1983, authorized under the authority of section one, article three, chapter twenty-two-a of this code, relating to the Department of Environmental Protection (procedures and practice before the Department of Energy, 38 CSR 1), is repealed.

(t) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (control of annual nitrogen oxide emissions, 45 CSR 39),

is authorized.

(u) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (control of air pollution from combustion of solid waste, 45 CSR 18), is authorized.

(v) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (control of air pollution from hazardous waste treatment, storage and disposal facilities, 45 CSR 25), is authorized.

(w) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (emission standards for hazardous air pollutants, 45 CSR 34), is authorized.

(x) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (control of ozone season nitrogen oxides emissions, 45 CSR 40), is authorized.

(y) The legislative rule filed in the State Register on July 24, 2015, authorized under the authority of section four, article five, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Air Quality (control of annual sulfur dioxide emissions, 45 CSR 41), is authorized.

(z) The legislative rule filed in the State Register on July 27, 2015, authorized under the authority of section thirteen, article three, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Division of Mining and Reclamation (surface mining reclamation, 38 CSR 2), is authorized with the following amendments set forth below:

On page 48, subdivision 3.27, after the word “ongoing” by inserting the following: “Once an operation has received a waiver of the renewal requirement, it is exempt from the restriction contained in paragraph 11.4.a.2 of this rule regarding changing from full permit bonding to incremental bonding, and the operation may submit a bonding revision to the Secretary for approval.”

And,

On page 135, paragraph 11.4.a.2.after the words “terms of the permit” by adding the following proviso: “*Provided*, That operations that have received a waiver of the renewal requirement are exempt, and the operation may submit a bonding revision to the Secretary for approval.”

(aa) The legislative rule filed in the State Register on July 27, 2015, authorized under the authority of section twenty-two, article eleven, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Water and Waste Management (administrative proceedings and civil penalty assessment, 47 CSR 30B), is authorized.

(bb) The legislative rule filed in the State Register on July 31, 2015, authorized under the authority of section five, article thirty, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Water and Waste Management (above ground storage tank fee assessments, 47 CSR 64), is authorized.

(cc) The legislative rule filed in the State Register on July 31, 2015, authorized under the authority of section five, article thirty, chapter twenty-two, of this code, relating to the Department of Environmental Protection, Department of Environmental Protection, Water and Waste Management (above ground storage tank administrative proceedings and civil penalty assessment, 47 CSR 65), is authorized.

(dd) The legislative rule filed in the State Register on July 31, 2015, authorized under the authority of section four, article eleven, chapter twenty-two, of this code, modified by the Department of Environmental Protection, Water and Waste Management to meet the objections

of the Legislative Rule-making Review Committee and refiled in the State Register on November 24, 2015, relating to the Department of Environmental Protection, Water and Waste Management (requirements governing water quality standards, 47 CSR 2), is authorized with the following amendments set forth below:

On page 46, in the column labeled "parameter", immediately following "8.27.1 Selenium (ug/g)" by inserting the following: "[g] (based on instantaneous measurement)

8.0 ug/g Fish Whole-body Concentration or

11.3 ug/g Fish muscle (skinless, boneless filet)";

On page 46, in the column labeled "parameter", immediately following "8.27.2 Selenium (ug/g) Fish Egg/Ovary Concentration[h]" by inserting the following: "(based on instantaneous measurement)"

On page 47, in the columns labeled "Chron[2]" by inserting the following in each of the two vacant spaces: "X";

On page 51, note g., after the words "concentration when" by striking the words "both fish tissue and";

On page 51, note g, immediately following the words "water concentrations" by inserting the following: "and either whole body or fish muscle (skinless, boneless filet)";

On page 51, note h, immediately following the word "any" by inserting the following: "fish";

And,

On page 51, note h, immediately following the word "whole-body" by inserting the following: "fish muscle (skinless, boneless filet)";

(ee) The legislative rule filed in the State Register on July 31, 2015, authorized under the authority of section five, article thirty, chapter twenty-two, of this code, modified by the Department of Environmental Protection, Water and Waste Management to meet the objections of the Legislative Rule-making Review Committee and refiled in the State Register on November 24, 2015, relating to the Department of Environmental Protection, Water and Waste Management

(above ground storage tanks, 47 CSR 63), is authorized with the following amendments set forth below:

On page one, paragraph 1.5.a.2., after the word "equipment;" by striking out the word "and";

On page one, paragraph 1.5.a.3., after the word "motors", by changing the period to a semicolon;

On page one, after paragraph 1.5.a.3., by adding the following new paragraphs:

"1.5.a.4. Tanks containing blasting agents or explosives as defined in 199 CSR 1; and

1.5.a.5. Aboveground storage tanks that contain water treatment chemicals used for maintaining compliance with NPDES permit effluent limits in treatment systems that are located at facilities subject to either the Groundwater Protection Rules for Coal Mining Operations (38 CSR 2F) or a Coal Mining NPDES permit issued pursuant to 47 CSR 30 are not Level 1 tanks for the purpose of this rule unless the tank is located within a zone of critical concern."

And,

On page forty-one, after paragraph 8.2.e.4., by adding the following new subdivision:

"8.2.f. For any new regulated AST to be constructed in karst terrain, which are areas generally underlain by limestone or dolomite, in which the topography is formed chiefly by the dissolving of rock and which may be characterized by sinkholes, sinking streams, closed depressions, subterranean drainage and caves, as such areas are identified, mapped and published by the West Virginia Geological and Economic Survey, the tank owner must submit to the Secretary documentation of the new construction design criteria and engineering specifications to indicate that surface or subsurface conditions will not result in excessive settling or unstable support of the proposed regulated AST, as approved by a professional engineering or an individual certified by API or STI to perform installations or a person holding certification under another program."

(ff) The legislative rule filed in the State Register on July 31, 2015, authorized under the authority of section six, article six-a, chapter twenty-two, of this code, modified by the Department of Environmental Protection, Oil and Gas to meet the objections of the Legislative Rule-making Review Committee and refiled in the State Register on November 23, 2015 relating to the Department of Environmental Protection, Oil and Gas (horizontal well development, 35 CSR 8), is authorized.

§64-3-2. Commercial Hazardous Waste Management Facility Siting Board.

The legislative rule effective on May 19, 1994, authorized under the authority of section three, article ten, chapter twenty of this code, relating to the Commercial Hazardous Waste Management Facility Siting Board (certification requirements, 57 CSR 1), is repealed.

§64-3-3. Environmental Quality Board.

(a) The legislative rule effective on June 30, 2005, authorized under the authority of section four, article three, chapter twenty-two-b of this code, relating to the Environmental Quality Board (requirements governing water quality standards, 46 CSR 1), is repealed.

(b) The procedural rule effective on February 19, 1996, authorized under the authority of section three, article three, chapter twenty-nine-a of this code, relating to the Environmental Quality Board (requests for information, 46 CSR 8), is repealed.

(c) The procedural rule effective on July 27, 1984, authorized under the authority of section three, article one, chapter twenty-two-b of this code, relating to the Environmental Quality Board (rules governing the notice of open meetings under the Open Governments Proceedings Act, 46 CSR 5), is repealed.

§64-3-4. Miner Training, Education and Certification Board.

(a) The legislative rule effective on June 1, 1992, authorized under the authority of section six, article nine, chapter twenty-two of this code, relating to the Miner Training, Education and Certification Board (certification of blasters for surface coal mines and surface areas of underground mines, 48 CSR 5), is repealed.

(b) The legislative rule effective on July 1, 1993, authorized under the authority of section six, article nine, chapter twenty-nine of this code, relating to the Miner Training, Education and Certification Board (standards for certification of blasters for surface coal mines and surface areas of underground mines, 56 CSR 5), is repealed.

(c) The procedural rule effective on September 11, 1983, authorized under the authority of section eight, article three, chapter twenty-nine-a of this code, relating to the Miner Training, Education and Certification Board (temporary suspension of certificates issued to persons pending full hearing before the board of appeals, 48 CSR 16), is repealed.

§64-3-5 Water Resources Board.

(a) The legislative rule effective on August 25, 1993, authorized under the authority of article five-a, chapter twenty of this code, relating to the Water Resources Board (State National Pollutant Discharge Elimination System Program, 46 CSR 2), is repealed.

(b) The legislative rule effective on July 1, 1987, authorized under the authority of article five-a, chapter twenty of this code, relating to the Water Resources Board (requirements governing the State National Pollutant Discharge Elimination System, 46 CSR 3), is repealed.

§64-3-6. Air Quality Board.

The procedural rule effective on February 2, 1996, authorized under the authority of section three, article three, chapter twenty-nine-a of this code, relating to the Air Quality Board (requests for information, 52 CSR 2), is repealed.

§64-3-7. Oil and Gas Inspectors Examining Board.

The procedural rule effective on January 18, 2009, authorized under the authority of section three, article seven, chapter twenty-two-c of this code, relating to the Oil and Gas Inspectors Examining Board (matters pertaining to the rules and regulations dealing with the Oil and Gas Inspectors Examining Board, 40 CSR 1), is repealed.

TITLE 47
LEGISLATIVE RULE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCES

SERIES 2
REQUIREMENTS GOVERNING WATER QUALITY STANDARDS

§47-2-1. General.

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

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

1.3. Filing Date. -- ~~May 4, 2015.~~

1.4. Effective Date. -- ~~June 1, 2015.~~

§47-2-2. Definitions.

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

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

2.2. Lakes

2.2a. “Cool water lakes” are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of cool water fish species or support cool water fish species, such as walleye and trout. “Cool water lakes” do not include those waters that receive stockings of trout, but that do not support year-round trout populations. (See Appendix F for a representative list.)

2.2.b. “Warm water lakes” are lentic water bodies that have a summer hydraulic residence time greater than 14 days, and are either managed by the West Virginia Division of Natural Resources for the support of warm water fish species or support warm water fish species, such as bass and catfish.

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

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

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

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

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

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

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

2.10. "Outstanding national resource waters" are those waters whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or State resource.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.1. Certain characteristics of sewage, industrial wastes and other wastes cause pollution and are objectionable in all waters of the state. Therefore, the Secretary does hereby proclaim that the following general conditions are not to be allowed in any of the waters of the state.

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

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

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

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

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

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

3.2.f. Distinctly visible color;

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

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

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

§47-2-4. Antidegradation Policy.

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

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

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

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

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

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

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

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

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

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

subsection 7.1 of 60CSR5, those waters whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource.

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

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

§47-2-5. 7.1.ds.

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

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

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

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

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

5.2.d. Mixing zones, including zones of initial dilution, shall not interfere with fish spawning or nursery areas or fish migration routes; shall not overlap public water supply intakes or bathing areas;

cause lethality to or preclude the free passage of fish or other aquatic life; nor harm any threatened or endangered species, as listed in the Federal Endangered Species Act, 15 U.S.C. §1531 et seq.

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

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

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

5.2.h. Mixing zones shall not:

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

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

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

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

5.2.h.5. Overlap one another.

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

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

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

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

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

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

5.2.l. In order to facilitate a determination or assessment of a mixing zone pursuant to this section, the Secretary may require a permit applicant or permittee to submit such information as deemed necessary.

§47-2-6. Water Use Categories.

6.1. These rules establish general Water Use Categories and Water Quality Standards for the waters of the State. Unless otherwise designated by these rules, at a minimum all waters of the State are

designated for the Propagation and Maintenance of Fish and Other Aquatic Life (Category B) and for Water Contact Recreation (Category C) consistent with Federal Act goals. Incidental utilization for whatever purpose may or may not constitute a justification for assignment of a water use category to a particular stream segment.

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

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

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

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

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

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

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

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

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

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

6.1.d. In establishing a less restrictive use or uses, or subcategory of use or uses, and the water quality criteria based upon such uses, the Secretary shall follow the requirements for revision of water quality standards as required by W. Va. Code §22-11-7b and section 303 of the Federal Act and the regulations thereunder. Any revision of water quality standards shall be made with the concurrence of

EPA. The Secretary's administrative procedural regulations for applying for less restrictive uses or criteria shall be followed.

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

6.2.a. All community domestic water supply systems;

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

6.2.c. All private domestic water systems;

6.2.d. All other surface water intakes where the water is used for human consumption. (See Appendix B for partial listing of Category A waters; see section 7.2.a.2, herein for additional requirements for Category A waters.) The manganese human health criterion shall only apply within the five-mile zone immediately upstream above a known public or private water supply used for human consumption.

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

This category includes:

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

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

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

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

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

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

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

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

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

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

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

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

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

§47-2-7. West Virginia Waters.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7.2.d.2. Potomac River

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

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

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

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

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

7.2.d.7. Monongahela River

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

7.2.d.8. Cheat River

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

7.2.d.8.2. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Martin Creek of Preston County and its tributaries, including Glade Run, Fickey Run, and their unnamed tributaries.

The following existing conditions will serve as instream interim criteria while this variance is in place: pH range of 3.2-9.0, 10 mg/L total iron, and 15 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

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

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

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

7.2.d.11.1. A variance pursuant to 46 CSR 6, Section 5.1, based on human-caused conditions which prohibit the full attainment of any designated use and cannot be immediately remedied, shall apply to WV DEP Division of Land Restoration's Office of Special Reclamation's discharges into Maple Run, Left Fork Little Sandy Creek, and their unnamed tributaries. The following existing conditions will serve as instream interim criteria while this variance is in place: For Maple Run, pH range of 3.3-9.0, 2 mg/L total iron, and 12 mg/L dissolved aluminum; for Left Fork Little Sandy Creek, pH range of 2.5-9.0, 14 mg/L total iron, and 33 mg/L dissolved aluminum. Alternative restoration measures, as described in the variance application submitted by WV DEP Division of Land Restoration's Office of Special Reclamation, shall be used to achieve significant improvements to existing conditions in these waters during the variance period. Conditions will be evaluated and reported upon during each triennial review throughout the variance period. This variance shall remain in effect until action by the Secretary to revise the variance or until July 1, 2025, whichever comes first.

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

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

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

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

7.2.d.16. Ohio River Tributaries.

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

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

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

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

7.2.d.19.1. For the Kanawha River main stem, Zone 1, the minimum flow shall be 1,960 cfs at the Charleston gauge.

7.2.d.19.2. Pursuant to 46 CSR 6, a Copper Water Effect Ratio (WER) of 5.62 shall be applied to The Sanitary Board of the City of Charleston, West Virginia wastewater treatment plant discharge of total recoverable copper to Kanawha River, Zone 1.

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

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

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

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

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

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

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

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

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

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

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

7.2.d.29. New River

7.2.d.29.1. In Marr Branch, a tributary of the New River, a site-specific dissolved zinc criteria defined by the equation CMC=CCC=e0.8541*ln(hardness)+1.151 x CF shall apply for both chronic and acute exposures

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

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

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

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

7.2.d.34. Guyandotte River

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

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

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

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

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

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

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

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

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

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

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

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

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

8.2. Criteria for Toxicants

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

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

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

8.3. Criteria for Nutrients

8.3.a. Lakes

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX A
CATEGORY B-2 - TROUT WATERS

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

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

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

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

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

River Basin	County	Stream
Kanawha River		
KGC	Pocahontas-Webster-Nicholas	Cranberry River
KGC	Pocahontas	South Fork Cranberry River
KGW	Pocahontas	Tea Creek
KGW	Pocahontas-Webster	Williams River (Above Dyer)
KN	Raleigh	Glade Creek
KN	Summers	Meadow Creek
KN	Fayette	Mill Creek
KN	"	Laurel Creek (Above Cotton Hill)
KN	Raleigh	Pinch Creek
KN	Monroe	Rich Creek
KN	"	Turkey Creek
KN	Fayette	Dunloup Creek (Downstream from Harvey Sewage Treatment Plant)
KN	Mercer	East River (Above Kelleysville)
KN	"	Pigeon Creek
KN	Monroe	Laurel Creek
KNG	Monroe	Kitchen Creek (Above Gap Mills)
KNG	Greenbrier	Culverson Creek
KNG	"	Milligan Creek
KNG	Greenbrier-Monroe	Second Creek (Rt. 219 Bridge to Nickell's Mill)
KNG	Greenbrier	North Fork Anthony Creek
KNG	"	Spring Creek
KNG	"	Anthony Creek (Above Big Draft)
KNG	Pocahontas	Watoga Lake
KNG	"	Beaver Creek
KNG	"	Knapp's Creek
KNG	"	Hills Creek
KNG	"	North Fork Deer Creek (Above Route 28/5)
KNG	"	Deer Creek
KNG	"	Sitlington Creek
KNG	"	Stoney Creek
KNG	"	Swago Creek
KNG	"	Buffalo Fork (Impoundment)
KNG	"	Seneca (Impoundment)

KNG	"	Greenbrier River (Above Hosterman)
KNG	"	West Fork-Greenbrier River (Above the impoundment at the tannery)
KNG	"	Little River-East Fork
KNG	"	Little River-West Fork
KNG	"	Five Mile Run
KNG	"	Mullenax Run
KNG	"	Abes Run
KNB	Mercer	Marsh Fork
KNB	"	Camp Creek
OG	Wyoming	Pinnacle creek
BST	McDowell	Dry Fork (Above Canebrake)

APPENDIX B

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

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

M	Monongalia	Morgantown Water Comm.	Colburn Creek & Monongahela River
M	"	Morgantown Ordinance Works	Monongahela River
M	Preston	Preston County PSD	Deckers Creek
M	Monongalia	Blacksville # 1 Mine	Impoundment
M	"	Loveridge Mine	Impoundment
M	"	Consolidation Coal Co.	Impoundment
M	Preston	Mason Town Water	Block Run
MC	Preston	Fibair Inc.	Impoundment
MC	Monongalia	Cheat Neck PSD	Cheat Lake
MC	"	Lakeview County Club	Cheat Lake-Lake Lynn
River Basin	County	Operating Company	Source
Monongahela River			
MC	Monongalia	Union District PSD	Cheat Lake-Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	Preston	Hopemount State Hosp.	Snowy Creek
MC	"	Rowlesburg Water	Keyser Run & Cheat River
MC	"	Albright	Cheat River
MC	Tucker	Parsons Water	Shavers & Elk Lick Fork
MC	"	Thomas Municipal	Thomas Reservoir
MC	"	Hamrick PSD	Dry Fork
MC	"	Douglas Water System	Long Run
MC	"	Davis Water	Blackwater River
MC	"	Hambleton Water System	Roaring Creek
MC	"	Canaan Valley State	Blackwater River Park
MC	Pocahontas	Cheat Mt. Sewer	Shavers Lake
MC	"	Snowshoe Co. Water	Shavers Fork
MC	Randolph	Womelsdorf Water	Yokum Run
MW	Harrison	Lumberport Water	Jones Run
MW	"	Clarksburg Water Bd.	West Fork River
MW	"	Bridgeport Mun. Water	Deecons & Hinkle Creek
MW	"	Salem Water Board	Dog Run
MW	"	West Milford Water	West Fork River
MW	Lewis	W.V. Water-Weston District	West Fork River

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

River Basin		County	Operating Company	Source
Ohio River				
O	Zone 1	Hancock	Chester Water & Sewer	Ohio River
O	"	Brooke	City of Weirton	Ohio River
O	Zone 1	Brooke	Weirton Steel Division	Ohio River
O	"	Ohio	Wheeling Water	Ohio River
O	"	Tyler	Sistersville Mun. Water	Ohio River
O	"	Pleasants	Pleasants Power Station	Ohio River
O	"	Cabell	Huntington Water Corp.	Ohio River
O	"	Marshall	Mobay Chemical Co.	Ohio River
O	"	Wood	E. I. DuPont	Ohio River

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

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

KE	Webster	W.V. Water-Webster Springs	Elk River
KE		Holly River State Park	Holly River
Gauley River			
KG	Nicholas	Craigsville PSD	Gauley River
KG	"	Summersville Water	Impoundment/ Muddlety Creek
KG	"	Nettie-Leivasy PSD	Jim Branch
KG	Webster	Cowen PSD	Gauley River
KG	Nicholas	Wilderness PSD	Anglins Creek & Meadow River
KG	"	Richwood Water	North Fork Cherry River
KN	Fayette	Ames Heights Water	Mill Creek
KN	"	Mt. Hope Water	Impounded Mine (Surface)
KN	Fayette	Ansted Municipal Water	Mill Creek
River Basin	County	Operating Company	Source
New River			
KN	Fayette	Fayette Co. Park	Impoundment
KN	"	New River Gorge Campground	Impoundment
KN	"	Fayetteville Water	Wolfe Creek
KN	Raleigh	Beckley Water	Glade Creek
KN	"	Westmoreland Coal Co.	Farley Branch
Bluestone River			
KNB	Summers	Jumping Branch-Nimitz	Mt. Valley Lake
KNB	"	Bluestone Conf. Center	Bluestone Lake
KNB	"	Pipestem State Park	Impoundment
KNB	Mercer	Town of Athens	Impoundment
KNB	"	Bluewell PSD	Impoundment
KNB	"	Bramwell Water	Impoundment
KNB	"	Green Valley-Glenwood PSD	Bailey Reservoir
KNB	"	Kelly's Tank	Spring
KNB	"	W.V. Water Princeton	Impoundment/ Brusch Creek
KNB	"	Lashmeet PSD	Impoundment
KNB	"	Pinnacle Water Assoc.	Mine
KNB	"	W.V. Water Bluefield	Impoundment

River Basin	County	Operating Company	Source
Greenbrier River			
KNG	Summers	W.V. Water Hinton	Greenbrier River & New River
KNG	"	Big Bend PSD	Greenbrier River
KNG	Greenbrier	Alderson Water Dept.	Greenbrier River
KNG	"	Ronceverte Water	Greenbrier River
KNG	"	Lewisburg Water	Greenbrier River
KNG	Pocahontas	Denmar State Hospital Water	Greenbrier River
KNG	"	City of Marlinton Water	Knapp Creek
KNG	"	Cass Scenic Railroad	Leatherbark Creek
KNG	"	Upper Greenbrier PSD	Greenbrier River
KNG	"	The Hermitage	Greenbrier River
Guyandotte River			
OG	Cabell	Salt Rock PSD	Guyandotte River
OG	Lincoln	West Hamlin Water	Guyandotte River
OG	Logan	Logan Water Board	Guyandotte River
OG	"	Man Water Works	Guyandotte River
OG	"	Buffalo Creek PSD	Buffalo Creek/ Mine/Wells
OG	Logan	Chapmanville	Guyandotte River
OG	"	Logan PSD	Whitman Creek/ Guyandotte River
OG	Mingo	Gilbert Water	Guyandotte River
OG	Wyoming	Oceana Water	Laurel Fork
OG	"	Glen Rogers PSD	Impoundment
OG	Wyoming	Pineville Water	Pinnacle Creek
OG	Raleigh	Raleigh Co. PSD-Amigo	Tommy Creek
OMG	Cabell	Milton Water Works	Guyandotte River
OMG	"	Culloden PSD	Indian Fork Creek
Guyandotte River			
OMG	Putnam	Hurricane Municipal Water	Impoundment
OMG	Putnam	Lake Washington PSD	Lake Washington

Big Sandy River

BS	Wayne	Kenova Municipal Water	Big Sandy River
BS	"	Fort Gay Water	Tug Fork
BST	Mingo	Kermit Water	Tug Fork
BST	"	Matewan Water	Tug Fork
BST	"	A & H Coal Co., Inc.	Impoundment
BST	"	Williamson Water	Impoundment
BST	McDowell	City of Welch	Impoundment/Wells
BST	"	City of Gary	Impoundment/Mine

APPENDIX C
CATEGORY E-3 - POWER PRODUCTION

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

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

APPENDIX D
CATEGORY C - WATER CONTACT RECREATION

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

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

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

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

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.1 Dissolved Aluminum (ug/l) For water with pH <6.5 or >9.0	750xCF[5]	750xCF[5]	750xCF[5]	87xCF[5]			
8.1.1 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the four-day average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+0.9121)} \times CF^5$		X		X			
8.1.2 Dissolved Aluminum (ug/l) For water with pH ≥ 6.5 and ≤ 9.0, the one-hour average concentration of dissolved aluminum determined by the following equation[e]: $Al = e^{(1.3695[\ln(hardness)]+1.8268)} \times CF^5$	X		X				
8.2. Acute and chronic aquatic life criteria for ammonia shall be determined using the National Criterion for Ammonia in Fresh Water[d] from USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014, December 1999)	X	X	X	X			
8.3 Antimony (ug/l)					4300	14	
8.4 Arsenic (ug/l)					10	10	100
8.4.1 Dissolved Trivalent Arsenic (ug/l)	340	150	340	150			

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PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.5 Barium (mg/l)						1.0	
8.6 Beryllium (ug/l)	130		130			4.0	
8.7 Cadmium (ug/l) Hardness (mg/l $CaCO_3$) — Soluble Cd 0 - 35 — 1.0 36 - 75 — 2.0 76 - 150 — 5.0 > 150 — 10.0						X	
8.7.1 10 ug/l in the Ohio River (O Zone 1) main stem (see section 7.1.d, herein)						X	
8.7.2 The four-day average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(0.7409[\ln(hardness)]-4.719)} \times CF$[5]		X		X			
8.7.3 The one-hour average concentration of dissolved cadmium determined by the following equation: $Cd = e^{(1.0166[\ln(hardness)]-3.924)} \times CF$[5]	X		X				
8.8 Chloride (mg/l)	860	230	860	230	250	250	
8.9.1 Chromium, dissolved hexavalent (ug/l):	16	11	16	7.2		50	
8.9.2 Chromium, trivalent (ug/l) The one-hour average concentration of dissolved trivalent chromium determined by the following equation: $CrIII = e^{(0.8190[\ln(hardness)]+3.7256)} \times CF$[5]	X		X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.9.3 The four-day average concentration of dissolved trivalent chromium determined by the following concentration: $CrIII = e^{(0.8190[ln(hardness)]+0.6848)} \times CF^{5}$		X		X			
8.10 Copper (ug/l)						1000	
8.10.1 The four-day average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.8545[ln(hardness)]-1.702)} \times CF^{5}$		X		X			
8.10.2 The one-hour average concentration of dissolved copper determined by the following equation[a]: $Cu = e^{(0.9422[ln(hardness)]-1.700)} \times CF^{5}$	X		X				
8.11 Cyanide (ug/l) (As free cyanide $HCN+CN^{-}$)	22	5.0	22	5.0	5.0	5.0	
8.12 Dissolved Oxygen[c]: not less than 5 mg/l at any time.	X				X	X	X
8.12.1 Ohio River main stem - the average concentration shall not be less than 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time or place outside any established mixing zone - provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.	X						
8.12.2 Not less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.			X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.13 Fecal Coliform: Maximum allowable level of fecal coliform content for Water Contact Recreation (either MPN or MF) shall not exceed 200/100 ml as a monthly geometric mean based on not less than 5 samples per month; nor to exceed 400 /100 ml in more than ten percent of all samples taken during the month.					X	X	
8.13.1 Ohio River main stem (zone 1) - During the non-recreational season (November through April only) the maximum allowable level of fecal coliform for the Ohio River (either MPN or MF) shall not exceed 2000/100 ml as a monthly geometric mean based on not less than 5 samples per month.					X	X	
8.14 Fluoride (mg/l)						1.4	
8.14.1 Not to exceed 2.0 for category D1 uses.							X
8.15 Iron[c] (mg/l)		1.5		1.0		1.5	
8.16 Lead (ug/l)						50	
8.16.1 The four-day average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-4.705)} \times CF$[5]		X		X			
8.16.2 The one-hour average concentration of dissolved lead determined by the following equation[a]: $Pb = e^{(1.273[\ln(hardness)]-1.46)} \times CF$[5]	X		X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.17 Manganese (mg/l) (see §6.2.d)						1.0	
8.18 Mercury The total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury.					0.5	0.5	
8.18.1 Total mercury in any unfiltered water sample (ug/l):	2.4		2.4		0.15	0.14	
8.18.2 Methylmercury (water column) (ug/l):		.012		.012			
Nickel (ug/l)					4600	510	
8.19.1 The four-day average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+0.0584)} \times CF^{5}$		X		X			
8.19.2 The one-hour average concentration of dissolved nickel determined by the following equation[a]: $Ni = e^{(0.846[\ln(hardness)]+2.255)} \times CF^{5}$	X		X				
8.20 Nitrate (as Nitrate-N) (mg/l)						10	
8.21 Nitrite (as Nitrite-N) (mg/l)	1.0		.060				
8.22 Nutrients							
Chlorophyll –a (µg/l) (see §47-2-8.3)							
Total Phosphorus (µg/l) (see §47-2-8.3)							

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.23 Organics							
Chlordane[b] (ng/l)	2400	4.3	2400	4.3	0.46	0.46	0.46
DDT[b] (ng/l)	1100	1.0	1100	1.0	0.024	0.024	0.024
Aldrin[b] (ng/l)	3.0		3.0		0.071	0.071	0.071
Dieldrin[b] (ng/l)	2500	1.9	2500	1.9	0.071	0.071	0.071
Endrin (ng/l)	180	2.3	180	2.3	2.3	2.3	2.3
Toxaphene[b] (ng/l)	730	0.2	730	0.2	0.73	0.73	0.73
PCB[b] (ng/l)		14.0		14.0	0.045	0.044	0.045
Methoxychlor (ug/l)		0.03		0.03	0.03	0.03	0.03
Dioxin (2,3,7,8- TCDD)[b] (pg/l)					0.014	0.013	0.014
Acrylonitrile[b] (ug/l)					0.66	0.059	
Benzene[b] (ug/l)					51	0.66	
1,2-dichlorobenzene (mg/l)					17	2.7	
1,3-dichlorobenzene (mg/l)					2.6	0.4	
1,4-dichlorobenzene (mg/l)					2.6	0.4	
2,4-dinitrotoluene[b] (ug/l)					9.1	0.11	
Hexachlorobenzene[b] (ng/l)					0.77	0.72	
Carbon tetrachloride[b] (ug/l)					4.4	0.25	
Chloroform[b] (ug/l)					470	5.7	
Bromoform[b] (ug/l)					140	4.3	

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Dichlorobromomethane[b] (ug/l)					17	0.55	
Methyl Bromide (ug/l)					1500	47	
Methylene Chloride[b] (ug/l)					590	4.6	
1,2-dichloroethane[b] (ug/l)					99	0.035	
1,1,1- trichloroethane[b] (mg/l)						12	
1,1,2,2-tetrachloroethane (ug/l)					11	0.17	
1,1-dichloroethylene[b] (ug/l)					3.2	0.03	
Trichloroethylene[b] (ug/l)					81	2.7	
Tetrachloroethylene[b] (ug/l)					8.85	0.8	
Toluene[b] (mg/l)					200	6.8	
Acenaphthene (ug/l)					990	670	
Anthracene (ug/l)					40,000	8,300	
Benzo(a) Anthracene[b] (ug/l)					0.018	0.0038	
Benzo(a) Pyrene[b] (ug/l)					0.018	0.0038	
Benzo(b) Fluoranthene[b] (ug/l)					0.018	0.0038	
Benzo(k) Fluoranthene[b] (ug/l)					0.018	0.0038	
Chrysene[b] (ug/l)					0.018	0.0038	
Dibenzo(a,h)Anthracene[b] (ug/l)					0.018	0.0038	
Fluorene (ug/l)					5300	1100	
Indeno(1,2,3-cd)Pyrene[b] (ug/l)					0.018	0.0038	

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
Pyrene (ug/l)					4000	830	
2-Chloronaphthalene (ug/l)					1600	1000	
Phthalate esters[6] (ug/l)		3.0		3.0			
Vinyl chloride[b] (chloroethene) (ug/l)					525	2.0	
alpa-BHC (alpha- Hexachloro-cyclohexane)[b] (ug/l)					0.013	.0039	
beta-BHC(beta- Hexachloro-cyclohexane)[b] (ug/l)					0.046	0.014	
gamma-BHC (gamma- Hexachloro-cyclohexane)[b] (ug/l)	2.0	0.08	2.0	0.08	0.063	0.019	
Chlorobenzene (mg/l)					21	0.68	
Ethylbenzene (mg/l)					29	3.1	
Heptachlor[b] (ng/l)	520	3.8	520	3.8	0.21	0.21	
2-methyl-4,6-Dinitrophenol (ug/l)					765	13.4	
Fluoranthene (ug/l)					370	300	
8.23.1 When the specified criteria for organic chemicals listed in §8.23 are less than the practical laboratory quantification level, instream values will be calculated from discharge concentrations and flow rates, where applicable.							
8.24 pH[c] No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	X	X	X	X	X	X	X

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.25 Phenolic Materials							
8.25.1 Phenol (ug/l)					4,600,000	21,000	
8.25.2 2-Chlorophenol (ug/l)					400	120	
8.25.3 2,4-Dichlorophenol (ug/l)					790	93	
8.25.4 2,4-Dimethylphenol (ug/l)					2300	540	
8.25.5 2,4-Dinitrophenol (ug/l)					14,000	70	
8.25.6 Pentachlorophenol[b] (ug/l)					8.2	0.28	
8.25.6.a The one-hour average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-4.869)	X		X				
8.25.6.b The 4-day average concentration of pentachlorophenol determined by the following equation: exp(1.005(pH)-5.134).		X		X			
8.25.7 2,4,6-Trichlorophenol[b] (ug/l)					6.5	2.1	
8.26 Radioactivity: Gross Beta activity not to exceed 1000 picocuries per liter (pCi/l), nor shall activity from dissolved strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3 pCi/l.	X		X		X	X	X

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.26.1 Gross total alpha particle activity (including radium-226 but excluding radon and uranium shall not exceed 15 pCi/l and combined radium-226 and radium-228 shall not exceed 5pCi/l; provided that the specific determination of radium-226 and radium-228 are not required if dissolved particle activity does not exceed 5pCi/l; the concentration of tritium shall not exceed 20,000 pCi/l; the concentration of total strontium-90 shall not exceed 8 pCi/l in the Ohio River main stem.	X		X		X	X	X
8.27 Selenium (ug/l) Water Column Concentration [f]	~~20~~	5	~~20~~	5		50	
8.27.1 Selenium (ug/g) [g] (based on instantaneous measurement) 8.0 ug/g Fish Whole-Body Concentration or 11.3 ug/g Fish Muscle (skinless, boneless filet)		X		X			
8.27.2 Selenium (ug/g) Fish Egg/Ovary Concentration [h] (based on instantaneous measurement)		15.8		15.8			

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.28 Silver (ug/l) Hardness Silver 0-50 1 51-100 4 101-200 12 >201 24				X		X	
8.28.1 0-50 1 51-100 4 101-200 12 201-400 24 401-500 30 501-600 43		X					
8.28.2 The one-hour average concentration of dissolved silver determined by the following equation: $Ag=e^{(1.72[ln(hardness)]-6.59)} \times CF$[5]	X		X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29 Temperature Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 87°F at any time during months of May through November and not to exceed 73°F at any time during the months of December through April. During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water more than 5°F above natural temperature. In lakes and reservoirs, the temperature of the epilimnion should not be raised more than 3°F by the addition of heat of artificial origin. The normal daily and seasonable temperature fluctuations that existed before the addition of heat due to other natural causes should be maintained.	X						
8.29.1 For the Kanawha River Main Stem (K-1): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 90°F in any case.	X						
8.29.2 No heated effluents will be discharged in the vicinity of spawning areas. The maximum temperatures for cold waters are expressed in the following table: Daily Mean °F / Hourly Max °F Oct-Apr 50 / 55 Sep-&May 58 / 62 Jun-Aug 66 / 70			X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.29.3 For Ohio River Main Stem (01) (see section 7.1.d, herein): Dates — Period Ave. — Inst. Max. Jan 1-31 — 45°F — 50°F February — 45 — 50 March 1-15 — 51 — 56 March 16-31 — 54 — 59 April 1-15 — 58 — 64 April 16-30 — 64 — 69 May 1-15 — 68 — 73 May 16-31 — 75 — 80 June 1-15 — 80 — 85 June 16-30 — 83 — 87 July 1-31 — 84 — 89 August 1-31 — 84 — 89 Sept 1-15 — 84 — 87 Sept 16-30 — 82 — 86 Oct 1-15 — 77 — 82 Oct 16-31 — 72 — 77 Nov 1-30 — 67 — 72 Dec 1-31 — 52 — 57	X						
8.30 Thallium (ug/l)					6.3	1.7	
8.31 Threshold odor[c] Not to exceed a threshold odor number of 8 at 104°F as a daily average.		X		X	X	X	
8.32 Total Residual Chlorine (ug/l - measured by amperometric or equivalent method)	19	11					
8.32.1 No chlorinated discharge allowed			X				

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.33 Turbidity No point or non-point source to West Virginia's waters shall contribute a net load of suspended matter such that the turbidity exceeds 10 NTU's over background turbidity when the background is 50 NTU or less, or have more than a 10% increase in turbidity (plus 10 NTU minimum) when the background turbidity is more than 50 NTUs. This limitation shall apply to all earth disturbance activities and shall be determined by measuring stream quality directly above and below the area where drainage from such activity enters the affected stream. Any earth disturbing activity continuously or intermittently carried on by the same or associated persons on the same stream or tributary segment shall be allowed a single net loading increase.		X		X	X	X	
8.33.1 This rule shall not apply to those activities at which Best Management Practices in accordance with the State's adopted 208 Water Quality Management Plan are being utilized, maintained and completed on a site-specific basis as determined by the appropriate 208 cooperative or an approved Federal or State Surface Mining Permit is in effect. This exemption shall not apply to Trout Waters.		X			X	X	
8.34 Zinc (ug/l) The four-day average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[\ln(hardness)]+0.884)} \times CF$[5]		X		X			

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APPENDIX E, TABLE 1

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		ALL OTHER USES
	B1, B4		B2		C[3]	A[4]	
	ACUTE[1]	CHRON[2]	ACUTE[1]	CHRON[2]			
8.34.1 The one-hour average concentration of dissolved zinc determined by the following equation[a]: $Zn = e^{(0.8473[ln(hardness)]+0.884)} \times CF$[5]	X		X				

[1] One hour average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[2] Four-day average concentration not to be exceeded more than once every three years on the average, unless otherwise noted.
[3] These criteria have been calculated to protect human health from toxic effects through fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[4] These criteria have been calculated to protect human health from toxic and/or organoleptic effects through drinking water and fish consumption, unless otherwise noted. Concentration not to be exceeded, unless otherwise noted.
[5] The appropriate Conversion Factor (CF) is a value used as a multiplier to derive the dissolved aquatic life criterion is found in Appendix E, Table 2.
[6] Phthalate esters are determined by the summation of the concentrations of Butylbenzyl Phthalate, Diethyl Phthalate, Dimethyl Phthalate, Di-n-Butyl Phthalate and Di-n-Octyl Phthalate.
[a] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.
[b] Known or suspected carcinogen. Human health standards are for a risk level of 10^{-6}.
[c] May not be applicable to wetlands (B4) - site-specific criteria are desirable.
[d] The early life stage equation in the National Criterion shall be used to establish chronic criteria throughout the state unless the applicant demonstrates that no early life stages of fish occur in the affected water(s).
[e] Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 26 mg/l, even if the actual ambient hardness is less than 26 mg/l. The maximum hardness value for use in this equation shall not exceed 200 mg/l even if the actual hardness is greater than 200 mg/l.
[f] Water column values take precedence over fish tissue values when new inputs of selenium occur in waters previously unimpacted by selenium, until equilibrium is reached between the water column and fish tissue.
[g] Overrides any water column concentration when water concentrations and either fish whole body or fish muscle (skinless, boneless filet) are measured, except in situations described in footnote [f]
[h] Overrides any fish whole-body, fish muscle (skinless, boneless filet), or water column concentration when fish egg/ovary concentrations are measured, except in situations described in footnote [f]

APPENDIX E

TABLE 2

Conversion Factors

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

APPENDIX F
COOL WATER LAKES

This list contains lakes to be managed for cool water fisheries and is not intended to exclude any waters which meet the definition in Section 2.2.

River Basin	County	Lake
Potomac River		
PC	Hardy Lost River	Trout Pond (Impoundment)
PC	Hardy Lost River	Rock Cliff Lake (Impoundment)
PSB	Pendleton	Hawes Run (Impoundment)
PNB	Mineral	New Creek Dam 14(Impoundment)
Monongahela River		
MC	Monongalia	Coopers Rock (Impoundment)
MC	Monongalia	Cheat Lake
MC	Tucker	Thomas Park (Impoundment)
MC	Randolph	Spruce Knob Lake (Impoundment)
MT	Taylor	Tygart Lake
MW	Lewis	Stonecoal Lake
Kanawha River		
KC	Raleigh	Stephens Lake (Impoundment)
KG	Nicholas	Summersville Reservoir (Impoundment)
KG	Greenbrier	Summit Lake (Impoundment)
KNG	Pocahontas	Watoga Lake
KNG	Pocahontas	Buffalo Fork (Impoundment)
KNG	Pocahontas	Seneca (Impoundment)
KCG	Pocahontas	Handley Pond
Guyandotte River		
OG	Wyoming/Mingo	RD Bailey Lake

5. Public Comment Materials

Public Hearing Transcript

Written & Oral comments

DEP Response to Comments

west virginia department of environmental protection

Division of Water & Waste Management
601 57th Street, Southeast
Charleston, WV 25304
Phone: (304) 926-0440
Fax: (304) 926-0463

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

Division of Water and Waste Management
Water Quality Standards Program
Requirements Governing Water Quality Standards Rule

On June 16, 2015, the Division of Water & Waste Management (DWWM) commenced a forty-five day public comment period and subsequently held a public hearing on July 21, 2015 to accept oral comments on proposed revisions to the WV legislative rule "Requirements Governing Water Quality Standards," 47CSR2. DWWM proposed the following revisions (summarized):

7.2.d.8.2.	Site-specific variance for specified streams in Cheat River watershed
7.2.d.11.1.	Site-specific variance for specified streams in Tygart River watershed
8.1.1 – 8.1.2	Revision to aquatic life aluminum criterion
8.27 – 8.27.2	Revision to aquatic life selenium criterion

Public Notice, Hearing, and Comments

The following sections are included:

1. **Statement of Notices to Public**
2. **Written & Oral comments**
3. **DEP response to comments**

1. Notices to Public

The public was noticed of WV Water Quality Standards proposed rule changes in several ways. DEP Public Information Office (PIO) sent out notices via its email-based mailing list on June 16 and 17, 2015. On June 18, notice of proposed changes to 47CSR2 was published in the WV State Register. A legal ad regarding proposed rule changes was published in The Charleston Gazette newspaper on June 19, 2015. News Releases were sent to press from DEP PIO on July 1 and July 14, 2015; as a result, several news articles throughout West Virginia were written regarding the upcoming public hearing.

2. Written and Oral Comments

Comments were accepted orally at a public hearing held at DEP Headquarters in Charleston, WV on Tuesday, July 21, 2015, from 6-8PM. Sixty-seven people signed a registration sheet, and sixteen people spoke at the hearing. Written comments were accepted by mail, direct email to Water Quality Standards program staff, hand-delivery, and via DEP's web-based public comment system, provided by DEP Public Information Office. Comments were accepted until July 31, 2015; comments received post-marked by that date were also accepted.

This section includes:

Transcript & Sign-in sheet from public hearing

Written Comments on revisions to 47CSR2

In Re:

PUBLIC HEARING ON DIVISION OF WATER AND WASTE MANAGEMNT'S PROPOSED REVISION TO LEGISLATIVE RULE 47CSR2, REQIUREMENTS GOVERNING WATER QUALITY STANDARDS

JULY 21, 2015
6:00 P.M.

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
601 57TH STREET, S.E.
CHARLESTON, WEST VIRGINIA

Dena A. Belisle
Certified Court Reporter

CAPITOL CITY REPORTING
"PROFESSIONAL STENOMASK FOR THE RECORD"

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APPEARANCES

ON BEHALF OF THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

JACOB GLANCE
PUBLIC INFORMATION OFFICE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
601 57TH STREET, S.E.
CHARLESTON, WEST VIRGINIA 25304

P R O C E E D I N G S

MR. GLANCE: Good evening. Before we get started, I'd like to remind everyone if you haven't signed the sign-in sheet and you want to speak, sign up in the back there by Mr. Ramey. There's several sheets left to sign up on.

I'm Jake Glance from the Department of Environmental Protection, Public Information office. I'm the facilitator for tonight's public hearing to discuss the Division of Water and Waste Management's Proposed Revisions to Legislative Rule 47CSR2, Requirements Governing Water Quality Standards.

Also here tonight from the DEP are Scott Mandirola, Cabinet Secretary and Director of the Division of Water and Waste Management; Laura Cooper, the Assistant Director of Water Quality Standards within the Division of Water and Waste Management; Mike Sheehan, the Assistant Director of the DEP's Division of Land Restoration; and Chris Smith, an environmental resource analyst in water quality standards.

The Rule 47CSR2 establishes requirements governing standards of surface water quality from water to the state. These standards are developed to

help protect and preserve water quality necessary to meet and maintain designated or assigned uses such as swimming, recreation, public water supply and/or aquatic life.

The DEP's proposed revisions to the rule include changes to aquatic life criteria for aluminum and selenium, and also the inclusion of two site-specific water quality standard variances.

The purpose of tonight's hearing is to give you the opportunity to share your comments with DEP about this proposed rule. Tonight's hearing is being recorded by a court reporter to give you -- so that the comments that are shared can be part of the public rulemaking record. I do ask when you do come up, even though I'm going to say your name to bring you up, when you get up to the podium, if you can say your name and she might ask you to spell your name just so we get it right.

To ensure that we successfully achieve the purpose of this hearing, we ask that everyone be respectful and considerate of each other by refraining from interrupting others while they're speaking and keeping your comments on topic so that our time together is used most efficiently.

We do have several people who are signed up to speak with the potential that more could come in, so we are going to limit each person's speaking time to five minutes.

For those wishing to speak, when I call you up to provide your comments, please state your name and say if you're representing any groups or organizations. If you have written comments that you would like to submit in addition to or in lieu of your spoken comments, please hand them to me after you speak or at the conclusion of this hearing.

If you did not sign up to speak when you come in, again you can still sign up in the back of the room near the sign that says public comments and please sign in. If no one has any questions about the hearing format -- yes, sir?

UNKNOWN SPEAKER: Written comments may be sent to you after tonight?

MR. GLANCE: Yes. If you want to talk to me after the meeting, I'll give you the address and also the email. So any other questions about the format? Okay. We'll get started. The first speaker is Rupie Phillips. Come on up.

MR. PHILLIPS: Ladies and gentlemen, my

name is Rupie Phillips. I'm a delegate out of Logan County representing the 24th District. I would like to tell you, I'm so glad to see so many friends here in stripes. That's great. I am also the lead sponsor of the house bill that kicked this all off. One of your own inspired me, Christopher Jeffrey, about two-and-a-half years ago to get this started, along with Roger Horton and I pushed. I pushed Jason Bostic to get me something so I could introduce it and, yes, I'm the one who told the tree huggers, you know, the coal association to give me a vehicle and I put it in four-wheel drive and I drove it to the top.

Ladies and gentlemen, it is very important that this issue goes through. I'm not real happy with the proposed limits, but I think it's a start. All you all coalminers are affected. My district is affected. I'm actually in sales in the coal industry too. My job is affected. It hurts. It hurts. Every day I get calls, I need a job. I need a job. And Obama said it himself, if you can't legislate the coal industry out of business, he'll regulate them out of business. And I tell you what, I'm ready to fight. I just left Savannah to get here today and I proposed a resolution down there to draw

the line in the sand down there and 15 states agreed to tell Obama no on his EPA.

I'm so glad to see you all tonight. But at any rate, the selenium level, you know, and everybody knows it, if you bottle the water, if anybody's got a bottle –- I see a bottle back here -- there of 50 parts per billion and they want to limit it to less than five parts per billion. That is absurd. Your body has got to have selenium. Why don't you drink water that's less than five parts per billion and see what it does to your body, the ones that's here that's against this.

Back in the spring, I looked at Secretary Huffman, I ask him every time I see him. He said, Rupie how is it going, where we at, it's going good. It's going good. I looked at him back in the spring and I said, hey, if you don't have something now –- this was three sessions ago in the past -- if you don't have something soon, don't worry about it, because there's not going to be any coalmines here to affect, because we are getting shut down.

But I hope and pray a new administration will change and we can get it back to where we need it and protect our coal jobs. You all are family. We

stick together. I'm with you. And this ain't no political speech because like I said it affects my job. The families that are hurting over this issue and these other issues, don't give up. Stick together. Thank you.

MR. GLANCE: Next up is Larry Orr and after Larry, we'll have Connie Gratop Lewis.

MR. ORR: Thank you. My name is Larry Orr. I'm the past Chairman of the West Virginia Council of Trout Unlimited. My son, Lee, is the current chairman. I'm speaking on behalf of him and the 1500 dues paying members of Trout Unlimited in West Virginia.

West Virginia Council of Trout Unlimited is a conservation organization. We're not an environmentalist organization. Our mission is to protect -- is to conserve, protect and restore the cold-water fisheries of West Virginia. Conserve, protect and restore.

Water is the most important natural resource in West Virginia, not coal, not oil, not gas, not timber or the product of any of the extractive industries. Water is the most important natural resource.

West Virginia Council of Trout Unlimited opposes weakening the standards on aluminum and selenium. These are both known toxins and the only reason for proposing the weakening of the standards is to reduce mining costs. If it costs more to mine with the current standards in order to protect water quality, then let the industry bear those costs.

Thank you for your consideration.

MR. GLANCE: Connie is up next and after Connie will be Leroy Stanley.

MS. LEWIS: I'm Connie Gratop Lewis of Charleston. I'm a legislative coordinator for the West Virginia Environmental Council and I wish to speak to the rule that is being proposed.

The West Virginia Environmental Council is not satisfied with the limits as they have been proposed. We do not believe that the science that was used in creating the selenium standard is the right science for West Virginia streams.

We do not believe that the aluminum standard is protective of human health, which should be of interest to all of us, even as we desperately try to hang on to any jobs that remain within the industry.

I understand your pain as the coal industry is in a time of contraction. Where I come from, the UAW was once the largest union and the auto industry was the largest employer. I saw the devastation in my hometown and I also see now that new industries are coming in using the skills that the auto workers had and that the glass workers had and that my hometown is in a time of fitful but steady resurgence. I know that the coalminers are tough and that they can, in fact, recover from this if they are given the opportunity to do so. I hope that you will join us at some point in the future when we work to diversify and strengthen the economy of the state. Thank you.

MR. GLANCE: By the way, if anybody has come in and wants to speak, if you would sign up in the back just on the kind of the rightmost column, just put yes if you know that you want to have your comments heard.

MR. STANLEY: I'm Leroy Stanley. I'm a retired construction worker. I spell my name L-e-r-o-y, S-t-a-n-l-e-y. We're here today on a different issue. We're here today to save the Tygart Watershed Association where the Tygart River runs in north

central West Virginia.

MR. GLANCE: You need to speak up.

MR. STANLEY: The Tygart River runs from north central West Virginia. It's one of the two, three rivers to make up the Mon. It goes all the way to Pittsburgh and then the Ohio River. About 14 years ago, we decided that we was going to do some things with the acid mine drainage that had been done, not now, not in coalmines going on now, but 90 years ago this one stream that's in issue here today was impacted with acid mine drainage, we're going to try to put lime dosers on it. We did this same process four years ago on another stream which was highly impacted with acid mine drainage at Three Fork Creek and it worked. A lot of people don't like lime dosers. Some of the people like to strain gnats and swallow camels, you know what I mean. They're questioning this process. This has nothing to do with this water standard issue that's here today. I'm glad to see all of my friend coalminers here.

But we have two watershed groups involved in this cleaning this stream up. One of them is Save the Tygart and the other one is Laurel Mountain. I've got a signed letter here I'd like to read into the

record and then submit it for evidence.

We believe the DEP has been working diligently to try to recover this stream. Yesterday I was on that other stream that I spoke of, Three Fork Creek, and it's loaded with trout now. Put these lime dosers on it and cure what they did 100 years ago and that has nothing to do with now, you understand. We want to put these dosers on Three Fork Creek, or on Sandy Creek like we did on Three Fork Creek. Number one, it's going to improve drinking water for half a million West Virginians in north central West Virginia, not counting when the water gets over there towards Pittsburgh, over there in western Pennsylvania, the same water. Half a million West Virginias, because of the aluminum, the iron, manganese and other things that's in the river is going to fall out. It precipitates, just like rain, the iron does, the sulfur. We have that problem in mining coal in north central West Virginia. The present coal companies and coalmines are taking care of it or are attempting to take care of it and this is a way to cure something that happened long before anybody in this room was born. We're going to cure this. DEP wants to try them lime dosers temporarily

and see how they work. The Save the Tygart Watershed Association and Laurel Mountain, there's a slew of coalminers that belong to it too. They know that we're not against coal. We're trying to fix something that was done long before -- long before any of us was born, I say again. This process involves putting lime, a natural substance, in the water and then the iron and the sulfur fall out, within they say a quarter a mile. We haven't seen it. We see it falling out from Three Fork Creek. It falls out very close to the doser and then you have clean water. The state buys this lime and puts it in these dosers.

The coalmine, which is Leer Number One, I think, Taylor County, they invited us over, a couple months ago. We went through the mines and everything. It didn't bother me a bit. I've been there before. But what I'm saying is, we need this process to go forward and clean up this old mine water, to clean up this old mine water.

MR. GLANCE: Sir, you might want to wrap it up.

MR. STANLEY: Okay. Just a minute. Let me finish. This old mine water we're going to take care of and this is a good proven, effective way of

having it both ways, clean water, doing away with the sulfur and the iron and all that. Thank you.

MR. GLANCE: Next up is Angie Rosser and after Angie is Cindy Rank.

MS. ROSSER: Good evening. I'm Angie Rosser. I'm the executive director of the West Virginia Rivers Coalition and we've set out to ensure that our rivers are there for us and future generations to enjoy fishing, swimming, drinking from.

Delegate Phillips pointed out that there are people drinking bottled water in here and our goal is to make sure that our water resources are protected so that we can feel like we are competent in that our tap water is a safe to drink and our water supplies are healthy enough to rely on for our survivals.

And we do have concerns about all three or four of the revisions that are proposed in this rule. The aluminum change is drastic and it follows a path that this state has gone down for 20 years now. In 1998, we weakened the criteria. In 2000, we went from a total -- looking at total recoverable aluminum to a dissolved criteria. In 2004, we saw a big weakening of the standards of 87 to 750 micrograms per liter for the warm water chronic criteria. In 2013,

we saw the emergency rule come in that was rejected by the legislature because of concerns about weakening water quality in the state, and here we are in 2015 with another emergency and I beg of you to consider what is the emergency here. Is it really that our streams are too clean? Are we really hearing from your neighbors that they're concerned that our streams might be too clean and that we should allow more pollution in them. And I worry about this mischaracterization that weakening this one water quality criteria too is going to solve all of our problems.

And I'm quite overwhelmed by the turnout tonight and I'm feeling your fear and your urgency. I don't want to put that aside that you're concerned about your livelihood and your families, but it's your all's communities that are going to bear the burden of this pollution. It's the people living in the mining communities that are going to see an aluminum increase and selenium increase and who's going to be cleaning it up?

And we just heard from the gentleman from the Tygart Watershed who was begging the DEP to help clean up these legacy issues and it's costing the

taxpayers millions and millions of dollars.

So what is our future going to look like in West Virginia? What is water going to look like? And I don't know how we start this dialogue, but we need to. And I'm worried we're taking risks that are going to put us in a position of paying the price down the line. I mean, we will submit written comments on this, technical comments, looking at the research because the science is important here. The science is important we consider the biological effects of aluminum that is hard to predict depending on stream chemistry, what happens to it, how it is ingested by insects that the fish depend on, that we depend on. It just goes up the food chain. These are heavy decisions that are being made right now and I just caution us in light of the -- there is urgency in the state to do something. I just don't think that this is the fix-it and we should think about the long-term consequences. We're talking about allowing more selenium in our streams. We're talking about moving to fish tissue sampling that we don't know if it will work. What if there are no fish to sample, then what happens? How are we going to control the bad actors in this? Most mining operators are responsible. What

are we going to do about the ones who are irresponsible and we all have to pay the price? What kind of oversight will there be? What kind of enforcement will there be? How will we do that?

And I'll just close by mentioning the variances. You'll hear from other folks, but we're setting a precedent here with these Tygart and Cheat variances I'm concerned about. There's just a lot of questions left unanswered. There's an open time limit, well, a ten-year time limit on this, a lack of detail on the applications, legal questions, a public meeting that got cancelled, lack of consult from other experts who know this watershed well.

So I just invite a dialogue and listening to each other and trying to find a way forward that doesn't set us up for more pollution in our waters and more cost to the state and more concern about will our kids even want to live here.

MR. GLANCE: Cindy Rank is up now and after that we have a Mike Becker. Mike Becker?

MR. BECKER: Yeah. Right here.

MR. GLANCE: Okay.

MS. RANK: I'm Cindy Rank with the West Virginia Highlands Conservancy. I know a lot of you

in this room and have seen a lot of you in court and down the road. I just want to say that we will be submitting written comments by the end of next week in conjunction with Rivers Coalition and several other groups on a lot on all of the aspects of this.

Tonight I'd just like to say a few words on variances. And with all due respect to Leroy and to the Office of Special Reclamation, I really think that as much as we would all love to fix and improve Sandy Creek and Muddy Creek and Martin Creek, I just don't believe that this is the way, the way that's being proposed is the way we should go about it.

One thing that Conservancy has done with several other people is, as you all know by being in court, and for the first time in years, we have been able to have a court order that said the DEP should, in fact, take care of the forfeited mining sites, those that were abandoned after the 1977 Surface Mine Act and actually get the NPDES and complete the reclamation in the water treatment that the mining industry is required to do through their permits. That was a big step forward. And in the Tygart and on Muddy, we have two very large mines that should be treated with two standards and the money is there in

the special reclamation fund, which isn't very well funded, but that should be used first and then see what happens and then use a lot of the other funds that might be available. We've got not necessarily the special reclamation fund, we've got the AML fund, we've got the stream restoration fund, we've got the water fund, all of which are underfunded given what's out there and what needs to be done, but in the long run and in the priority list, if we do the forfeited sites first and then look at other ways to deal with the older sites, the abandoned mines, the ones that were abandoned prior to the 1977 Act, we'll be able to do it with the dosers what Leroy talked about.

I was impressed with the Fork Creek dosers. I think there's a different -- I think it's different, a different situation in both Muddy and in Sandy and I think we have a different way to approach that before we get to just the dosers.

In terms of policy, the actual variance that's suggested in this proposed rate is so wide open, it's just not supported by the information that's there. It's not supported by the assessments of what could be there if we do the reclamation site first and then consider the whole watersheds. We just

don't believe that it's -- it's substantiated enough to support things. There's some general concerns. One is the willingness to give up on major portions of streams that are impacted, whether it be by old, old mines or old mines or recently forfeited mines. When you put a doser in, you're going to forget about the streams that are above it and what comes below it turns into a very large mixing pool, a very large treatment pond because of the sediment and the settling out of the iron and the magnesium. We just don't think that that's necessary. We don't think that is wise. We don't think that would be the basis for these variance. And the precedent that these set is amazing. I mean the limits that are in the variances that are suggested, Muddy Creek would have a pH between two and nine, 2.1 and nine, iron limit of 179 milligrams per liter, aluminum of 48, and in Sandy Creek pH of 2.59, iron of 21 and aluminum of 34. We just think that it's so wide -- so wide open for anything to be going on in either of those watersheds and it's a bad precedent to set for any treatment mines down the line that we just can't accept those as effluent limits or instream limits in these two streams. It's just putting off for ten years

something that we're going to have to deal with in a different way is my feeling. It's a license to pollute for an experiment in these watersheds that aren't necessarily going to happen the way Leroy hopes they will happen. And I know people in the Fellowship area will worry about the sediment and the actual dropping out of metals in the mine on downstream in Sandy and they're concerned about that. Rightly so.

Up in the Cheat, we're worried the Cheat canyon how far down will these sediments go and how much will that impact the actual streambed in terms of ability to support biological aquatic insects down into the future.

MR. GLANCE: Can you wrap it up?

MS. RANK: Uh-huh. So I will leave the rest for our written comments that we can elaborate more, but I will just say now that we believe that is good to clean up every stream in the state when and how that we really can, but we just don't think this is the best, the most supported or the wisest way to move forward in Sandy Creek or in Muddy Creek. Thank you.

MR. GLANCE: Mike Becker? After Mike is Jason Bostic.

MR. BECKER: Good evening. My name is Mike Becker. I work with Appalachian Mountain Advocates. I actually came prepared tonight to talk about the site-specific variances, which is a fairly discreet issue, but I can't help myself from addressing a little bit of the other issues on the table, especially the politics that are involved with some of these that we started off with tonight.

I would just like to say there's no doubt in anyone's mind that the coal industry is hurting right now. You can't read the newspaper or open your eyes in the state without seeing it. But I do think there is a misguided effort to focus everything on a black and white issue of whether you are for or against coal.

This state is going through a major change in the next few years. I think we're rapidly than anybody expected and it's not going to get anywhere simply by blaming politicians or blaming environmental activists for the decline of coal jobs. The reality is much more complicated than that and it's going to take a much more complicated solution.

I myself and Appalachian Mountain Advocates would backup what many of the other

environment groups here have said on selenium and aluminum. I think part of the solution to West Virginia's future is not -- has got to be not racing to the bottom and relaxing standards to a point where we are losing resources we do have. I think that's going to be critical.

I also say those issues that I am prepared to talk about the site-specific variances, in my mind are very related. These site-specific variances are necessary specifically because of legacy mines that were not regulated or were not well regulated and mines that went belly up leaving water pollution problems.

I don't want to see a new set of regulations and a new set of legacy problems that West Virginia taxpayers have to address in the future and I think that relaxing selenium and aluminum standards is on the path to do that.

One issue I came to speak about are the variances in Little Sandy Creek and Martin Creek. I want to say from the outset that, you know, I don't think that these -- I think the intentions behind the variances are good. I think that these are greatly impacted streams that do need help and recognize that

the money to help these streams is limited. However, I do have, you know, several serious concerns about the variances, particularly about the precedence they set.

First and foremost, these variances require the use of removing the designated uses of fishable, swimmable waters from certain sections of the streams and that's something that's at the very heart of the Clean Water Act. In fact, the very first few lines, the purpose of the Clean Water Act is to maintain fishable and swimmable uses and it's not something that should be taken away lightly.

In fact, if you look at the federal regulations, there are specific sets of criteria that must be followed, including the use attainability analysis that must be followed to remove those types of designated uses. It requires documenting sources, the infuseability of treatment of sources and the reasons why those water quality standards can be met.

I have looked over the applications. I know from talking with folks, like Mike Sheehan, that a lot of work has been done here, but I will say that I've not seen the necessary steps that are needed to do that use attainability analysis and to prove the

unattainability of those fishable, swimmable uses have been done here.

Again, I'm also more concerned than the specific sites about the example this will set. I think taking a stream and saying because it has bad water quality now is difficult to correct and we should relax the standards. It sets a really dangerous precedence across the state.

MR. GLANCE: Mr. Bostic is up now. After Jason is Roger Horton.

MR. BOSTIC: Good evening, everyone. Thank you to DEP, Scott and the members of the staff to give me the opportunity to speak tonight. Before I touch on the technical issues associated with aluminum and selenium standards, let me first thank the room full of coal miners around the state that have come out tonight to support these rule changes. I can't begin to tell you how important it is that our state agencies and our elected leaders understand the importance of this issue for those of you in this room that earn a living mining and producing America's energy. It is also so terribly important that you are here unlike the activists and the lawyers that are very, very proud of the fact that they have cost your

communities, your industry billions of dollars in unneeded water treatment to address essentially meaningless standards and that you all are here as the true representatives of our coalfield communities. These changes are terribly important to restore sanity and rationale to the regulations of the West Virginia coal industry.

I also want to specifically thank the members of the West Virginia Legislature that came out, Rupie Phillips, Kelly Sobonya, Senator Art Kirkendoll, because in the end, it's the West Virginia Legislature that has the responsibility for enacting West Virginia's Water Quality Standards and it was the West Virginia Legislature that after ten years of everybody from our state agencies to the federal counterparts knowing that these standards were wrong that took legislative action to finally enforce opposed changes to the water quality water standards.

I'm going to spare you, for the most part, on the technical comments. We will submit those as part of our written package, but there are a couple of key points that I think need to be addressed tonight.

The methodology used by our DEP for both

the aluminum and selenium standards that are proposed is entirely consistent with the way the federal Environmental Protection Agency recommends that water quality standards be calculated. And our standards -- West Virginia's proposed standards go even further by applying even more restrictive factors of safety and surely these two standards are protective of aquatic life in the streams.

As I mentioned, West Virginia's federal counterpart, the EPA, realized the current selenium standards of five micrograms per liter is wrong and it's been wrong and they've known it has been wrong for ten years. It's taken us that long to finally spur the agency to take some kind of action.

In the meantime, millions of dollars have been spent to comply with what is essentially a meaningless standard. One of the earlier speakers mentioned that science is important and I couldn't agree more. That's one of the things that frustrates me the most about the representation that speaks to a water quality standard of a weakening of that standard. It's not a weakening. Those who respect the selenium standard, which is a tissue based approach, and the aluminum standard, which is an

harvest measurement, that reflects the current state of the science and the current understanding of how those particular metals behave in West Virginia and Appalachian streams.

And the aluminum standard that was mentioned earlier was rejected by the legislature that is not true. The West Virginia Legislature did not reject the aluminum standard previously proposed. It was withdrawn.

Another thing to remember with respect to the comment about weakening West Virginia's water quality standards, we are acutely aware, as I think the agency is, there are certain industrial discharges, including coal mines in the State of West Virginia, that will receive lower permit limits for aluminum based on the enactment of the new standard. Again, it's about what is most protective for the streams. So it's not a weakening of the standards by any stretch of the imagination.

That concludes my remarks and we will have pretty extensive technical comments submitted for the record. Again, thank you all for coming out tonight to support this terribly important rule.

MR. GLANCE: Roger Horton is up now and

after Roger is Tim Hudley; is that correct?

MR. HORTON: Thanks to the DEP for holding this very important hearing and thank all these brothers and sisters in the coal industry for being here. I am just pleased and proud to be a part of this. We're thankful you're here.

As Jason alluded to, the comments specifics, technical aspects will all be presented to you folks forthwith. They will be coming and I'm sure they've done a very good job.

I want to talk specifically about 200 people, 200 people that were my employees, brothers and sisters that are no longer working. There were closed down because of a standard that cost millions and millions of dollars at the Apogee Coal Mine to build a selenium treatment plant that is was absolutely of no value. And then I'm looking at the 500 individuals who are going to lose their jobs very shortly because of the selenium standards that is outdated and the ability to use whatsoever at the Hobet operation because of the massive amount of money that this company had to spend on a worthless, an absolutely worthless system. You could argue that what they're doing is sound and just and when you see

500 families leave an area, there's no just about that, none whatsoever.

No one with any money even wants to look at Hobet or Apogee because of that liability, you know what I'm saying. They do not want to look at it, so it's absolutely just of no use whatsoever. And there has been many, many of you who have worked your entire life in this industry and gave it your most and I thank you for that and I want you to continue to work and continue to work safely. I want to let you know, too, that everything that I can do, I will continue to do to make sure your jobs are there and we can return our industry's people back to work. I thank you for your time.

MR. GLANCE: Tim Hudley is up next and after Tim is, I think, it's Amanda Pitzer; is that right?

MR. PITZER: Yeah.

MR. HUDLEY: Actually my name is Terry Hudley. I was born and raised down in Chapmanville. I worked for the coal industry and I want to tell you a little bit from my personal perspective. Jason and I worked together. He's good in giving the perspective in the industry as far as the regulations

and rules.

I go down this road and I see stripes and I hear people talking about the damage to these water systems and one thing I'd like to say is there's nobody in this room -- I would say this without any hesitation, there's nobody in this room that wants dirty water, nobody, coal miners, anybody in this room, so let's get beyond that. Let's quit talking about the purview and let's talk about what actually happens to people and the people I'm concerned about, the people that I represent are these guys in stripes and their families and right now there's about 80,000 of them laid off in West Virginia. There's about 35,000 other jobs that are probably lost as a result of the layoffs in the coal industry, and I looked around and the headlines today and the West Virginia's unemployment rate raised to 7.4 percent. That's nothing. McDowell County is 15 and a half percent. Mingo County is 15 percent. All across the southern coalfields and there's no reason for that other than the fact that our industry is suffering and it's suffering because of policies. And we can talk all about the cost of the price of natural gas. We can talk about the price of coal in other competing

countries, other fuels. We can talk about the shift in markets of power plants, but when you peel away the onion -- when you peel away the onion in every situation, you come back to policy, and a good policy is a policy that's balanced. It's a balance of needs. And I don't see these guys -- these guys in stripes, I don't see their needs coming into the balance. They're not being weighed at all. Somebody's hand is on the scale and that's President Obama and the Obama administration.

Now, this rule here that we're talking about here tonight, it's a state regulation. It's not directly related to the war on coal, but it's another symptom. It's another thing, another weight on that scale against the guys in stripes and I just want our policymakers to make decisions without tipping that scale. I want our policymakers to look at these guys, look at their families and take everybody into account, everybody.

And like I say, these guys in stripes they're more than about the policymakers today. And, you know, ultimately, we'll going to pay the price for that because like I say our grid is going to fail. I really believe that. And it's going to fail because

these guys aren't working. Take those coal powered power plants offline and take the miners out of the jobs and they don't go back to work tomorrow. They don't turn those power plants back on tomorrow. And it come down a few weeks ago a representative of AEP said in one of our meetings, said with no reservation at all, if we had another winter like we've had the last couple of winters, that there would be disruptions, there would be blackouts and brownouts, period. So, yeah, this is not directly related, but it's a symptom. It's another weight on the scale and it's time policymakers balance those scales.

MR. GLANCE: Amanda Pitzer is up next and after Amanda is Bill Price.

MS. PITZER: Thank you. Good evening, everyone. My name is Amanda Pitzer. I'm Executive Director of Friends of the Cheat. We are a watershed group located up in north central West Virginia, not far from Leroy's group, Save the Tygart, and I'm here tonight to comment specifically on the proposed variances in Martin, Glade and Fickey Run, which are the waters that flows into Muddy Creek, which I also will be talking about tonight.

So Friends of Cheat has actively been

working on the ground for over 20 years to restore streams from acid mine drainage. There are 500 abandoned coal mine lands in the Cheat watershed alone. The coal industry has long left the Cheat. We're cleaning up the mess of last regulations from decades ago and we've done that with success. We've done that on the ground. I might be wearing heels today, but typically I have mud boots on. I'm not in the courtroom. I'm out there looking at sludge, looking at dosers, looking at systems on the ground. We've implemented 16 acid mine drainage systems on over 40 properties in the Cheat River watershed and since 2013, we've been actively working closely with the Office of Special Reclamation to maintain 27 of their mine forfeiture sites. It's a unique partnership and through that work with DEP and through our work with the river council over the last 21 years, I truly believe that the DEP has good intentions with this variance and wants to restore streams. And I would really like to be able to stand here today and give my unconditional support for this variance; however -- well, I'll tell you why. Why won't I support it, because Friends of Cheat knows that it's going to take an outside of the box strategy

to clean up the Muddy Creek Watershed, no doubt? With over 500 abandoned mine lands and no one footing that bill, we are not going to restore Muddy Creek without some other way and instream dosing may be that way.

However, given ample opportunity, Friends of Cheat has not been convinced that the proposed ultimate restoration measures that are associated with this variance are being implemented in the most well thought out and responsible way. We have many questions about the particulars, which we will submit in written comments and will be further addressed tonight by another one of our staffers, but more broadly, we question the implications for a variance for an entire set of streams versus the site-specific request, and more broadly, I just have to question the overall logic of rolling back water quality standards to improve water quality.

We believe there is a better and more transparent and collaborative means to this end to the shared goal and we encourage the DEP to think of another way potentially working with the plaintiffs to ask for more time to try their experiment. Requesting more time would allow for the studies to be completed and evaluated without making a ten-year modification

to water quality standards.

DEP could continue their innovative work with the EPA on into the permits from all the stakeholders who have worked so patiently and persistently for over 20 years can outline a set of goals and metrics that we can all feel good about.

One may question, what's the risk? Muddy Creek is dead. Fickey Run is dead. Glade and Martin Run is dead. And the risk to this is adding additional solids to the newly protected Cheat canyon. It would degrade the whitewater experience and potentially harm the rebounding fishery.

In 1995, the Cheat was named one of the nations more endangered rivers. In 20 years, we brought it back. We've got fish from the headwaters to the mouth. We've got Walleye swimming up from the lake and there's bald eagles proliferating. That is the risk. We just don't know if this is the best measure and we think when you put on the brakes and consider a more transparent approach that is evaluated in a way we can all feel good about.

The north central region of West Virginia has already seen the coal industry come and go and we think our best hope for bringing back life to our

community is maintaining the progress we have made in water quality and promoting the outdoor recreation opportunities that require clean water to succeed.

So, in conclusion, I want to reiterate, we share the goal of DEP to restore the streams. We know that Muddy Creek requires an outside of the box approach, but we cannot support the variance in the proposed form. And, you know, I was sitting next to my friend, Leroy, and we hadn't talked a lot before this, and he said, well, what's the risk. I've never seen anything bad happen. And, you know, this might not be bad, but that's not a restored stream to me. So let's figure out what that restored stream is. Let's work together to develop metrics and the variance, maybe I'll be up here next year supporting that variance. I agree that science is important, but these standards are not. Thanks, everybody.

MR. GLANCE: Bill Price is up now. After Bill is Kevin Ryan.

MR. PRICE: Good evening. I'm Bill Price. I am with the Sierra Club. I'm based here in Charleston, West Virginia. We will also have technical comments, so I'm going to stay away from whatever the grams are. I'm not a scientist. What I

am is a guy who grew up in the southern part of West Virginia in the coal producing areas of Boone and Raleigh County and a union coal mining family. I remember my father coming home in the evenings with coal dust on his face, trying to impart to me values of responsibility.

One of the things that he said was that that we deserve -- when he goes into the mines, he deserves a safe and clean workplace and we deserve a safe and clean community to live in. I think that's what we're trying to do here. One of my father's bedrock things that I got in trouble with a lot was you mess it up, you clean it up.

Today we have an industry that is messing it up. Selenium is a pollutant in the streams which is having an impact on the water quality of this state. The industry is messing it up. I'm not blaming any of the miners, but the industry is polluting the streams and they need to clean it up.

This proposed rule change is unenforceable in the way that it is being looked at. It would be fine if you could get that fish that you're going to take the tissue from to stay in one part of the streams. Maybe we could build some cages.

I don't think anyone here wants to do that. Because fish move around in a stream, and so when you get to that stream and you do the sampling and let's say that there is a selenium problem in that fish tissue and you have three different operations that are polluting that area, which of those three operations do you go to and say, you messed it up, so, therefore, you clean it up? Which one? That is just one level of the unenforceability of this proposed rule change.

They tried that in Kentucky and they're having -- already having problems with it. They tried that last year. They're already having problems with trying to figure out how they're going to reinforce -- how they're going to actually get the fish to get the fish tissue from.

We don't need that kind of unenforceability in this state. If we learned nothing else 18 months ago, and some of you may have been among the 300,000 who couldn't drink their water, some of you may even be among the people who still don't feel comfortable drinking the water that comes out of the tap -- if we learn nothing else, what we did learn from that if that you don't enforce the standards, if you don't have simple enforcement, then bad things

will happen. Water will get polluted. The water coming out of your tap will be unusable. If you don't have enforceability, the economy will suffer. Just go ask the businesses, the restaurants that closed down in the City of Charleston because of the water crisis. I'm not trying to blame the coal industry for that particular incident. What I am saying is this, we have got to have high water quality standards and the aluminum standard change would make it the weakest standard in the United States. I don't think we want to continue to be seen as a state that has low water quality and low standards on aluminum. I think we want to lead the country, not be the last.

I'll end this with one more father statement. My father said the first step to getting out of a hole is to quit digging the hole. You cannot, when you're heading down a path, simply stop and think that a change in the administration -- that somewhere out there there's this big bad guy who, if we get rid of him, will change and solve all the problems that you all are facing. We cannot do that. We have to start down a new path.

I'd like to have a conversation with anyone in this room around the power plus plan, the

administration's budget proposal right now. I would like to have a conversation about good reliability because I would be interested in what the AEP official said about that. That's not what I'm hearing. But maybe I'm hearing wrong. We could have this conversation.

What we cannot do is to continue to let this industry divide us, because we do all want good, clean water. We do all want good jobs for everyone. What we cannot do is get stuck in the past and continue to bend over backwards for this industry or any other industry. Thank you.

MR. GLANCE: Kevin Ryan is up next and after Kevin is Art Kirkendoll. You have five minutes.

MR. RYAN: Okay. So my name is Kevin Ryan. I work for Friends of the Cheat. Amanda Pitzer is our director. You heard a little bit about our organization and unfortunately I'm speaking in opposition to the proposed variance on the Martin Creek Watershed issue that you've heard tonight. And I say unfortunately because I think that some of our opposition could have been avoided if we had a little better communication and collaboration amongst the watershed groups, the state agencies, the plaintiffs

that are -- the DEP's special reclamation is worried about in implementing this restoration strategy. I also say that I believe the DEP is doing what they think is right. They want to clean up watersheds. So do we. I commend them for this effort. And what I'm going to do right now is just briefly outline some of the technical questions that I would really love to see DEP answer specifically in a variance application. And if you've read the variance application, it is quite vague, and, in fact, some of the language that is pulled from a report that Friends of the Cheat authored back in 2012 ourselves. So we know what the data says and we know what monitoring had been done.

And the first thing I want to tell you about is that in 2012, we actually did a pilot study where we dosed Martin Creek in collaboration with special reclamation and the picture that Amanda showed you, you probably just saw it was a little bit red, that was actually during dosing. And so the solids that come out, the iron and aluminum that, I think Leroy talked about, it comes out, but where's it go. It goes either into the bottom of the stream or it stays in the water and gets pushed downstream into other rivers, creeks and eventually, in our case,

Cheat Lake. So it doesn't just disappear. And in our case, the Martin Creek Watershed and the Muddy Creek Watershed is short in that regard, only miles, only a few miles. In the Three Fork situation, we're all impressed by that. It was much longer --

MR. STANLEY: Say that again.

MR. RYAN: We're all impressed by the Three Fork --

MR. STANLEY: Thank you.

MR. RYAN: Yes, you're welcome. I think that it was done right, but every watershed is not the same. And in our case, again --

MR. STANLEY: Say that again.

MR. RYAN: Every watershed is not the same. And in our case, we really don't have a lot of time for those metals to drop out and create clear water where we're going to see what we think is real restoration.

So we tried that study, we got muddy water and so we have reason to believe that it may not work. And that's not to say that we don't -- we should not try, but we have reason to believe that we shouldn't give DEP a blanket ten-year variance for what they want to do and it may not work.

So my specific questions are regarding how this is going to be implemented and evaluated. And I think they're pretty easy to resolve. The first thing that Amanda mentioned is that there's not really a specific restoration goal in the variance application. All it does is it proposes to set standards to the worst case water quality scenarios that already exist in the stream. That's an extremely low bar for restoration. If DEP really wants to restore streams, set a restoration goal and let's try to meet that. In fact, water quality standards are already essentially restoration goals. That's where we want to be. But this variance doesn't do that. So I think it's sort of fundamentally flawed in that regard.

Second, there's no mention of actual metrics that will be used to determine whether or not this is successful. And those are easy. Let's measure WVSCI scores, benthic and fish. That's easy. There's no fish in there right now. So if we're monitoring fish, we should be able to determine whether this is working. But there's no mention that DEP will do that or that they'll have to do that with the implementation of this program.

And then finally, or not finally, but third, which downstream sites will be monitored to determine whether this is a success or failure. The variance is only for the Martin Creek Watershed. Well, directly below that is the Muddy Creek Watershed and directly below that is the Cheat River and things flow downstream. So if you dose the stream, you create sludge, we're going to get impacts in both Muddy and the Cheat River and we will need to be monitoring that as well. And DEP needs to monitor that. It needs to be on paper that that's going to be part of their study.

In some cases where this dosing might occur, this sludge could flow just less than a mile into these other streams. So we think that there's reason for concern there.

And then, finally, I think this is maybe my most important point I want to make to those in the room that are aware of lime dosing strategies and the management of sludge, when will DEP decide to stop the dosing program if it's not working or advise a strategy. I think that lime dosing has a place for restoration in the watershed, but it may not be the only tool that we need to use. So we may need to use

some of that for 50 percent of the load and we may need to use other sludge management techniques that we're already using to get the rest to achieve real restoration. And that's just common sense. I don't think that just saying that we're going to dose the streams is going to fix it. So I would like to see DEP acknowledge that there might be some solid management methods that we actually need to use in order to achieve the restoration goals, which have yet to be sort of defined on paper.

And so with that, I'll just conclude that I think there's some very basic questions concerning how this program is going to be implemented and evaluated and I would encourage DEP to continue to communicate more directly with us. We live and work and study this watershed. I've been studying this watershed for a few years now and I would love to be more involved with how this is going to play out, so thank you very much.

MR. GLANCE: Art Kirkendoll is up next. Is there anybody who has not signed -- Art's our last speaker to sign up, so if anybody else wants to speak, there is one more signup sheet in the back, so feel free to sign up.

MR. KIRKENDOLL: My name is Art Kirkendoll. I represent Logan, Boone, Lincoln, Mingo, Wayne and 7 Central District and two years ago, I think it was bill legislature. I may be off a number, but I believe that bill passed 134 to nothing with the senate vote and the house vote. And the reason I'm saying that, I've served over there since November of 2011. We have quite a few people in the legislature pretty environmentally sound. So with this piece of legislation in front of these people that have environmental concerns, it passed unanimous. And tonight we are here looking at some issues regarding that.

And I also heard some of them say it was about politics. I want to just say there's just a little bit of both. I've been through the coal industry up and down since I became a county commissioner back in 1981 in Logan at the age of 29. My dad worked 42 years underground. My brother worked underground. I actually worked underground 11 years. I have a passion for people that do this and mine coal. I come from three of the counties I represent, Mingo, Logan and Boone. For about a five or six-year period when reduction levels were decent, we were

sending 170 million dollars a year in taxes to the state coffers. I done the math. We were getting about 11.4 back, with a pat on the back, thank you. So it was apparent the rest of the state loved us at that point in time. Now, we're getting to the point on Monday morning, back in Mingo, Logan and Boone, men and women your age group now waking up do we have a job where we can feed and educate our kids. And you talk about political. Go to Illinois and see if they're having any trouble mining coal. Take a little trip out to Wyoming out to the Power River Basin and see if they're having any trouble mining coal. The standards for the Appalachian region are completely different. Everything is different when you mine coal in our area. And by the estimation, they have actually said we're going to shut you down. Now, the sadness of that is this. We're going to have some trouble by August and September if this heat keeps up. And, my God, I made a statement I hope nobody dies. They shut down four power plants and they've operated at 85 to 100 percent efficiency. They're off the grid now. They're going to make a mistake and we'll have to come back and retrofit them and put them back online until they choose to retrofit them and gas down

the road that would be something they would look at, but I hope it's not at the expense of somebody dying in a nursing home needing oxygen or dialysis or something like that.

But how did we get to this point in America? I've served on the Southern States Energy Board since I've been in the senate. I've been to Oklahoma, Alabama, Mississippi. It's a composite of 16 states in America, Puerto Rico and the Virgin Islands. It's a known fact we're going to mine. We're going to ask for 30 percent more use of fossil fuels as coal -- known as coal, because of the ability to mine cheaper, quality prices on your electricity. The rest of the world says, look, we've tried it all. We want coal. Germany's tried it all. They want coal. But we're not going to send anything to them because of the regulation aspects we have and regarding the production levels and putting it on the rail. I read a little message from CSX. They're looking to lay off 600 people in a five-state area and most of them are in the area where they transport coal. That's four percent of the workforce.

Now, how can the rest of the world start a global boom and we're sitting here and can't even

affordably get underground and mine the coal. It doesn't make sense to me. Air quality standards, we put 13 percent of the CO2 emissions from America that goes up in the atmosphere. Challenged and contested and I'm fine with that. I want a clean environment. But 90 percent of it is force out there with no restrictions whatsoever. And just a matter of days it's overtop of us. When they had the Olympics, China had to shut cars down so they could clean the air up for the athletes to walk to the stadiums. But America has got to where we've let outside forces of environmentalists come in here. Most of these people are not West Virginia people in the coal industry. They aim and advertise for college kids to come and join their efforts to rally and everything against what you do.

This country was based on coal, steel, manufacturing and housing and timbering. Why are we not the strongest country in the world? We give up being productive people in the workforce through efforts and laws that they say are political, absolutely.

Now, as long as I'm there, I want the environment clean and safe. I worked underground.

There's a couple times I was lucky to get outside. But I've never worked with a group of people any better than coal people. They tell you the truth and look you dead in the eye and work with like you're family. I worked 60 and 70 hours a week. I seen my guys on my shift more than I did my family. But tell me how we could go -- right now, I believe the average electrical power bill in America is $272.00, $280.00. Cheapest in the world. They tried retrofitting gas. It don't get hot enough. It's high. And the cost of it is down. Now, I'd rather see it rise because both -- I want both of them to survive. I don't think we should have 100 percent dependency on coal. But this country needs an energy bill. They need to know how much we're going to produce to coincide with gas, solar, use it all. But why are we so challenged only in one area in America. We even put together a resolution asking the people in DC to put us in Atlanta EPA region. We don't need to be in Philadelphia. I spoke in front of people in Philadelphia and I thought I was talking to people from Mars. They don't get what we're doing. It's not fair. Am I an environmentalist, absolutely? I want everything clean as it can be. But if we're going to

clean up the world, why don't they all meet and have world standards, not just the Appalachian region standards. We're the only ones that has these cement standards. That's not fair to you, you and you. How are you going to wake up and feed your family and do what you've got to do? America needs to stand up and tell these people in DC, we'll do it right, but let's have everybody else do it right. That's all we ask for, isn't it, a level playing field. And I'll tell you one thing, the vote on the selenium bill is 130 to 11. With all the environmental people in the legislature, they went ding, green. I'm just getting started.

Thank you for the opportunity and I just wish you the best of luck. I know you're in a challenging effort, but as a guy that represents you in Charleston, I'm proud to say that I stand up for coal and doing it right. Thank you very much.

MR. GLANCE: Mike Carpenter is up now and after Mike is Cody Cooper.

MR. CARPENTER: I want to thank you for the opportunity to speak. My name is Mike Carpenter and I work for Maxxim Shared Resources, an Alpha subsidiary, Brooks Run North comprised of Nicholas,

Braxton, Webster, Kanawha County. I've got several fellow employees in here. I'm proud of them for being here and probably 20 or 30 and for every one of these I know that are laid off. So I just want to say I thank you for the opportunity to provide comments this evening. I'm here to support the adoption of the new water quality standards for selenium and aluminum in the State of West Virginia. I'm a lifetime West Virginian. I'm not from out of state. I didn't come in here to try to tell you what to do. I care about the water and the environment and have seen how overly protective standards and effluent limits have been used by the anti-mining groups to influence the state's mining program and to repeatedly sue the industry resulting in a permitting quagmire and the requirement for the installation of costly treatment systems that have little, if any, proven environmental benefit. And that's selenium systems. We're building them 3, 5, 6, 7 million dollars. It's a waste of money when we could be using that for better productivity and more equipment for people in our mines.

Under selenium, the proposal is an important first step toward restoring reasonableness

to West Virginia's water quality standards programs and the legislature is to be complimented for directed the West Virginia DEP to use the best available scientific information to promote and update to its outdated standard.

It has taken way too long to propose a revised standard. Despite knowing the standard was incorrect, the West Virginia Legislature had to instruct the agency to undertake a rulemaking to fix it.

The state and federal government has known for 17 years that the current selenium criteria is incorrect since selenium's impact on aquatic life is not simply from presence in the water, but its accumulation in fish, which can vary dramatically based on many factors.

The proposed state standard adopts a fish tissue measurement for selenium, consistent with US EPA's recommendations for developing such standards.

The proposed selenium standard was developed using EPA's approved methodology and using data specific to the waters of West Virginia.

The proposed rule would revise only the aquatic life use standards, currently 5 ug/L chronic

and 20 ug/L acute, with no proposed changed to the human health standard or the FDA recommendation maximum daily intake for humans.

A very similar standard was recently proposed by Kentucky and approved by EPA. We're not asking you to do something that other states haven't done or that the EPA hasn't approved. You know, we're not trying to back up on standards and I'm like everybody else, I like to have clean water, I like to have a clean environment. I've worked in the mining industry for 39 years.

We feel the proposed standard is more protective of the environment since it's based on the actual science and is derived from the West Virginia-specific data.

Touching on aluminum. Unlike West Virginia, most other states realized that compliance with an aluminum standard would be too difficult since it is one of the most abundant elements in soil.

Most aluminum is found in streams is harmlessly bound up in sediments. This is a natural condition in West Virginia streams.

The natural background level of aluminum in state streams is often higher than the current

water quality standard.

Aluminum is only an issue where water hardness drops below certain levels since hardness buffers the potential impacts of aluminum.

The state's proposed aluminum standard would be hardness dependent, with applied safety factors and caps on the amount of aluminum to better reflect the current science.

Hardness based standards are a better way to implement productive criteria for certain metals like aluminum. West Virginia and the federal EPA have developed several hardness-based criteria and standards for other metals.

The proposal follows EPS's recommendations for developing water quality standards for metals. The proposed standard is actually more protective than the current standard since it reflects the true potential impact from aluminum that can occur in water with low hardness.

Some mining discharges to low-hardness streams could actually receive lower aluminum limits under the new standard.

West Virginia's current overly protective aluminum water quality standard leaves our state coal

industry at a competitive disadvantage. And you've seen a lot of that lately regarding the stream and we seem to be on the short end of the stick, I would say.

Again, thank you for allowing me to comment here this evening. I also want you to know that we support the technical comments provided by the West Virginia Coal Association. God bless our miners and God bless our great state.

MR. GLANCE: Cody Cooper is our last speaker.

MR. COOPER: Hi. My name is Cody Cooper. Yeah, I'm not good at public speaking or anything. Yeah, I'm 25-years-old and I'm the future of the coal industry. I've worked underground. I'm doing environmental work right now and the guys I work with, you know, we go out and we make sure everything to the best of our ability is what it's supposed to be. And I'm from here. I'm from like ten miles down the road here and, you know, I hunt and fish. I don't want to see anything, you know, destroyed or anything, so -- I have a son. I have a daughter. I want them to, you know, grow up and see what I have. But I believe the limits, they're set -- the bar's set too high right now. I think we need to -- especially when we get

limits, it's like 1/1000th's out and, you know, we tried our best, the best we could do, but, you know, we're going to try hard. Appreciate it.

MR. GLANCE: Is there anybody else who want to speak? If not, this concludes the public hearing on the Division of Water and Waste Management's proposed revisions to Legislative Rule 47CSR2. The agency will accept written comments on the proposed rule through 9:00 a.m. on July 31st. Thank you all very much.

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(Concluded at 7:20 p.m.)

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REPORTER'S CERTIFICATE

STATE OF WEST VIRGINIA,
COUNTY OF KANAWHA, to wit:

I, Dena A. Belisle, Notary Public in and for the State of West Virginia, duly commissioned and qualified, do hereby certify that the foregoing **PUBLIC HEARING** duly taken by and before me, under the West Virginia Rules of Civil Procedure, at the time and place and for the purpose specified in the caption thereof; the said witness having been duly sworn by me to testify the whole truth and nothing but the truth concerning the matter in controversy.

I do certify that the said deposition was correctly taken by me by means of the Stenomask; that the same was transcribed by me, and that the said transcript is a true record of the testimony given by said witness.

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

Given under my hand this 28th day of July, 2015.

Dena A. Belisle, CCR
Notary Public

My commission expires April 8, 2023.

Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

(1)

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

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
√ Delegate Rupie Phillips	PO Box 194 Logan WV	House	687-9793	Rupert.Phillips@wvhouse.gov	Yes
James D. Whitt	Rt 1 Box 168 Crum WV	A/Jan AF	304-750-9578	—	NO
Terry Mahood	Rt 1 Box 2842 Dingess		304-784-2340		NO
Corey Hoover	368 Town Mtn. Rd Summersville WV	Alpha	304-619-4303	—	NO
Mike Jenkins	301 Maple Lane Kingwood WV 26537	AQUAFIT	304-329-1056	mjj@aquafit.com	NO
PATRICK MURPHY	PO Box 1064 Beckley 25802	MARCO	304-890-9902	murphy.marcoresources@gmail.com	No.
~~Larry Adkins~~	90 Vermont Dr Summersville	Alpda			NO
Ken Ward JR	1001 Virginia St E Charleston WV	Gazette	304-345-1700	kward@wvgazette.com	NO
Garry Jewell	127 Leslie Pl SCOTT Depot WV	ALPHA	304-687-6655		
Ron Adkins	1407 LOGAN, W. VA		304-239-0752		NO
Danny Bess	105 Scott Depot, WV Maplewood Est. 25560	Nalco	304993-3191	dbess@nalco.com	NO
Brian Lively	465 Hunters Ridge Fayetteville WV 25840	NALCO	304-640-0305	blively@nalco.com	NO

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Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

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Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Tiff Hilton	202 Crawford Cir Lewisburg	WOPEC	304-667-1952	wopec@suddenlink.net	No
Ron Lilly	PO Box 1298 Shady Spring, WV 25918	MALLARD ENV. Services	304-787-5550	rlammonia@yahoo.com	No
Leslie Lavender	3340 West 1st Ave Belle WV 25015	Venator	3042068363	leslie.lavender@[illegible]	No
Steve Cochrane	Man WV	Alpha			NO
Brian Bledsoe	Chapmanville WV	Alpha			No
Orville Cline	Man W.V	Alpha	304 752-5208		No
Ray Daugherty	Matewan W.V	Alpha	304-784-9039		No
Marton Lilly	Camp Creek, WV	Alpha	304-920-5748		No
Matt Ellis	Wharncliffe, WV	Alpha	304-784-9049		No
Martin Christ	2031 Pleasant Valley Rd Fairmont	WVDEP	304 368 2000	Martin.J.Christ@wv.gov	No
Leroy Stanley	PO Box 164 Grafton 26347	Save The Tygart	304-265-5719	Stanleyleroy70@Gmail	yes
Mike Carpenter	1292 Webster Rd Webster Springs WV 26288	Alpha	304-872-5065		

Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

3

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Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Linda Torre	4984 N. Washington 25313	Decota Consulting	304 776 3333	Lindatorre@decotaconsulting.com	No
Allyn Turner	707 Va. St. E.	Steptoe+Johnson	3043538167	allyn.turner@steptoe-johnson.com	NR
Drew McCallister	300 Running Right Dr	ANR	304-369-8691	dmccallister@alphanr.com	No
Angie Rosser	3501 Macorkle #129	WV Rivers Coalition	637-7201	arosser@wvrivers.org	YES
Cindy Rank	4401 Eden Rd Rock Cave	WV HC	304-924-5866	drank2@gmail.com	Yes
Julie Archer	1500 Dixie Street Charleston, WV 25311	WVCAG/WVSCRO	304-346-5891	julie@wvscro.org	no
MIKE PUSHKIN	411-B RANDOLPH ST CHARLESTON, WV 25301		304-344-4339	pushkinforhouse@gmail.com	no
Ladd Williams	3751 Fill Hollow RD TUNNELTON, WV 26444	WVDEP	304-841-2454	Lawrence.B.Williams@wv.gov	No
Shane Harvey	511 Lee St	JLC	304-539-501	shane@jacksonkelly.com	No
Kenny Williams	40 Pine Ridge Tornado WV		304-644-4866	Kennyd.williams@aol.com	no

Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

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

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Steve Phares	722 Bright Mtn Rd Summersville	Alpha	(304) 239-9828	~~(304) 239-9828~~	NO
Scott Heflin	607 Holly Drive Summersville	Alpha	304 765-4006	—	NO
Jason C. Miller	296 Rockland Hills Dr. ~~Dunbar~~ Dunbar, WV	Rhino Energy	304-934-6576	—	No.
Brian Chapman	P.O. Box 834 Hastings WV	Alpha	304-657-3652	—	NO
Wayne Pennington	302 Pratt Avenue	ALPHA	304-207-1733		NO
Andy Henthorn	266 Molly Gauley Rd	—	304-964-0361	—	NO
Jennie Henthorn	517 6th Avenue St Albans WV 25177	Henthorn Env	304-727-1445	jhenthorn@henthornenv.com	NO
Steve Hamilton	213 Jacobs Ave Summersville WV 26651	Alpha	206 276-5795	—	NO
~~[illegible]~~					
Larry Dell	104 Wildcrest Ave Elkview, WV	WVETO	3049657185	edlarse@suddenlink.net	YES
Connie Gratopheus	PO Box 1007 Chas WV 25321	WEC	304-543-5811	conniegle aol.com	yes

Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

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Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
Mike Carpenter	1792 Webster Road Webster Springs, WV	Alpha	304-872-5065	mcarpenter alphanr.com	✓
Cody Cooper	1993 Cens Creek Rd Herndon, WV 25107	Alpha	304-872-5065	ccooper@ alphanr.com	✓

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Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

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

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
✓ Mike Becker	~~546~~ P.O. Box 507 Lewisburg	Appalachia		mbecker@appvoices.org	Yes
✓ JASON BOSTIC	PO Box 3923 Charleston WV 25339	WV COAL	304-342-4153	jbostic@wvcoal.com	YES
✓ ROGER HORTON	P.O BOX 692 HOLDEN	CITIZENS FOR COAL	304-239.3780	UNEARMRIDER [illegible]	Yes
✓ [illegible] Headley	2622 Kanawha Drive, [illegible], WV 25345	WV Coal	304-390 5441	prdoc1@gmail.com	Yes
Scott HALL	Yawkey WV	Alpha	304-369-7710	gshall@alphanr.com	
Aven Sizemore	New Richmond, WV	Alpha	304-898-2862	asizemore@alphanr.com	
Owen Mulkeen	Kingwood, WV	FOC	304 329 3621	omulkeen@gmail.com	
✓ Amanda Pitzer	"	FOC	304 329 3621	amanda@cheat.org	Yes
Brent Coakley	Lincoln WV	Alpha	3046870944	bcoakley@alphanr.com	
Kelli Sobonya	B'ville WV	House of Delegates	304-340 3175		
Ken Marcum	Alum Creek, WV	Alpha	304-877-7017	Kmarcum@alphanr.com	No
✓ Bill Price	Charleston WV.	Sierra Club.	304-389.8822	Bill.Price@sierraclub.org	Yes

Public Hearing Sign In Sheet

Water Quality Standards Public Hearing (Legislative Rule 47CSR2)
July 21, 2015 - 6:00 p.m. Charleston

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

Name (please print)	Address	Organization	Phone/Fax	E-mail	Comment Yes/No
John Gilkeson	Naoma WV	Alpha Natural Resources	854-0721	JGilkeson@AlphaNR.Com	No
David Petry	Kingwood, WV	Friends of the Cheat	304 329 3621	david@cheat.org	No
KEVIN RYAN	KINGWOOD, WV	Friends of the Cheat	304 329 3621	kevin@cheat.org	Yes
Blair M. Gardner	Charleston, WV	Jackson Kelly	304-340-1146	bgardner@Jacksonkelly.com	No
GREG CARROLL	3501 BENEDICT Rd, CULLODEN WV	WVEC	304.206-8849	GREG.CARROLL@FRONTIER	NO
Karen Tabor	3501 Benedict Rd, Culloden	WVEC	479-790-7213	kfteach123@yahoo.com	No
MATTHEW VANCE		ALPHA NATURAL RESOURCES	304-849-3730	mvance@alphanr.com	No
David McGraw	4101 Slate drive Scarbro, WV 25917	Alpha	304-595-1870	dmcgraw@alphanr.com	No
Cork McGraw	4101 Slate Drive Scarbro 25917	Alpha	304-595-1870	cmcgraw@alphanr.com	No
ART Kirkendoll	Chapmanville	ST. SENATE	304-855-7418		Yes

Written Comments on revisions to 47CSR2

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

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

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

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,

Jason D. Bostic
Vice-President

Comments Pg 8

UNITED STATES ENVIRONMENT.
REGION
1445 ROSS AVENUE
DALLAS, TX 75
APR 30 2

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

Enclosure

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

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

UNITED STATES ENVIRONMI
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1595 Wyni
DENVER, CO
Phone 80
http://www.epa

Ref: 8EPR-EP

AUG 04 2011

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

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

Dear Mr. Butler:

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

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

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

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

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

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

CLEAN WATER ACT REVIEW REQUIREMENTS

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

TODAY'S ACTION

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

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

ENDANGERED SPECIES ACT REQUIREMENTS

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

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

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

STANDARDS APPROVED WITHOUT CONDITION

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

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

STANDARDS APPROVED SUBJECT TO ESA CONSULTATION

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

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

PROVISIONS EPA IS NOT ACTING ON TODAY

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

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

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

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

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

CONCLUSION

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

Sincerely,

Carol L. Campbell

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

Enclosure

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

West Virginia
PO Box 3923, Charleston, WV 25339 • (3
jbostic@wvcoal.com

September 21, 2011

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

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

Dear Director Mandirola:

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

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

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

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

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

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

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

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

Sincerely,

Jason D. Bostic
Vice-President

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

GEI Consultants

Geotechnical
Environmental
Water Resources
Ecological

Updated Freshwater Aquatic Life Criteria for Aluminum

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

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

August 2011
Project 114210

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List of Acronyms

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

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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.

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2.0 Summary of Existing Criteria

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

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

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

3.0 Summary of New Toxicity Studies

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

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

3.1 Acute Toxicity

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

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

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

3.2 Chronic Toxicity

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

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

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

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

Species Latin Name	Species Common Name	Method	Chemical	pH	Hardness (mg/L as $CaCO_3$)	LC_{50} or EC_{50} (µg Al/L)	LC_{50} or EC_{50} Adjusted to Hardness of 50 mg/L (µg Al/L)	Species Mean Acute Value at Hardness of 50 mg/L (µg Al/L)	Reference
Acroneuria sp.	Stonefly	S,M	$AlCl_3$	7.46	47.4	>22,600	>24,315	>24,315	Call 1984
Asellus aquaticus	Isopod	S,U	$Al_2(SO_4)_3$	6.75	50	4,370	4,370	4,370	Martin and Holdich 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.42	50	1,900	1,900	>2,164	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.66	50	1,500	1,500	-	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	8.13	50	2,560	2,560	-	McCauley et al. 1986
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.5	26	720	1,783	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.6	46	1,880	2,107	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	7.8	96	2,450	1,993	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	$AlCl_3$	8.1	194	>99,600	>15,554	-	ENSR 1992a
Ceriodaphnia dubia	Cladoceran	S,M	-	7.6	98.5	2,680	1,138	-	Soucek et al. 2001
Ceriodaphnia sp.	Cladoceran	S,M	$AlCl_3$	7.36	47.4	2,300	2,475	3,134	Call 1984
Ceriodaphnia sp.	Cladoceran	S,M	$AlCl_3$	7.68	47.4	3,690	3,970	-	Call 1984
Crangonyx pseudogracilis	Amphipod	S,U	$Al_2(SO_4)_3$	6.75	50	9,190	9,190	9,190	Martin and Holdich 1986
Cyclops viridis	Copepod	S,U	Al_2O_3	6.9	-	>27,000	=	-	Storey et al. 1992
Daphnia magna	Cladoceran	S,M	$Al_2(SO_4)_3$	7.05	220	38,200	8,922	4,735	Kimball manuscript
Daphnia magna	Cladoceran	S,M	$AlCl_3$	7.61	45.4	>25,300	>28,875	-	Brooke et al. 1986
Daphnia magna	Cladoceran	S,U	$AlCl_3$	7	45.3	3,900	4,485	-	Biesinger and Christensen 1972
Dugesia tigrina	Flatworm	S,M	$AlCl_3$	7.48	47.4	>16,600	>17,859	>17,859	Brooke et al. 1986
Gammarus pulex	Amphipod	S,M	Al_2O_3	6.9	-	>2,700	=	-	Storey et al. 1992
Gammarus pseudolimneus	Amphipod	S,M	$AlCl_3$	7.53	47.4	22,000	23,669	23,669	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	7.46	47.4	55,500	59,711	32,922	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	6.59	47.4	>23,400	>25,176	-	Call 1984
Physa sp.	Snail	S,M	$AlCl_3$	7.55	47.4	30,600	32,922	-	Call 1984
Tanytarsus dissimilis	Midge	S,U	$Al_2(SO_4)_3$	6.85-7.71	17.43	>79,900	>338,321	>338,321	Lamb and Bailey 1981
Tubifex tubifex	Worm	R,U	$Al(NH_4SO_4)_2$	7.6	245	50,230	5,698	5,698	Khangarot 1991
Hybognathus amarus	Rio Grande silvery minnow	S,M	$AlCl_3$	8.1	140	>59,100	>14,426	>14,426	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 Al/L)	LC_{50} or EC_{50} Adjusted to Hardness of 50 mg/L (µg Al/L)	Species Mean Acute Value at Hardness of 50 mg/L (µg Al/L)	Reference
Ictalurus punctatus	Channel catfish	S,M	$AlCl_3$	7.54	47.4	>47,900	**>51,534**	>51,534	Call 1984
Lepomis cyanellus	Green sunfish	S,M	$AlCl_3$	7.55	47.4	>50,000	**>53,794**	>53,794	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	6.59	47.4	7,400	**7,961**	>7,547	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	7.31	47.4	14,600	**15,708**	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	7.46	47.4	8,600	9,253	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	S,M	$AlCl_3$	8.17	47.4	>24,700	>26,574	-	Call 1984
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.25	23.2	9,170	**17,660**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.26	35	9,170	**10,066**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.29	83.6	7,670	**3,794**	-	Gundersen et al. 1994
Oncorhynchus mykiss	Rainbow trout	F,M	$AlCl_3$	8.29	115.8	6,930	**2,194**	-	Gundersen et al. 1994
Oncorhynchus tshawytscha	Chinook salmon	S,M	$NaAlO_2$	7	28	>40,000	**>58,495**	>58,495	Peterson et al. 1974
Perca flavescens	Yellow perch	S,M	$AlCl_3$	7.55	47.4	>49,800	**>53,578**	>53,578	Call 1984
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	6.1	140	>59,100	>14,428	>5,869	Buhl 2002
Pimephales promelas	Fathead minnow	S,M	$Al_2(SO_4)_3$	7.34	220	35,000	**4,801**	-	Kimball manuscript
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.61	47.4	>48,200	>51,357	-	Call 1984
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.05	47.4	>49,800	>53,578	-	Call 1984
Pimephales promelas	Fathead minnow	S,U	$Al_2(SO_4)_3$	7.6	-	>18,900	-	-	Boyd 1979
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.8	28	1,160	**2,840**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	7.8	46	8,160	**9,170**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.1	98	20,300	**8,398**	-	ENSR 1992b
Pimephales promelas	Fathead minnow	S,M	$AlCl_3$	8.1	194	44,800	**8,998**	-	ENSR 1992b
Salmo salar	Atlantic salmon	S,M	$AlCl_3$	6.5	6.8	599	**9,2051**	9,205	Hamilton and Haines 1995
Salvelinus fontinalis	Brook trout	F,M	$Al_2(SO_4)_3$	6.5	-	3,600	-	-	Decker and Menendez 1974

* Bold, underlined values were used to calculate species mean acute values.
S = static, R = renewal, F = flow-through, U = unmeasured, M = measured

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

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

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

Species	Hardness (mg/L)	LC_{50} or EC_{50} (µg Al/L)	Reference
Ceriodaphnia dubia	26	720	ENSR 1992a
	46	1,880	ENSR 1992a
	50	1,500	McCauley et al. 1986
	50	1,900	McCauley et al. 1986
	50	2,560	McCauley et al. 1986
	96	2,460	ENSR 1992a
	98.5	2,880	Soucek et al. 2001
	194	>99,600	ENSR 1992a
Daphnia magna	45.3	3,900	Biesinger and Christensen 1972
	220	38,200	Kimball Manuscript
Fathead minnow	26	1,160	ENSR 1992b
	46	8,180	ENSR 1992b
	96	20,300	ENSR 1992b
	194	44,800	ENSR 1992b
	220	35,000	Kimball Manuscript

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

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

[a] This value is an EC_{15} for reproductive effects. It was included in Table 6 ("Other Data") of USEPA (1988), presumably because Al concentrations were not measured. However, it was included in Table 2 of this updated criteria evaluation because it provides information on the chronic sensitivity of *D. magna* in water of a moderate hardness (45.3 mg/L) and the result seems reasonable in comparison to the chronic value of 742.2 µg/L at a hardness of 220 mg/L (Kimball manuscript).

Table 2b: Aluminum acute-chronic ratios.

Species Latin Name	Species Common Name	pH	Hardness (mg/L as CaCO3)	Acute Value (µg Al/L)	Chronic Value (µg Al/L)	Acute-Chronic Ratio	Species Mean Acute-Chronic Ratio
Ceriodaphnia dubia	Cladoceran	7.15	50	1,900	1,908	0.9958	0.9690
Ceriodaphnia dubia	Cladoceran	7.75	50	1,500	1,624	0.9236	-
Daphnia magna	Cladoceran	8.30	220	38,200	742.2	51.47	-
Daphnia magna	Cladoceran	6.5-7.5	45.3	3,900	320	12.19	12.19[a]
Pimephales promelas	Fathead minnow	7.24-8.15	220	35,000	3,288	10.64	10.64
						Final ACR:	**4.9923**

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

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3.3 Other Data

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

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

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

3.4 Unused Data

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

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(*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."

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4.0 Hardness-Toxicity Relationship

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

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

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

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

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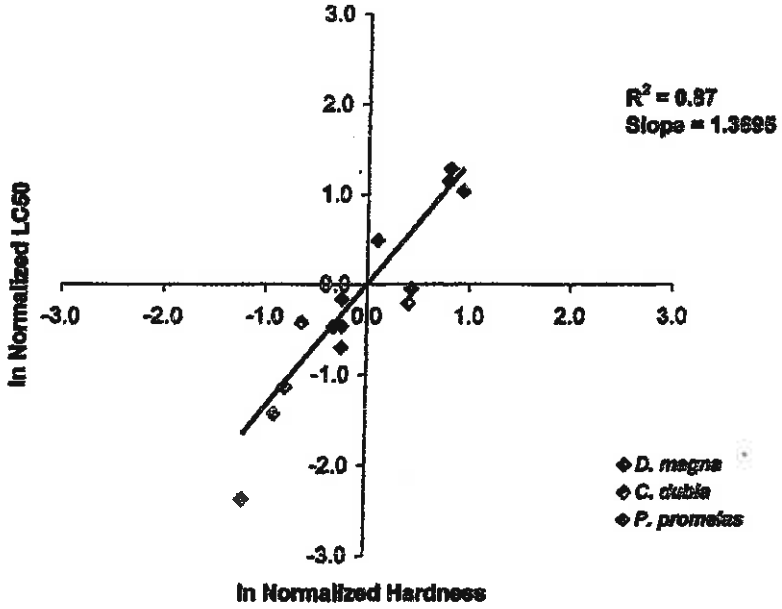

Figure 1: Relationship between hardness and acute aluminum toxicity.

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5.0 Revised Aluminum Criteria

5.1 Acute Criterion

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

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

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:

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

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.

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Table 3: Ranked genus mean acute values with species mean acute-chronic ratios

Rank	Genus Mean Acute Value (µg Al/L)	Species	Species Mean Acute Value (µg Al/L)	Species Mean Acute-Chronic Ratio
17	>338,321	*Tanytarsus dissimilis* (midge)	>338,321	-
16	>53,794	*Lepomis cyanellus* (green sunfish)	>53,794	-
15	>53,578	*Perca flavescens* (yellow perch)	>53,578	-
14	>51,534	*Ictalurus punctatus* (channel catfish)	>51,534	-
13	32,922	*Physa* sp. (snail)	32,922	-
12	>24,315	*Acroneuria* sp. (stonefly)	>24,315	-
11	23,669	*Gammarus pseudolimnaeus* (amphipod)	23,669	-
10	>18,189	*Dugesia tigrina* (flatworm)	>18,189	-
9	>14,428	*Hybognathus amarus* (Rio Grande silvery minnow)	>14,428	-
8	9,205	*Salmo salar* (Atlantic salmon)	9,205	-
7	8,190	*Crangonyx pseudogracilis* (amphipod)	8,190	-
6	>7,547	*Oncorhynchus mykiss* (rainbow trout)	>7,547	-
		Oncorhynchus tshawytscha (chinook salmon)	>88,495*	-
5	>5,869	*Pimephales promelas* (fathead minnow)	>5,869	10.64
4	5,698	*Tubifex tubifex* (worm)	5,698	-
3	4,735	*Daphnia magna* (cladoceran)	4,735	12.19
2	4,370	*Asellus aquaticus* (isopod)	4,370	-
1	>2,604	*Ceriodaphnia dubia* (cladoceran)	>2,164	0.9590
		Ceriodaphnia sp. (cladoceran)	3,134	-

* SMAV for chinook salmon excluded from the GMAV for *Oncorhynchus*. See text for details.

Acute Criterion:

Final Acute Value = 2,648 µg/L (calculated at a hardness of 50 mg/L from Genus Mean Acute Values)

Criterion Maximum Concentration = (2,648 µg/L) / 2 = 1,324 µg/L (at a hardness of 50 mg/L)

Pooled Slope = 1.3695 (see Table 4)

ln (Criterion Maximum Intercept) = ln (CMC) – [slope x ln(50)] = ln (1,324) – [1.3695 x ln(50)] = 1.8308

Criterion Maximum Concentration = e(1.3695[ln(hardness)] + 1.8308)

Final Acute-Chronic Ratio = 4.9923

Chronic Criterion:

Final Chronic Value = (2,648 µg/L) / 4.9923 = 530 µg/L (at a hardness of 50 mg/L)

Pooled Slope = 1.3695 (see Table 4)

ln (Final Chronic Intercept) = ln (FCV) – [slope x ln(50)] = ln (530) – [1.3695 x ln(50)] = 0.9161

Final Chronic Value = e(1.3695[ln(hardness)] + 0.9161)

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5.3 Protectiveness of the Chronic Criterion to Brook Trout and Striped Bass

As discussed in Section 2, USEPA (1988) derived a FCV of 750 µg/L based on a FAV of 1,496 µg/L and an ACR of 2 (i.e., 1,496 µg/L / 2 = 750 µg/L). However, two chronic studies that did not meet strict acceptability criteria (USEPA 1985) for calculation of the FCV were ultimately considered to be important enough to warrant lowering of the FCV to ensure protection of the two species tested. Based on the Cleveland et al. and Buckler et al. manuscripts cited in the 1988 AWQC, the USEPA lowered the chronic criterion to 87 µg/L in order to ensure protection of brook trout (*Salvelinus fontinalis*) and striped bass (*Morone saxatilis*). The following briefly summarizes these studies, and evaluates the level of protection that the updated criteria equations 1 and 2 would provide for these species.

5.3.1 Brook Trout

USEPA (1988), citing an unpublished Cleveland et al. manuscript (and now published as Cleveland et al. 1989), reported that Al concentrations of 169 and 350 µg/L resulted in 3 percent and 48 percent larval brook trout mortality, respectively, after a 60 day exposure, and Al concentrations of 88 and 169 µg/L resulted in a 4 percent and 24 percent reduction in weight, respectively. Following the USEPA (1985) guidelines, the chronic value from this study would typically be defined as the geometric mean of the NOEC and LOEC for the most sensitive endpoint (growth), which is 88 and 169 µg/L, respectively. The chronic value for this test would, therefore, be 122 µg/L. It should be noted that this test was conducted in very soft water with a hardness of 12.3 mg/L. Based on the hardness-toxicity slope of 1.3695, this converts to an estimated chronic value of 833 µg/L at a hardness of 50 mg/L. Given that the FCV at a hardness of 50 mg/L is 530 µg/L, this suggests that brook trout would be adequately protected by the revised criterion[3].

In addition, the GMAV of 3,600 µg Al/L for brook trout reported in Table 1a is well above the FAV of 2,648 µg Al/L (Table 3), even though water hardness was not reported in this study (Decker and Menendez 1974) and so could not be included in the FAV derivation. Finally, an additional chronic brook trout study cited in Table 6 of the 1988 AWQC (Hunn et al. 1987) reports a chronic growth reduction at 283 µg Al/L, but in extremely soft waters (0.57 mg/L hardness). It would likely not be meaningful to apply a hardness slope to such a low water hardness, but given that the chronic value from Cleveland et al. (1989) conducted in harder water was lower than that of Hunn et al. (1987), a revised chronic criterion using Equation 2 would still be considered protective. Therefore, the available toxicity data suggest that the revised chronic criteria reported here would also be protective of both chronic and acute Al toxicity to brook trout, and so the calculated FCV does not need to be lowered to protect this species.

[3] Given that the very low hardness of 12.3 mg/L is below the range of hardness levels used to develop the pooled hardness slope, there is some uncertainty associated with this evaluation.

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5.3.2 Striped Bass

USEPA (1988), citing the unpublished Buckler et al. manuscript (and now published as Buckler et al. 1987), reports that Al concentrations of 87.2 and 174.4 µg/L, at a pH of 6.5, resulted in 0 percent and 58 percent mortality of 160 day-old striped bass, respectively, after a 7 day exposure. USEPA (1988) also reported that Al concentration of 174.4 and 348.8 µg/L resulted in 2 percent and 100 percent mortality in 160 day-old striped bass at a pH of 7.2 (i.e., Al was more toxic at pH 6.5 than at pH 7.2). In addition, citing the Buckler et al. manuscript, USEPA (1988) reported that an Al concentration of 390 µg/L resulted in 0 percent mortality of 159 and 195 day-old striped bass at both a pH of 6.5 and 7.2 following a 7 day exposure. These values were identical to those in the published version of the study in Buckler et al. (1987). Additional 7 day toxicity tests of younger life stages were reported in Buckler et al. (1987). However, control survival in these other studies was marginal: (1) 72-78 percent and 79 percent for 11 day old fish at a pH of 7.2 and 6.5, respectively; and (2) 80 percent and 48 percent for 13 day old fish at a pH of 7.2 and 6.5, respectively. Conversely, control mortality was 0 percent in studies with 160 day old fish at pH levels of 6.5 and 7.2. However, if it is assumed that control mortality in the range of 20-28 percent is acceptable for younger life stages, a measured Al concentration of approximately 131 µg/L was associated with 75 percent mortality in 13 day old fish at a pH of 7.2, which was significantly greater ($p<0.05$) than in the respective control that had 20 percent mortality. In another study with 11 day old fish at a pH of 7.2, survival was not significantly reduced relative to the control up to a higher Al concentration of 179 µg/L, but was significantly reduced ($p<0.05$) at an Al concentration of 358 µg/L. At a pH of 6.5, control mortality was 21 percent (compared to 26 percent in the pH 7.2 control), but survival in Al treatments ≥22 µg/L was significantly reduced ($p<0.05$) compared to the pH 7.2 control (and presumably compared to the pH 6.5 control, but this was not reported).

Overall, Al toxicity to striped bass is highly variable depending on the age of the test organism and the pH of the water (6.5 vs. 7.2). Lowest observed effect concentrations range from 22 to <393 and NOECs range from 87 to >390 (in other words, the ranges of NOECs and LOECs from the various tests substantially overlap). Even within a similar age the NOECs and LOECs are highly variable, with NOECs for 159 day old fish being >390 µg/L and LOECs for 160 day old fish being 174 to 348 µg/L. Given this variability, we suggest that the striped bass toxicity data be excluded from consideration in updating the chronic Al criterion. Nevertheless, the chronic value reported in USEPA (1988) for striped bass in soft water[4] is 123 µg/L, which, assuming a water hardness of 14 mg/L, results in a chronic value of 703 µg/L at a hardness of 50 mg/L. Therefore, the available toxicity data suggest that the revised chronic criteria reported here (530 µg/L) would also be protective of chronic Al toxicity to striped bass, and so the calculated FCV does not need to be lowered to protect this species.

[4] Buckler et al. (1987) did not report the hardness of the test water, although the authors did note that hardness was monitored. They characterized the test water as soft. The test solution was created using well water passed through a water softener, which was then treated by reverse osmosis and passed through anionic, cationic, and mixed-bed exchange resins. The alkalinity and hardness of the well water were 237 and 272 mg/L, respectively. The alkalinity of the resulting test water was 12 mg/L. If we assume that the ratio of well water-to-test water alkalinity applies to hardness, we can estimate that the hardness of the test water was approximately 14 mg/L.

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6.0 Criteria Statement

The available toxicity data, when evaluated using the procedures described in the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (USEPA 1985) indicate that, except possibly where a locally important species is unusually sensitive, freshwater aquatic life should be protected if the four-day average concentration (in µg/L) of Al does not exceed the numerical value given by $e^{(1.3695[\ln(\text{hardness})]+0.9161)}$ more than once every three years on the average, and if the 24-hour average concentration (in µg/L) does not exceed the numerical value given by $e^{(1.3695[\ln(\text{hardness})]+1.8308)}$ more than once every three years on the average. For example, at hardness levels of 50, 100, and 200 mg/L as $CaCO_3$, the four-day average Al concentrations are 530, 1,370, and 3,541 µg/L, respectively, and the 24-hour average Al concentrations are 1,324, 3,421, and 8,838 µg/L.

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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.

PENAL SUM FORM

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 (Words) 5% (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: Vice President	By:
Signature and Title	Signature and Title Andrew K. Teeter, Attorney-in-fact, Licensed WV Resident Agent
	(Attach Power of Attorney)
Attest:	Attest:
Signature and Title Witness to Bidder	Signature and Title Kimberly L. Miles, Witness

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

Comments Pg 41

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

West Virginia Highlands Conservancy

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
WVHC Mining Committee
4401 Eden Road
Rock Cave, WV 26234

Phone: 304-924-5802
Email: clrank2@gmail.com

APPALACHIAN MOUNTAIN ADVOCATES

P.O. Box 507
Lewisburg, WV 24901
ph: 304-645-9006
fax: 304-645-9008
email: info@appalmad.org
www.appalmad.org

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 caser 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
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901
304-382-4798
mbecher@appalmad.org

/s/ Cynthia Rank
Cynthia "Cindy" Rank
West Virginia Highlands Conservancy
HC 78 Box 227
Rock Cave, WV 26234
304-924-5802
clrank2@gmail.com

/s/ Angie Rosser
Angie Rosser
West Virginia Rivers Coalition
3501 MacCorkle Ave SE #129
Charleston, WV 25304
arosser@wvrivers.org

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
304-637-7201 office | 304-437-1274 mobile
WVRivers.org | Sign up for e-news

WEST VIRGINIA RIVERS COALITION

3501 MacCorkle Ave. SE #129 • Charleston, WV 25304 • (304) 637-7201 • www.wvrivers.org

July 30, 2015

Laura Cooper
Water Quality Standards, DWWM, DEP
601 57th St. SE
Charleston, WV 25304

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.

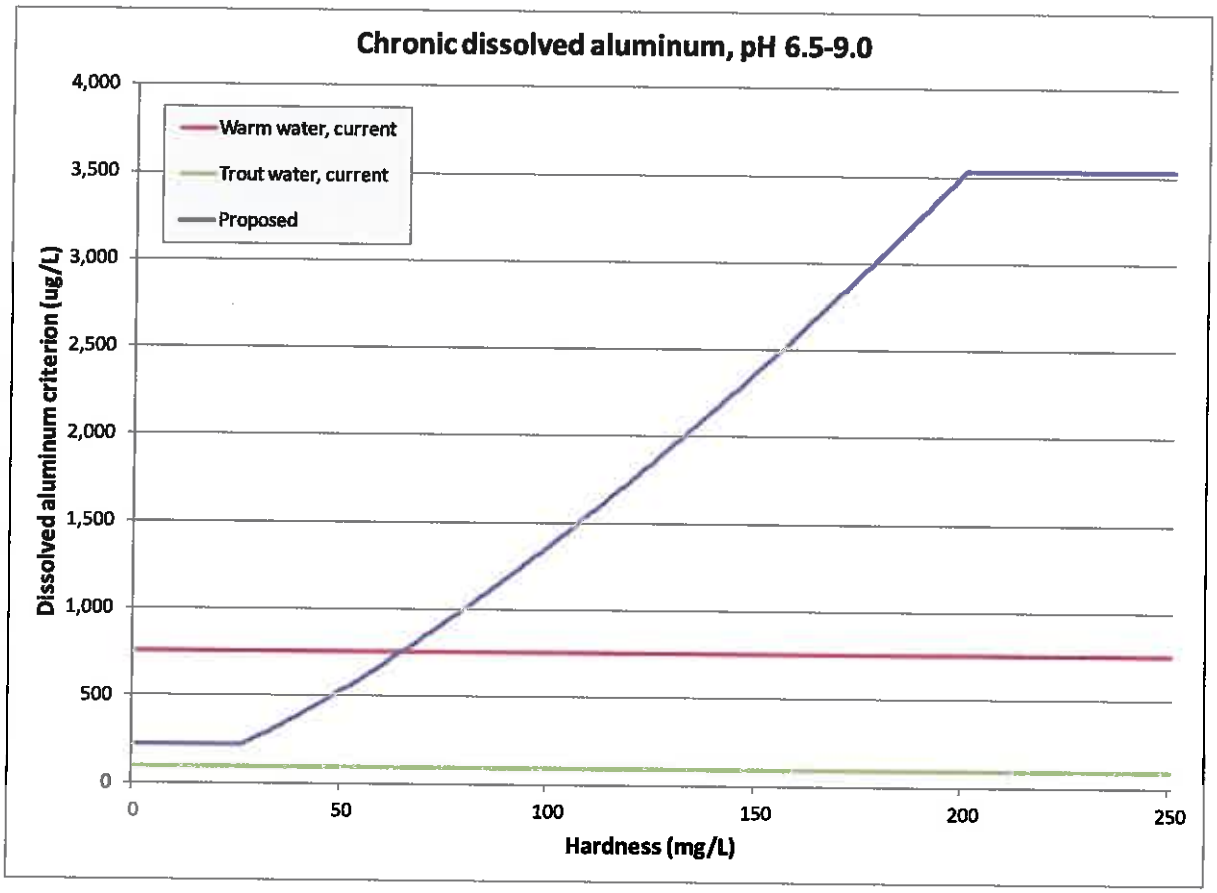
The proposed rule change will significantly weaken the Aluminum criteria.

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.

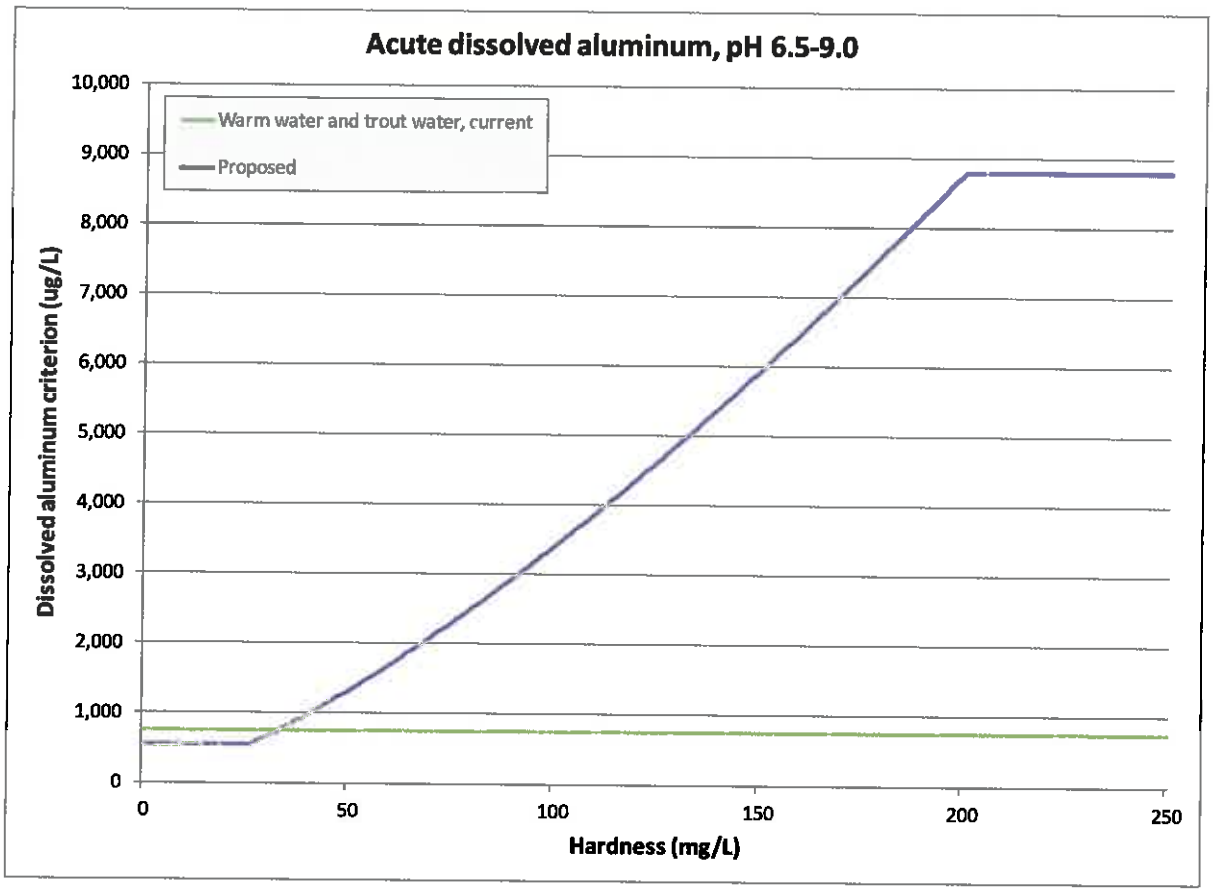
[1] The proposed change was exactly the same as what is being proposed now, except that the maximum hardness concentration was changed from 220 to 200 mg/L.

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 $Al(OH)_3$ 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, $Al(OH)_3$, 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 grammatica*) 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 $Al(OH)_3$ prevalent at normal stream pHs into more soluble (and more toxic) forms such as the Aluminate ion, $Al(OH)_4^-$. 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 analysis0.45 µm.[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 µm pore size minimized mineral-phase aluminum without restricting amorphous or colloidal phases and that if turbidity was less than 30 NTU, no filtration was needed.[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 (R2 = 0.96) with a regression equation of ln(TSS) = 1.32 ln(NTU) + C, with C not significantly different than zero for eight of the nine sampled streams. See www.depts.washington.edu/cuwrm/research/tssturb.pdf.

filtering under the New Mexico criteria. More generally NPDES discharges are usually restricted to an average monthly TSS of 35 mg/L. Thus, in effect, the New Mexico criteria are based on total aluminum and are also nearly 2 ½ times more stringent that what WVDEP is proposing.

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 inmate 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

Dr. Carys L. Mitchelmore
Associate Professor,

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

March 18th, 2013

In Summary:

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

(1) There are very limited peer reviewed studies and definitive toxicity data available regarding this relationship, especially in the pH range of 7-9.

(2) Aluminum toxicity is complex and dependent upon many other water quality parameters (e.g. dissolved organic material, pH), species and life-stages.

(3) Aluminum toxicity in laboratory tests may not represent the array of toxicity mechanisms (i.e. especially physical toxicity) for aluminum in field situations.

(4) West Virginia's proposal is to use dissolved aluminum levels. This differs from the EPA's guideline that total recoverable aluminum be used. The use of total recoverable is the most conservative and consistent approach.

Detailed report:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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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 $Al(OH)_3$ 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, $Al(OH)_3$, 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 grammatica*) 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 $Al(OH)_3$ prevalent at normal stream pHs into more soluble (and more toxic) forms such as the Aluminate ion, $Al(OH)_4^-$. 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. $Al(OH)_4^-$] being produced. Gensemer and Playle (1999) point out that the prediction of Aluminum toxicity at 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

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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

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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

APPALACHIAN MOUNTAIN ADVOCATES

P.O. Box 507
Lewisburg, WV 24901
ph: 304-645-9006
fax: 304-645-9008
email: info@appalmad.org
www.appalmad.org

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, 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 +- 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. Evan 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 ($p<0.01$, $p<0.01$, $p<O.OS$). Mean ranks were significantly higher for the 2.5 and 10 ug/L treatments than for the control ($p<O.OS$)."[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.

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[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 (Le., 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
J. Michael Becher
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901
304-382-4798
mbecher@appalmad.org

/s/ Cynthia Rank
Cynthia "Cindy" Rank
West Virginia Highlands Conservancy
HC 78 Box 227
Rock Cave, WV 26234
304-924-5802
clrank2@gmail.com

/s/ Angie Rosser
Angie Rosser
West Virginia Rivers Coalition
3501 MacCorkle Ave SE #129
Charleston, WV 25304
arosser@wvrivers.org

APPALACHIAN MOUNTAIN ADVOCATES

P.O. Box 507
Lewisburg, WV 24901
ph: 304-645-9006
fax: 304-645-9008
email: info@appalmad.org
www.appalmad.org

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 caser 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
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901
304-382-4798
mbecher@appalmad.org

/s/ Cynthia Rank
Cynthia "Cindy" Rank
West Virginia Highlands Conservancy
HC 78 Box 227
Rock Cave, WV 26234
304-924-5802
clrank2@gmail.com

/s/ Angie Rosser
Angie Rosser
West Virginia Rivers Coalition
3501 MacCorkle Ave SE #129
Charleston, WV 25304
arosser@wvrivers.org

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

APPALACHIAN MOUNTAIN ADVOCATES

P.O. Box 507
Lewisburg, WV 24901
ph: 304-645-9006
fax: 304-645-9008
email: info@appalmad.org
www.appalmad.org

July 31, 2015

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601 57th Street S.E.
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/s/ J. Michael Becher
J. Michael Becher
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901
304-382-4798
mbecher@appalmad.org

/s/ Cynthia Rank
Cynthia "Cindy" Rank
West Virginia Highlands Conservancy
HC 78 Box 227
Rock Cave, WV 26234
304-924-5802
clrank2@gmail.com

/s/ Angie Rosser
Angie Rosser
West Virginia Rivers Coalition
3501 MacCorkle Ave SE #129
Charleston, WV 25304
arosser@wvrivers.org

APPALACHIAN MOUNTAIN ADVOCATES

P.O. Box 507
Lewisburg, WV 24901
ph: 304-645-9006
fax: 304-645-9008
email: info@appalmad.org
www.appalmad.org

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, 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 +- 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. Evan 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:

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[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 ($p<0.01$, $p<0.01$, $p<O.OS$). Mean ranks were significantly higher for the 2.5 and 10 ug/L treatments than for the control ($p<O.OS$)."[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.

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[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 (Le., 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
J. Michael Becher
Appalachian Mountain Advocates
P.O. Box 507
Lewisburg, WV 24901
304-382-4798
mbecher@appalmad.org

/s/ Cynthia Rank
Cynthia "Cindy" Rank
West Virginia Highlands Conservancy
HC 78 Box 227
Rock Cave, WV 26234
304-924-5802
clrank2@gmail.com

/s/ Angie Rosser
Angie Rosser
West Virginia Rivers Coalition
3501 MacCorkle Ave SE #129
Charleston, WV 25304
arosser@wvrivers.org

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

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/WWE/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 (NDPES) 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

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.

Aluminum at 500 µg/L at neutral pH for15 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 (pH4-5) 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 of at (304) 234-0238 or at the letterhead address.

Sincerely,

Barbara Douglas
for

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 spinymussel (*Pleurobema collina*), northern riffleshell (*Epioblasma torulosa rangiana*), pink mucket pearlymussel (*Lampsilis abrupta*), rayed bean (*Villosa fabilis*), sheepnose (*Plethobasus cyphyus*), snuffbox (*Epioblasma triquetra*), spectaclecase (*Cumberlandia monodonta*), and tubercled-blossum pearlymussel (*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 spinymussel.
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 pearlymussel, 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. Pynnönen (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

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.

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MacKnight, Evelyn
Tuesday, November 26, 2013 5:07 PM
Mandirola, Scott G; Coyne, Kevin R
Hakowski, Denise; Fleisig, Erica
Subject: FW: HECD WV Aluminum analyses attached
Attachments: 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 Al 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.eveiyn@epa.gov

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

Additional studies EPA is considering beyond those included in the WV analysi (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 reticulate* 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 dolomieui*)
Jung and Jagoe 1995 (*Hylas 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 geomean 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 Al 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 *Ceriodaphinia 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 dolomieui*). 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.

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EPA OW Crosswalk of WV Al 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 = difference in EPA/GEI paper interpretation

Species	Method[a]	Chemical	Hardness (mg/L as $CaCO_3$)	pH		LC50 or EC50 Concentration (µg/L)	Reference	Comparison:
Midge (2nd-3rd instar larvae), *Tanytarsus dissimilis*	S, U	Aluminum sulfate	17.43	6.85-7.71	>	77,700	Lamb and Bailey 1981; 1983	GEI (2010) has a slightly different LC50 (>79900)
Green sunfish (juvenile, 3 mo.), *Lepomis cyanellus*	S, M	Aluminum chloride	47.4	7.55	>	50,000	Call et al. 1984	
Yellow perch, *Perca flavescens*	S, M		47.4	7.55	>	49,800	Call et al. 1984	We excluded this value for this species, b/c there were only two exposure concentrations
Channel catfish, *Ictalurus punctatus*	S, M		47.4	7.54	>	47,900	Call et al. 1984	We excluded this value for this species, b/c there were only two exposure concentrations
Snail (adult), *Physa sp.*	S, M	Aluminum chloride	47.4	6.59	>	23,400	Call et al. 1983	GEI (2010) doesn't use b/c it is undefined
Snail (adult), *Physa sp.*	S, M	Aluminum chloride	47.4	7.55		30,600	Call et al. 1984	
Snail (adult), *Physa sp.*	S, M	Aluminum chloride	47.4	8.17	>	24,700	Call et al. 1984	GEI (2010) doesn't use b/c it is undefined
Snail (adult), *Physa sp.*	S, M	Aluminum chloride	47.4	7.46		55,500 (aged solution)	Call et al. 1984	GEI (2010) doesn't use b/c EPA 1988 says it is an unusual experimental design
Stonefly (nymph), *Acroneuria sp.*	S, M	Aluminum chloride	47.4	7.46	>	22,600	Call et al. 1984	
Amphipod, *Gammarus pseudolimnaeus*	S, M		47.4	7.53		22,000	Call et al. 1984	We excluded this value for this species, b/c there was leaf disc in the exposure chamber that served as shelter annd a possible substrate for food organisms
Planarian (adult), *Dugesia tigrina*	-	Aluminum chloride	47.4	7.48	>	16,660	Brooke 1985	EPA contractor review - duration too short (48 hr)
Rio Grande silvery minnow, *Hybognathus amarus*	R, M	Aluminum chloride	140	8.1	>	59,100	Buhl 2002	

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Atlantic salmon (Sac fry, ≈0.2 g), *Salmo salar*	S, U	Aluminum chloride	6.8 (6.6-7)	6.5		599	Hamilton and Haines 1995	
Amphipod (4 mm), *Crangonyx pseudogracilis*	R, U	Aluminum sulfate	50	6.75		9,190	Martin and Holdich 1986	
Rainbow trout, *Oncorhynchus mykiss*			1	7		3800	Thomsen et al. 1988	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
Rainbow trout, *Oncorhynchus mykiss*			150	7		71000	Thomsen et al. 1988	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
Rainbow trout (fingerling), *Oncorhynchus mykiss*	S, M	Aluminum chloride	47.4	6.59		7,400	Call et al. 1984	
Rainbow trout (fingerling), *Oncorhynchus mykiss*	S, M	Aluminum chloride	47.4	7.31		14,600	Call et al. 1984	
Rainbow trout (fingerling), *Oncorhynchus mykiss*	S, M	Aluminum chloride	47.4	8.17	>	24,700	Call et al. 1984	GEI (2010) doesn't use b/c it is undefined
Rainbow trout (fingerling), *Oncorhynchus mykiss*	S, M	Aluminum chloride	47.4	7.46		8,600 (aged solution)	Call et al. 1984	GEI (2010) doesn't use b/c EPA 1988 says it is an unusual experimental design
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	27.4	7.58	>	9,840	Gundersen et al. 1994	GEI (2010) doesn't use b/c it is undefined
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	45.2	7.62	>	8,070	Gundersen et al. 1994	GEI (2010) doesn't use b/c it is undefined
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	89.5	7.58	>	8,160	Gundersen et al. 1994	GEI (2010) doesn't use b/c it is undefined
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	130.4	7.58	>	8,200	Gundersen et al. 1994	GEI (2010) doesn't use b/c it is undefined
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	23.2	8.3		6,170	Gundersen et al. 1994	
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	35.0	8.3		6,170	Gundersen et al. 1994	
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	83.6	8.3		7,670	Gundersen et al. 1994	
Rainbow trout (juvenile, 1-3 g), *Oncorhynchus mykiss*	F, M	Aluminum chloride	115.8	8.3		6,930	Gundersen et al. 1994	

Chinook salmon (juvenile), *Oncorhynchus tshawytscha*	S, M	Sodium aluminate	28.0	7.00	>	40,000	Peterson et al. 1974	GEI (2010) doesn't use this species in the GMAV calculation
Fathead minnow (adult), *Pimephales promelas*	S, U	Aluminum sulfate	-	7.6	>	18,900	Boyd 1979	
Fathead minnow (juvenile), *Pimephales promelas*	S, M	Aluminum sulfate	220	7.34		35,000	Kimball 1978	EPA review - test species fed
Fathead minnow (juvenile, 32-33 d), *Pimephales promelas*	S, M	Aluminum chloride	47.4	7.61	>	48,200	Call et al. 1984	GEI (2010) doesn't use b/c EPA 1988
Fathead minnow (juvenile, 32-33 d), *Pimephales promelas*	S, M	Aluminum chloride	47.4	8.05	>	49,800	Call et al. 1984	GEI (2010) doesn't use b/c EPA 1989
Fathead minnow (juvenile, 1 mm, 3 mg), *Pimephales promelas*	F, M	Aluminum chloride	21.6	6.5	>	400	Palmer et al. 1989	
Fathead minnow (juvenile, 1 mm, 3 mg), *Pimephales promelas*	F, M	Aluminum chloride	21.6	7.5	>	400	Palmer et al. 1989	
Fathead minnow (larvae, 1 d), *Pimephales promelas*	F, M	Aluminum chloride	21.6	6.5	>	400	Palmer et al. 1989	
Fathead minnow (larvae, 1 d), *Pimephales promelas*	F, M	Aluminum chloride	21.6	7.5	>	400	Palmer et al. 1989	
Fathead minnow (≤7 d), *Pimephales promelas*	R, M	Aluminum chloride	26	7.8		1,160	ENSR 1992c	
Fathead minnow (≤7 d), *Pimephales promelas*	R, M	Aluminum chloride	46	7.6		8,180	ENSR 1992c	
Fathead minnow (≤7 d), *Pimephales promelas*	R, M	Aluminum chloride	96	8.1		20,300	ENSR 1992c	
Fathead minnow (≤7 d), *Pimephales promelas*	R, M	Aluminum chloride	194	8.1		44,800	ENSR 1992c	
Fathead minnow (larva, 4-6 dph), *Pimephales promelas*	R, U	Aluminum chloride	140	8.1	>	59,100	Buhl 2002	
Tubificid worm, *Tubifex tubifex*		Aluminum ammonium sulfate	245	7.6		50,230	Khangarot 1991	EPA review - Inappropriate form of toxicant
Cladoceran, *Daphnia magna*	Aluminum chloride	Aluminum chloride	45.4	7.61	>	25,300	Brooke 1985	EPA review - No dose response observed; GEI (2010) not used per EPA 1988

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Cladoceran (≥12 hr), *Daphnia magna*	S, U	Aluminum chloride	45.3	7.74		3,900	Biesinger and Christensen 1972	
Cladoceran (<24 hr), *Daphnia magna*	S, M	Aluminum sulfate	220	7.05		38,200	Kimball 1978	
Cladoceran (0-24 hr), *Daphnia magna*	S, U	Aluminum chloride	45	7.7		2,800	Shephard 1983	
Isopod (7 mm), *Asellus aquaticus*	S, U	Aluminum sulfate	50	6.75		4,370	Martin and Holdich 1986	EPA review - Duration too short (72 hrs)
Cladoceran, *Ceriodaphnia dubia*	S, M		98.5	7.6		2,880	Soucek et al. 2001	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	S, M	Aluminum chloride	50.0	7.42		1,900	McCauley et al. 1986	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	S, M	Aluminum chloride	50.5	7.86		1,500	McCauley et al. 1986	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	S, M	Aluminum chloride	50.0	8.13		2,560	McCauley et al. 1986	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	R, M	Aluminum chloride	26	7.5		720	ENSR 1992d	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	R, M	Aluminum chloride	46	7.6		1,880	ENSR 1992d	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	R, M	Aluminum chloride	96	7.8		2,450	ENSR 1992d	
Cladoceran (<24 hr), *Ceriodaphnia dubia*	R, M	Aluminum chloride	194	8.1	>	99,600	ENSR 1992d	
Cladoceran (<12 hr), *Ceriodaphnia dubia*	S, U	Aluminum sulfate	90 (80-100)	7.0-7.3		3,726	Fort and Stover 1995	
Cladoceran (<12 hr), *Ceriodaphnia dubia*	S, U	Aluminum sulfate	90 (80-100)	7.0-7.3		5,672	Fort and Stover 1995	
Cladoceran (0-24 hr), *Ceriodaphnia reticulata*	S, U	Aluminum chloride	45	7.7		2,800	Shephard 1983	
Cladoceran, *Ceriodaphnia sp.*	S, M		47	7.36		3,300	Call 1984	EPA contractor review - since there are other identified species, we exclude these values b/c of the guidelines
Cladoceran, *Ceriodaphnia sp.*	S, M		47	7.36		3,690	Call 1984	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). *Stenocypris major*	R, M	Aluminum sulfate	15.63	6.51		3,101.96	Shuhaimi-Othman et al. 2011a
Brook trout (14 mo., 210 mm, 130 g), *Salvelinus fontinalis*	F, U	Aluminum sulfate	-	6.5		3,600	Decker and Menendez 1974
Smallmouth bass (larvae, 48 hr post hatch), *Micropterus dolomieui*	S, M	Aluminum sulfate	12.45 (12.1-12.8)	6.0-7.5	>	978	Kane and Rabeni 1987
Smallmouth bass (larvae, 48 hr post hatch), *Micropterus dolomieui*	S, M	Aluminum sulfate	12.45 (12.1-12.8)	7.2-7.7	>	217	Kane and Rabeni 1987

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

GEI (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 artifically

GEI (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 artifically

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

Species	Method*	Chemical	Hardness (mg/L as $CaCO_3$)	pH		LC50 or EC50 Concentration (µg/L)	Reference
Cladoceran (0-24 hr), *Ceriodaphnia reticulata*	F, M	Aluminum chloride	45	6.0		304	Shephard 1983
Cladoceran (0-24 hr), *Ceriodaphnia reticulata*	F, M	Aluminum chloride	4.0	5.5		362	Shephard 1983
Rainbow trout, *Oncorhynchus mykiss*	S, U	-	-	5.5		310	Holtze 1983
Atlantic salmon (Sac fry, ~0.2 g), *Salmo salar*	S, U	Aluminum chloride	6.8 (6.6-7)	5.5		584	Hamilton and Haines 1995
Brook trout (14 mo., 210 mm, 130 g), *Salvelinus fontinalis*	F, U	Aluminum sulfate	-	6.0		4,400	Decker and Menendez 1974
Brook trout (14 mo., 210 mm, 130 g), *Salvelinus fontinalis*	F, U	Aluminum sulfate	-	5.5		4,000	Decker and Menendez 1974
Brook trout (0.6 g, 4.4-7.5 cm), *Salvelinus fontinalis*	S, U	Aluminum sulfate	40	5.6		6,530	Tandjung 1982

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

[a] S=static, F=flow-through, U=unmeasured, M=measured

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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 Altzheimers.
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

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

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
Phone: 804-273-3167

dom.com

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

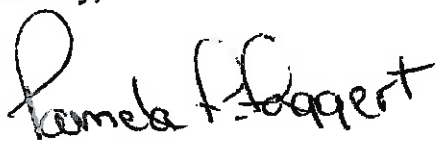
Dear Ms. Cooper,

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 that 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,



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 wavier. 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

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 "Alterative 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

Preston County Courthouse Annex • 106 West Main Street, Suite 202, Kingwood, West Virginia 26537
Phone (304)329.1805 • Fax (304)329.3192 • TDD (304)329.0652
www.prestoncountywv.org

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 Wyrostok [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 Wyrostok

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

Water is Life...Keep It Clean

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

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-----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

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
Pubiic 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

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 an 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 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 it's 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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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.

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!

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 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!

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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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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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
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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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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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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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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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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 Patiriot 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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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!

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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I want to stay here and keep my job!

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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I want to stay here and keep my job!

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 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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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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I want to stay here and keep my job!

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
137 Maggie Drive
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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I want to stay here and keep my job!

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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I want to stay here and keep my job!

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.atl131.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 chailenges 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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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!

Margaret McClaugherty
Margaret McClaugherty
386 South Ridge Road , West Virginia Herndon
United States
(304) 673-4494
mmcclaugherty@alphanr.com

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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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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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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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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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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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 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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I want to stay here and keep my job!

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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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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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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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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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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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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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 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!

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
To: Cooper, Laura K; Mandirola, Scott G
Subject: WV DEP We Need These Changes!

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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: 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 Praskwiecz <no-reply@mail133-2.atl131.mandrillapp.com> on behalf of John Praskwiecz <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 Praskwiecz** 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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I want to stay here and keep my job!

John Praskwiecz
4012 Ridgeview Lane
Hurricane, West Virginia 25526
United States
(304) 760-7226
john.praskwiecz@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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I want to stay here and keep my job!

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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I want to stay here and keep my job!

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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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@wvdsl.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
(704) 948-0161
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
1714 Dogwood Dr
Sissonville, West Virginia 25320
United States
(304) 984-2889
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
houston, Pennsylvania 15342
United States
(724) 746-7331
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
Summersville, West Virginia 26651
United States
(304) 239-9828
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

Cooper, Laura K

From: Chad Parsons <no-reply@mail187-10.suw11.mandrillapp.com> on behalf of Chad Parsons <no-reply@friendsofcoal.org>
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United States
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Csp102677@hotmail.com

AMERICAN ELECTRIC POWER

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

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

RECEIVED
JUL 30 2015

July 27, 2015

Dear Mr. Mandirola:

On behalf of Appalachian Power Company, American Electric Power (AEP) submits the following comments on proposed changes to "Requirements Governing Water Quality Standards, Title-Series 47-02", filed by WV DEP on June 29, 2015. The agency has proposed the following changes:

- New acute and chronic dissolved aquatic life criteria for aluminum (within a pH range ≥ 6.5 and ≤ 9.0 s.u.), that are based on receiving stream hardness.
- New acute and chronic dissolved aquatic life criteria for aluminum that apply to pH values ≤ 6.5 and ≥ 9.0 s.u.
- New chronic aquatic life criteria for selenium that are based on fish whole body or egg/ovary tissue analysis. These criteria, if not exceeded, would override the existing chronic water-based aquatic life criterion (5 µg/L). The egg/ovary criterion, if not exceeded, would override the whole body-based criterion (acknowledging scientific findings that the concentration of selenium in eggs/ovary is a better predictor of potential adverse effects in fish).

AEP provides the following comments:

<u>New acute and chronic aluminum criteria</u>

AEP supports the adoption of new aluminum criteria that are based on receiving stream hardness, within the pH range ≥ 6.5 and ≤ 9.0 s.u. WV DEP's technical support document for the new criteria ("Updated Freshwater Aquatic Life Criteria for Aluminum", authored by GEI Consultants) provides a comprehensive review of aluminum toxicity to freshwater aquatic life since US EPA issued its nationally-recommended criteria in 1988. Appropriate new toxicity data (i.e., results meeting US EPA's data quality requirements) were used to calculate the updated acute and chronic criterion. Expressing the criteria as hardness-dependent values is appropriate as the correlation coefficients between toxicity endpoints and hardness were very high for all species with available data.

We believe it is appropriate to express the proposed new aluminum criteria as dissolved (soluble), similar to the existing criterion of 750 µg/L. AEP has conducted several translator studies for aluminum at facilities that operate in West Virginia and the percentage of total aluminum in the dissolved phase – for both ambient waters and waste water discharges - is typically very low (less than 10%).

We believe that the proposed dissolved criterion at extreme pH values (750 µg/L) is protective of aquatic life.

New chronic selenium criteria

AEP supports the scientific basis of the proposed fish tissue-based chronic selenium criteria. While we do have concerns regarding the technical basis of the existing water-based acute and chronic criteria, we believe it is appropriate for WV DEP to retain these criteria as there may be waters in the state where populations of fish do not occur (e.g., intermittent streams or waters that lack suitable habitat).

We agree with the data selection and calculation procedures outlined in the technical support document, "Updated Freshwater Aquatic Life Criteria for Selenium", authored by GEI Consultants. The calculation procedure used is consistent with US EPA's proposed 2015 updated criteria, and the procedure used by the Commonwealth of Kentucky to derive fish tissue-based chronic criteria (these criteria were, subsequently, approved by US EPA). The decision to exclude chronic toxicity data for Dolly Varden, desert pupfish, and cutthroat trout is appropriate as these fish species do not occur east of the Mississippi River.

On page 13 of the technical support document, in the 2nd full paragraph, a phrase reads "...it was possible to calculate new egg/ovary to whole-body CFs for creek chub and fathead minnow (Table 5)." Table 5, however, does not include conversion factor data for creek chub.

We believe it may be appropriate for WV DEP to develop technical guidance on how the new chronic criteria (if adopted and approved by US EPA) will be implemented. AEP has conducted several fish tissue studies at sites in West Virginia and we would welcome an opportunity to work with the agency on this.

If you have any questions regarding these comments please contact me directly at rjreash.com or by phone at 614-716-1237.

Sincerely,

Rob Reash
Certified Fisheries Professional
American Electric Power
Water & Ecological Resources
Columbus, Ohio

5. DEP response to comments

3. DEP response to comments

WV Department of Environmental Protection (DEP) response to comments to 47 CSR 2 Rule Revisions

Public Hearing July 21, 2015 – Oral Comments DEP Response

Speakers in favor of aluminum and selenium revisions: Rupert "Rupie" Phillips, WV Delegate**; Jason Bostic,** Vice President WV Coal Association**; Roger Horton,** Citizens for Coal**; Terry Hadley; Art Kirkendoll,** WV State Senator**; Mike Carpenter; Cody Cooper.**

These commenters were in favor of DEP-proposed revisions to aluminum and selenium standards.

DEP Response Thank you for providing these comments. Please see DEP's response to WV Coal Association's written comments.

Speaker: Leroy Stanley, Save the Tygart Watershed Association

Mr. Stanley spoke in favor of WV DEP Office of Special Reclamation using in-stream lime dosers to treat Left Fork of Little Sandy Creek watershed, and that it is a proven method that has worked before in similar situations.

DEP Response: First, DEP is grateful for the work that Tygart Watershed Association has done to restore, preserve, and promote the Tygart River watershed. You should be proud of the collaborative work you've done to restore the Tygart River and its tributaries from the effects of acid mine drainage. Thank you for providing these comments. DEP agrees that using in-stream lime dosers is an effective method of treatment in cases such as the ones in the proposed variances.

Speakers opposed to aluminum and selenium revisions: Larry Orr past chairman of Trout Unlimited, West Virginia; **Conni Gratop Lewis,** WV Environmental Council; **Angie Rosser,** Executive Director of WV Rivers Coalition; **Cindy Rank**, WV Highlands Conservancy; **Mike Becker,** Appalachian Mountain Advocates; **Amanda Pitzer,** Executive Director for Friends of the Cheat; **Bill Price,** Sierra Club; **Kevin Ryan,** Friends of the Cheat.

These speakers were opposed to DEP-proposed revisions to aluminum and selenium standards.

DEP Response: Thank you for providing these comments. Similar comments were combined and have been responded to below. Comments made by speakers who also submitted written comments have been responded to in responses to the written comments.

Comment: *water is West Virginia's most important natural resource*

DEP Response: DEP agrees that water is an important natural resource in West Virginia. Moreover, the Division of Water and Waste Management's (DWWM) mission is to preserve, protect, and enhance the state's watersheds for the benefit and safety of all its citizens through implementation of programs controlling hazardous waste, solid waste and surface & groundwater pollution, from any source.

Comment: *aluminum and selenium are both known toxins*

DEP Response: Although selenium is a required micronutrient for both humans and aquatic life, certain levels of either aluminum or selenium can threaten aquatic life. This is why it's important to develop water quality standards of both of these substances that are protective of West Virginia's aquatic life.

Comment: *not satisfied with aluminum and selenium limits as they have been proposed, and aluminum standard revision would make it the weakest in the nation*

DEP Response: EPA 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses (*EPA 1985 Guidelines*)* was designed for states and tribes to establish water quality standards that are fully protective of designated aquatic life uses. The proposed aluminum criterion was developed in accordance with these EPA 1985 Guidelines, taking into consideration research that has been performed in regards to aluminum toxicity since EPA's recommended aluminum criterion from 1988. Therefore, the proposed aluminum criterion revision is not considered to be weakening water quality standards; rather, it is a criterion based on current research and designed to more adequately protect aquatic life.

For selenium, please see DEP's response to EPA comments (page 8) regarding changes DEP has made to selenium criteria based on EPA's *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015*, published on July 27, 2015.

Comment: *the aluminum standard is not protective of human health*

DEP Response: There is no EPA National Recommended Water Quality Human Health Criterion for aluminum, nor is there an aluminum maximum contaminant level in EPA's National Primary Drinking Water Regulations. Aluminum is not considered a threat to human health.

Comment: *the proposed rule change for selenium is unenforceable*

DEP Response: Please see DEP's response to EPA comments (page 8) regarding changes DEP has made to selenium criteria based on EPA's *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015*, published on July 27, 2015.

Written Comments on 2015 Proposed WQS Rule – DEP Responses

Commenter: Environmental Protection Agency

Comment: *asks for clarification and revision of variances and Al and Se aquatic life criteria*

See EPA comments pgs 98-123

DEP Response:

Water Quality Standards Variances for WV DEP Office of Special Reclamation

- At EPA's request, DEP has changed the criterion from dissolved iron to total iron. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.
- Although EPA suggests that interim criteria be assigned individually to Fickey Run, Glade Run, and Martin Creek, DEP asserts that one set of criteria should be used in the water quality standards variance for this watershed, due to the one in-stream compliance point at the mouth of Martin Creek that will be used for this watershed-based permit.
- At EPA's request, DEP requested more recent data from DEP Division of Land Restoration's Office of Special Reclamation (OSR), and has updated the interim criteria for both the Martin Creek and Sandy Creek watershed variances to reflect this recently-collected stream data. This more recent data represents the "highest attainable" condition, rather than the older "worst case scenario" data which was presented in the original application. In updating these data, the variance for "Left Fork Sandy Creek for the portion upstream of Stevensburg" was removed due to current data showing that this portion of the stream is in compliance with water quality standards. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.
- At EPA's request, and because there will be multiple instream compliance points for this watershed-based permit, DEP has specified interim criteria for both Maple Run and Left Fork Little Sandy Creek. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.
- DEP forwarded EPA requests for additional supporting documentation to DEP Office of Special Reclamation, and updated applications for these variances will soon be available. The applications will provide more detail on reclamation activities, specify the need for a 10 year variance term, and will reference and make available the nonpoint source watershed-based plans that were developed for both the Sandy Creek and Martin Creek watersheds.
- At EPA's request, DEP clarified the relationship of the variances to any existing or potential new discharges in these areas by specifying that these variances are specific to DEP Division of Land Restoration's Office of Special Reclamation's discharges only. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.

Aluminum Aquatic Life Criteria Revision

- DEP will provide a detailed justification of its aluminum criteria revision upon submittal of the 47CSR2 Emergency Rule to EPA for approval later this year. This submittal will include:
    - Review of West Virginia's criteria in regards to federally endangered mussels
    - Explanation of DEP's consideration of pH and its effect on aluminum toxicity
    - Analysis of studies being considered by EPA as it updates recommended aluminum criteria
    - Response to EPA's comments regarding WVDEP's proposed aluminum criteria, January 2014

Selenium Aquatic Life Criterion Revision

- At EPA's request, DEP removed its acute water column-based aquatic life selenium criterion of 20 ug/L, because selenium is bioaccumulative and toxicity primarily occurs via dietary (chronic) exposure. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.
- DEP asserts that the chronic selenium water column criterion of 5 ug/L is protective of aquatic life in West Virginia waters, and consistent with EPA's current recommended criteria. No update to this criterion is being made at this time.
- At EPA's request, and because EPA's 2015 update to their 2014 recommended selenium draft more closely reflects DEP's interpretation of selenium research data, DEP has changed its chronic aquatic life fish whole-body and egg/ovary concentration values to exactly reflect those recommended in EPA's *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015*, published on July 27, 2015. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.
- At EPA's request, DEP has used language directly from EPA's 2015 draft selenium criterion to more adequately describe implementation of the selenium criterion. Specifically, DEP added language relative to the primacy of water column concentration over fish tissue concentration in the case of "fishless waters." DEP has also specified water column concentration primacy in the case of new inputs of selenium into waters previously unimpacted by selenium. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015. DEP asserts, however, that in the case of increased discharges of selenium into streams already receiving selenium, permit limits will be established taking into account any existing effect of the selenium loading.

Commenter: WV Coal Association

Comment: *in support of revisions to aluminum and selenium aquatic life criteria*

See WV Coal Association comments pgs 1-41

DEP Response:

Aluminum Aquatic Life Criteria Revision

Thank you for providing these comments. The aluminum aquatic life criterion proposed by DEP was developed in accordance with EPA's 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses*. Water quality standards must be designed to fully protect designated uses, taking into consideration representative genus and species, and based upon current research. Because designated uses will be fully protected, this recommended criterion is not considered weakening water quality standards. For selenium, please see DEP's response to EPA comments (page 8) regarding changes DEP has made to selenium criteria based on EPA's *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015*, published on July 27, 2015.

Selenium Aquatic Life Criterion Revision

Thank you for providing these comments. Because EPA's 2015 update to their 2014 recommended selenium draft more closely reflects DEP's interpretation of selenium research data, DEP has changed its chronic aquatic life fish whole-body and egg/ovary concentration values to exactly reflect those recommended in EPA's *Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015*, published on July 27, 2015. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.

Commenter: WV Highlands Conservancy

Comment: *opposing variances for Martin Creek and Sandy Creek watersheds*

See WV Highlands Conservancy comments pgs 42-45

DEP Response: Thank you for providing these comments. Please see DEP response to EPA: Water Quality Standards Variances for WV DEP Office of Special Reclamation, and DEP response to comments from Friends of the Cheat.

Commenter: Appalachian Mountain Advocates, also on behalf of WV Highlands Conservancy and WV Rivers Coalition

Comment: *opposing revision of selenium aquatic life criterion, and opposing variances for Martin Creek and Sandy Creek watersheds*

See Appalachian Mountain Advocates comments pgs 46-48, 73-97

DEP Response: Thank you for providing these comments. For comments on the proposed variances, please see DEP response to EPA: Water Quality Standards Variances for WV DEP Office of Special Reclamation, and DEP response to comments from Friends of the Cheat.

In addition, in response to Appalachian Mountain Advocates Comments 1 and 6, these applications are not for the removal of a designated use as outlined in 47CSR2 section 6.1.b; rather, these applications are

for site-specific, time-limited variances of water quality standards, as provisioned by 40 CFR 131.13 "General Policies." Temporary variances do not require a use attainability analysis.

On selenium comments, please see DEP response to EPA: Selenium Aquatic Life Criterion Revision. The U.S. Environmental Protection Agency has spent several years developing a revised selenium criterion, 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.

Commenter: WV Rivers Coalition, and on behalf of WV Highlands Conservancy

Comment: *opposing revision of aluminum aquatic life criteria, and affirming signatory on submittal from Appalachian Mountain Advocates regarding proposed variances and selenium revision*

See WV Rivers Coalition comments pgs 49-84

Comment: "*There is no emergency that justifies the promulgation of this rule."*

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 statue 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: "*The proposed rule change will significantly weaken the aluminum criteria."*

DEP Response: EPA 1985 *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses* (EPA 1985 Guidelines) was designed for states and tribes to establish water quality standards that are fully protective of designated aquatic life uses. This proposed aluminum criterion was developed in accordance with these EPA Guidelines, taking into consideration research that has been performed in regards to aluminum toxicity since EPA's recommended aluminum criterion from 1988. Therefore, the proposed aluminum criterion revision is not considered to be weakening water quality standards; rather, it is a criterion based on current research and designed to more adequately protect aquatic life.

Comment: "*WVDEP lacks sufficient information to promulgate hardness-based aluminum criteria."*

DEP Response: The proposed aluminum criterion was developed in accordance with EPA 1985 Guidelines, which specifies minimum study requirements for consideration in the development of aquatic life criteria. Since the release of the current recommended ambient water quality criteria for aluminum in 1988,

several acute and chronic aluminum toxicity studies have been published in the scientific literature. These toxicity studies meet the EPA guidelines for ambient water quality criteria development and also result in additional data being available for deriving an aluminum acute-chronic ratio. These studies also present evidence that a scientifically defensible relationship exists between the stream hardness concentration and the toxicity of dissolved aluminum in waters within a pH range of greater-than or equal to 6.5 to less-than or equal to 9.0. As stated in some of the comments, this revision will lead to higher aquatic life criteria in some environments, yet in low hardness streams the criteria will actually tighten.

With respect to trout water protection, in the analysis of the initial approach, the DWWM utilized the toxicity study completed by Cleveland, Little, Wiedmeyer and Buckler (1989), which included toxicity studies on brook trout, and this study was included in the calculation of the final equation to ensure that this approach took into account native trout species and would be protective in B2 Trout designated waters. As is done for numerous other metal(s) criteria such as zinc, expressing the aluminum criteria on the basis of a hardness equation, rather than as a single fixed value, is an acceptable and scientifically defensible approach.

Comment: "*Aluminum toxicity is complex and further undermines WVDEP's proposal."*

DEP Response: The fate of aluminum in aquatic ecosystems is indeed complex, and has been shown to be dependent upon pH and water hardness concentration. In fact, it is generally known from aluminum research that this element "becomes more soluble and, hence, potentially more toxic to aquatic biota at acidic pH" (Gensemer 1999). 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 a wealth of scientific research for this criterion development relating to aluminum in aqueous environments, at various hardness concentrations, and within the pH range specified in the proposed criterion. DEP used this data, in coordination with EPA 1985 Guidelines, to develop a hardness-based, pH dependent dissolved aluminum criterion that is protective of aquatic life.

Comment: *"The proposed rule is flawed in that it only considers dissolved aluminum."*

DEP Response: Current research does not indicate that precipitated, or non-dissolved, aluminum is a dietary toxin to either invertebrates or fish. The commenter summarizes a Cain 2011 study by stating "one study suggests that as much as 95% of the metal body burden of aquatic insects *may come* from dietary sources" (emphasis added). The comment does not disclose, however, that Cain's 2011 study explores the bioaccumulation of cadmium and copper, not aluminum. In regards to the bioaccumulation and magnification of aluminum, Gensemer's *The Bioavailability and Toxicity of Aluminum in Aquatic Environments* states "Wren and Stephenson (1991) summarized data regarding Al in aquatic invertebrates and found no evidence of biomagnification of Al in aquatic systems." (Gensemer 1999).

Comment: *"The Colorado and New Mexico criteria are less permissive than WVDEP's proposal because they apply to total aluminum, not dissolved aluminum."*

DEP Response: Aluminum is not an Environmental Protection Agency priority pollutant; thus, many states do not have a water quality standard for aluminum. Examples of nearby states without an aluminum criterion are Kentucky, Virginia, Maryland and Ohio. As Colorado and New Mexico have, West Virginia seeks to establish an aluminum criterion that is hardness-based within a limited pH range. Furthermore, the permissiveness of a water quality standard is not paramount to decision-making. EPA 1985 *Guidelines*

*for Deriving Numerical National Water Quality Criteria for the Protection Of Aquatic Organisms and Their Uses (*EPA 1985 Guidelines*)* was designed for states and tribes to establish water quality standards that are fully protective of designated aquatic life uses. The proposed aluminum criterion was developed in accordance with these EPA 1985 Guidelines, taking into consideration research that has been performed in regards to aluminum toxicity since EPA's recommended aluminum criterion from 1988. Therefore, the proposed aluminum criterion revision is not considered to be more permissive than other states' water quality standards; rather, it is a criterion based on current research and designed to more adequately protect aquatic life.

Commenter: Friends of the Cheat

Comment: *opposing variances for Martin Creek and Sandy Creek watersheds*

See Friends of the Cheat comments pgs 134-140

DEP Response: First, DEP is grateful for the work that Friends of the Cheat (FOC) has done to restore, preserve, and promote the Cheat River watershed. FOC should be proud of the collaborative work they have done to restore the Cheat River basin from the effects of acid mine drainage. Unfortunately, and as FOC states, in the Martin Creek watershed "the 'status quo' is not working." The Martin Creek watershed, which empties into Muddy Creek and eventually reaches Cheat River, has been effectively "dead" for decades due to pre and post-law acid mine drainage. DEP Office of Special Reclamation's proposal to treat instream is a cost-effective way to treat not only bond-forfeited sites, but also treat the legacy AMD sites in this watershed.

In order to use alternative restoration measures to improve water quality in this watershed, DEP Division of Land Restoration's Office of Special Reclamation (OSR) is required to obtain a site-specific variance from DEP DWWM water quality standards, and has thus applied to DWWM per the requirements outlined in 46CSR6 , *Procedural Rules Governing Site-Specific Revisions to Water Quality Standards*. DWWM reviewed this application, and discussed the alternative restoration measures with the federal Environmental Protection Agency. It was determined that the application adhered to the requirements for a revision to water quality standards. FOC's request for additional information in OSR's applications has been forwarded to that office, and updates to the applications will be made available when they are completed.

In response to concerns for the "worst case scenario" interim criteria, DEP requested more recent data from OSR, and has updated the interim criteria for both the Martin Creek and Sandy Creek watershed variances to reflect this recently-collected stream data. This more recent data represents the "highest attainable" condition, rather than the older "worst case scenario" data which was presented in the original application. These changes are represented in the agency-approved version submitted to WV Secretary of State on July 31, 2015.

Commenter: Dominion Resources Services, Inc.

Comment: *in support of revision to aluminum aquatic life criterion*

See Dominion Resources Services comments pgs 128-130

DEP Response: Thank you for providing these comments. Please see DEP's response to WV Coal Association's written comments regarding to the proposed aluminum revision.

Commenter: American Electric Power

Comment: *in support of revision to aluminum and selenium aquatic life criteria*

See American Electric Power comments pgs 299-300

DEP Response: Thank you for providing these comments. Please see DEP's response to WV Coal Association's written comments, and also DEP's response to EPA's comments regarding selenium.

Commenter: Preston County Commission

Comment: *In favor of variances for Martin Creek and Sandy Creek watersheds*

See Preston County Commission comments pgs 141-142

DEP Response: Thank you for providing these comments. Please see DEP response to EPA: Water Quality Standards Variances for WV DEP Office of Special Reclamation.

Commenters with similar comments in favor of aluminum and selenium revisions: 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, Jenna Worry, Jennifer Ratliff, Jim Ashby, Jim Dean, Jim Johnston, Joe Beam, Joe Crane, Joe Fisher, Joe Lester, John Jones, John Pigza, John Popp, John Praskwiecz, John Vance, John Workman, Jon Ours, Jordan Maynard, Joseph Dotson, Joshua Birchfield, Joyce Morton, Justin Richardson, Justin Skeens, Karen Cobb, 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 Jenkins, Mike Mosteller, Mitchell Kalos, Molly Antonk, Neil Novak, Norman Douglas, Pameal Parrish, Patrick Popicg, Paul James, Paul Ostand, Preston Lewis, Rachel Metheny, Randall Cunnigham, 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, Vijnton Fry, William Arnold, William Cooper and William Rounkles

See emailed comments pgs 183-298

A total of 125 individuals provided emailed comments with the subject "WV DEP We Need These Changes!" These comments 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.

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.

DEP Response: Thank you for providing these comments. Please see DEP's response to WV Coal Association's written comments.

Commenters with similar comments opposing aluminum and selenium aquatic life criteria revisions:: Ann Payne, Anna Mary Walsh, Barbara Humes, Bert Lustig, Bill Hicks, Brian Dorsey, Carla, Carli Mareneck, Charles & Nancy Brabec, Chuck Wyrostok, 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 Runfola , Tom Nagle

See emailed comments pgs 85, 124-127, 131-133, 143-182

A total of 43 individuals provided comments which were similar in substance and opposed the proposed water quality standards rule revisions to aluminum and selenium.

DEP Response: Thank you for providing these comments. Please see DEP's response to EPA, WV Rivers Coalition, WV Highlands Conservancy, and Appalachian Mountain Advocates.

References

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Cleveland, L., E.E. Little, R.H. Wiedmeyer, and D.R. Buckler. 1989. Chronic no-observed-effect concentrations of aluminum for brook trout exposed in low-calcium, dilute acidic water. Pages 229-245 in T.E. Lewis, ed. Environmental chemistry and toxicology of aluminum. Lewis Publishers, Chelsea, Michigan. 344 pp.

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Gensemer, R. W., and R. C. Playle. 1999. The bioavailability and toxicity of aluminum in aquatic environments. CRC Critical Reviews in Environmental Science and Technology 29:315-450.