

WEST VIRGINIA
SECRETARY OF STATE
KEN HECHLER
ADMINISTRATIVE LAW DIVISION

Form #3

Do Not Mark in this Box

FILED

AUG 15 9 46 AM '94

OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

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

AGENCY: Environmental Quality Board TITLE NUMBER: 46
(formerly Water Resources Board)
CITE AUTHORITY W. Va. Code § 22B-3-4

AMENDMENT TO AN EXISTING RULE: YES NO

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 1

TITLE OF RULE BEING AMENDED: Requirements Governing Water
Quality Standards

IF NO, SERIES NUMBER OF NEW RULE BEING PROPOSED: _____

TITLE OF RULE BEING PROPOSED: _____

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

Frances E. Hunter
Authorized Signature

52.50
18.80 W/O Comment



DEPARTMENT OF COMMERCE, LABOR, AND ENVIRONMENTAL RESOURCES

STATE WATER RESOURCES BOARD

1615 Washington Street, East
Charleston, West Virginia 25311-2126

Telephone: (304) 558-4002

FAX No.: (304) 558-0899

GASTON CAPERTON

Governor

JOHN M. RANSON

Cabinet Secretary

August 15, 1994

The Honorable Ken Hechler
Secretary of State
Administrative Law Division
Building 1, Room 157K
Capitol Complex
Charleston, West Virginia 25305

Dear Mr. Secretary:

Enclosed find a copy of the Environmental Quality Board's (formerly the Water Resources Board) approved proposed rule (46 CSR 1 - Requirements Governing Water Quality Standards) along with documents as listed below:

1. Notice of Agency Approval of a Proposed Rule and Filing with the Legislative Rule-Making Review Committee Form # 3;
2. Approval of Filing by the Commissioner of Agency;
3. Legislative Rule-Making Review Committee Questionnaire;
4. Summary of Agency Approved Rule;
5. Statement of Circumstances, Rationale Document;
6. Fiscal Note;
7. Agency Approved Rule; and
8. Transcript of Public Hearing, List of Attendees, Comments Received.

"An independent Board dedicated to the protection of West Virginia waters and to the fair adjudication of environmental disputes"

BOARD MEMBERS

Charles R. Jenkins, Ph.D.
Sarah Lee Neal
David E. Samuel, Ph.D.
Edward M. Snyder, Ph.D.
Donald C. Tarter, Ph.D.

STAFF

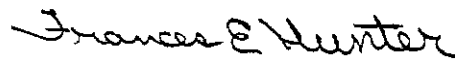
Executive Secretary Frances E. Hunter
Technical Advisor Elizabeth M. Chatfield
Legal Advisor Britt A. Bernheim

The Honorable Ken Hechler
page 2
August 15, 1994

Please be advised that on this date fifteen (15) copies of the above documents along with the Agency's existing rule have been filed with the Legislative Rule-Making Review Committee.

If you have any questions do not hesitate to contact this office.

Sincerely yours,



Frances E. Hunter

enclosures

c Legislative Rule-Making Review
Committee (15 copies)



DIVISION OF ENVIRONMENTAL PROTECTION

10 McJunkin Road
Nitro, WV 25143-2506

GASTON CAPERTON
GOVERNOR

DAVID C. CALLAGHAN
DIRECTOR

August 10, 1994

Ms. Judy Cooper
Director, Administrative Law Division
Secretary of State's Office
Building 1, Suite 157K
Charleston, West Virginia 25305

RE: CSR-46-1 - Requirements Governing Water
Quality Standards

Dear Ms. Cooper:

This is to advise you that I am giving approval for the filing of the above-captioned rule with your Office and with Legislative Rule-Making Review Committee as an agency-approved rule.

Your cooperation in this regard is very much appreciated. If you have any questions or require additional information, please feel free to contact Roger T. Hall at 759-0515.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "David C. Callaghan".

David C. Callaghan
Commissioner
Bureau of Environment

DCC;RTH:cc

Attachment

DATE: August 15, 1994

TO: LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

FROM: Frances E. Hunter, Environmental Quality Board
(formerly Water Resources Board)

LEGISLATIVE RULE TITLE: Requirements Governing Water Quality Standards

1. Authorizing statute(s) citation W. Va. Code § 22B-3-4

2. a. Date filed in State Register with Notice of Hearing:
June 1, 1994
- b. What other notice, including advertising, did you give of the hearing?
Legal Advertisement - Charleston Gazette & Charleston Daily Mail

- c. Date of hearing(s): July 7, 1994

- d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments.
Attached X No comments received
- e. Date you filed in State Register the agency approved proposed Legislative Rule following public hearing:
(be exact)
August 15, 1994
- f. Name and phone number(s) of agency person(s) to contact for additional information:
Libby Chatfield, Technical Advisor 558-4002

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

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

b. Date of hearing: _____

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

d. Attach findings and determinations and reasons:

Attached _____

SUMMARY AND STATEMENT OF CIRCUMSTANCES
FOR PROPOSED AMENDMENTS TO 46 CSR 1

A state review of Water Quality Standards is required at least once every three years by Section 303(c)(1) of the Clean Water Act (Public Law 92-500, as amended). The Environmental Quality Board (formerly the State Water Resources Board (Board) is authorized under State law (WV Code Section 22B-3-4) to promulgate the legislative rule governing water quality standards. Pursuant to these laws, the Board conducted a review of the rules and has proposed amendments to the rule based on that review.

In addition, pursuant to its authority under the Clean Water Act, the US Environmental Protection Agency (EPA) conducted a review of the Water Quality Standards and disapproved certain portions of the rule as indicated in a letter from the Acting Regional Administrator of Region III EPA to the Board in January, 1994. The Board has responded to EPA's action by proposing the following changes:

- o Adoption of acute aquatic life criteria (Appendix E)
- o Revised mixing zone provisions (Section 5)
- o Revisions to the antidegradation policy including the adoption of categories of "Waters of Special Concern" and "Outstanding National Resource Waters" (sections 4.1 and 7.3)
- o Updating various numeric criteria to reflect revised values from EPA (Appendix E)
- o Adoption of numeric criteria for 8 organic parameters (Appendix E, section 8.22)
- o Adoption of provisions governing variances to water quality standards (Section 8.3)
- o Changes to the water use categories in which human health standards for carcinogens shall apply. (Section 8.2)

Additional changes resulting from the triennial review conducted by the Board include:

- o Reorganization and reformatting of Appendix E

The following site specific revision was proposed based on an application made to the Board:

- o A site-specific numeric criterion for aluminum on Opequon Creek (Section 7.2.d.B.(b))

RATIONALE

In addition to the comments reviewed below, additional comments were received addressing sections of the rule which were not the subject of this revision. Although many of those comments have some merit, the Board declines to adopt significant changes to the rule that were not available for public review and comment. Those comments will be considered for inclusion in the next review of these standards but are not addressed in this proposed revision, or this rationale document.

SECTION 46-1-1 General

Existing Rule

1.1-1.5 - Scope, Filing Date, Effective Date, Repeal of Former Rule.

Proposed Changes

Amended dates to reflect current filing dates.

Comments and Responses

None received.

Board Action

Proposal adopted.

SECTION 46-1-2 Definitions

Existing Rule

This section provides definitions for terms used throughout this rule.

Proposed Changes

2.3 and 2.4. The Board proposed to include definitions for "designated uses" and "existing uses" which are terms used within the rule. The definitions proposed are those which have been developed by the U.S. Environmental Protection Agency ("EPA") They are included to clarify those sections of the rule in which they occur.

2.8. The Board proposed to amend "National Resource Waters" to "Outstanding National Resource Waters" to comply with Federal Clean Water Act requirements. See additional discussion at Section 46-1-4.

2.17. The Board proposed to include the definition for "water" or "waters" which is currently included in the State Water

Pollution Control Act.

2.18. The Board proposed a new definitions for wetlands which has been adopted by EPA and U.S. Fish and Wildlife Service and is being used in the implementation of a number of federal programs.

2.20 and 2.21. The Board proposed the inclusion of definitions for "Coal remining operation" and "remined area" to clarify new provisions in section 8.4 of the rule.

Comments and Responses

2.8. Several comments received regarding changes in this section indicated that it is too broad and will result in overly stringent regulation of waters, due to the fact that no new or increased discharges will be allowed in Outstanding National Resource Waters (ONRW). Others indicated that due to the changes in the list of waters included in the category, that the result would be the opposite; that the application of the provisions would not include enough waters.

The Board has proposed the adoption of this category, along with a category of "Waters of Special Concern" as a step toward full implementation of the federally mandated antidegradation requirements. The waters which currently are designated as National Resource Waters will be moved into the "Special Concern" category, which are subject to somewhat less stringent regulation than ONRWs but more stringent than high quality waters. Waters in federally designated Wilderness Areas will be included as ONRWs. Additional waters may be nominated into the ONRW category - the Boards decisions on such nominations will be subject to full public comment and hearing requirements.

2.17. Comments included a concern that the definition of "waters" was overbroad, including groundwater as well as surface water. The proposed definition is that which occurs in 20-5a and has been used to implement these standards since their first promulgation.

The Board, however recognizes the concern raised by the commenters and agrees that some confusion could result from including the definition in this rule.

2.20 and 2.21. Comments received suggested these definitions be changed to those promulgated by the Office of Surface Mining pursuant to the Federal Energy Act of 1992. The definitions referred to are from a proposed rule, not final. Because the Board did not adopt the variance provisions for coal remining, these definitions are unnecessary. See discussion at Section 46-1-8.4.

Board Action

2.3 and 2.4. Proposals adopted

2.8. Proposal adopted.

2.17. Proposal deleted.

2.18 Proposal adopted...

2.20 and 2.21. Proposals deleted.

SECTION 46-1-4 Anti-degradation Policy.

Existing Rule

This section of the rule describes provisions for protection of existing uses of the waters of the state. Federal requirements for components which must be included in this section are outlined in 40 CFR 131.12.

In addition to the changes described below, the Board will work with the Office of Water Resources of the DEP to develop a legislative rule which outlines requirements for implementation of the antidegradation provisions in the standards.

Proposed Changes

4.1. The Board proposed to clarify the policy statement of this section by specifically including wetlands as waters to be protected by the antidegradation provisions. Because the definition of "waters" which is used to implement this rule, specifically includes wetlands, this is new language does not change the substance of this section.

4.1.a-d. The Board proposed reorganization of this section of the rule to distinguish the antidegradation provisions from those governing the adoption of designated uses. The first two sentences in subsection a were retained in the antidegradation section and the remainder of that section as well as subsections b through d were moved to section 6 which outlines the water use categories. Subsection a as proposed is consistent with 40 CFR 131.12(1), which outlines what EPA has described as the Tier 1 level of protection of existing uses.

The subsections of 4.1 were renumbered. All references to subsections in 4.1 will be to the new renumbered subsections.

4.1.b. Subsection b describes the Tier 2 level of protection under the federal antidegradation requirements. Two changes in this section were proposed by the Board in response to EPA's disapproval of the antidegradation section of the rule. First, the first portion of the first sentence in subsection b which provided for the incorporation of exceptions which are outlined in section 7 of the rule, has been deleted. The exceptions outlined in section 7.2.c are intended to apply only to numeric water quality standards which are developed to protect designated uses. Their inclusion as exceptions to the antidegradation portion of the rule, which is intended to protect existing uses, was disapproved by EPA.

The second change in subsection b was to include the requirement that any change in the existing quality of the waters described in this section can only occur after "satisfaction of the

intergovernmental coordination if the State's continuing planning process". The continuing planning process is outlined in section 303 (e) of the Clean Water Act and is implemented in West Virginia by the Office of Water Resources of the Division of Environmental Protection. Inclusion of this language was required by EPA for their approval of the antidegradation policy.

With the proposed changes outlined above, subsection b complies with the requirements in 40 CFR 131.12(2).

In addition, the language in former subsection f has been moved to subsection b above, as it was intended to apply to Tier 2 waters.

4.1.c. The new language in this section proposes to adopt an intermediate tier of protection of waters between tier 2 and tier 3. This is proposed by the Board in order to recognize waters which warrant greater protection than Tier 2 affords.

4.1.d. New language in this section proposes a procedure for nominating waters for inclusion in the Tier 3, Outstanding National Resource Waters category. The nomination process will be further delineated in a rule to be drafted jointly by the Board and the Office of Water Resources of the DEP, the agency authorized to issue permits and implement the water quality standards. It is the Board's intent that the nomination process will provide to all parties potentially affected by the designation of a water as ONRW ample opportunity to submit comments and that a thorough review of comments and potential impacts of such designation be carried out on a case by case basis.

Comments and Responses

4.1. Commenter indicated that using the term "waters" would include wetlands, and further would be more accurate because the antidegradation provisions apply not only to water uses, but to water quality as well. The Board agrees.

4.1.c and 4.1.d. Some comments raised questions regarding how the Waters of Special Concern and ONRW categories will be implemented. One commenter suggested moving the definitions for those two categories from section 46-1-7 to this section.

The Board agrees with the second comment, and proposes moving the definitions currently in the Classified Waters of the State (46-1-7) into the antidegradation section. Regarding the second comment, as stated above, the Board will work with other State agencies to develop implementation procedures for the antidegradation provisions in the rule.

Board Action

4.1. First sentence amended to read: "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-d Proposal adopted.

4.1.b. Proposal adopted.

4.1.c. and 4.1.d. These sections amended to include the definitions and lists of waters from section 46-1-7.

SECTION 46-1-5 Mixing Zones

Existing Rule

5.1 ÷ 5.5. The existing rule provides general criteria for establishing mixing zones in NPDES permits.

Proposed Changes

EPA has disapproved the existing mixing zone provisions in the standards. The Board has proposed deletions of sections 5.2 through 5.5 of the existing language and replacing those sections with language which addresses the deficiencies cited by EPA in their disapproval. Those deficiencies cited by EPA included insufficient precision to ensure that mixing zones will not impair the integrity of the water body as a whole, that there will be no lethality to organisms passing through the mixing zone and that there are no significant health risks, considering likely pathways of exposure.

The new language includes requirements for definable geometric and spatial limits for mixing zones, requirements identifying where acute and chronic aquatic life criteria must be met, provisions prohibiting interference with sensitive areas such as fish spawning or nursery areas and public water supply intakes, and provisions prohibiting mixing zones from causing lethality to or precluding the free passage of fish or other aquatic life and provision that mixing zones shall not harm any endangered species.

Comments and Responses

Comments were received questioning several aspects of the implementation of these provisions including identification of the spatial and geographic limits, potential for increased water sampling and implementation of the zone of initial dilution. Further comments referred to the provision in section 7.2.a.B, which is interpreted to prohibit mixing zones within 5 miles above a water supply intake.

The Board recognizes these new provisions have raised questions regarding implementation of mixing zones. The Office of Water Resources of the Division of Environmental Protection, the State agency responsible for implementing these provisions in National Pollutant Discharge Elimination System (NPDES) permits plans to develop an implementation policy for these mixing zone requirements. The Board plans to work with that office in the development of that policy.

Board Action

Proposal adopted.

SECTION 46-1-6 Water Use Categories.

Existing Rule

This section of the rule establishes and defines water use categories for the waters of the state.

Proposed Changes

6.1. The Board proposed adding the words "including wetlands" to the first sentence in this section. This addition is made primarily for clarification and emphasis, but does not substantively alter the implementation of this section of the rule. The definition of waters of the state which is employed in implementing these standards includes wetlands as such waters.

6.1.a-d. The Board proposed that these subsections, which describe requirements for designating and removing uses, be moved from the antidegradation section (section 4.1.). No changes have been made to these subsections of the rule.

6.2. This section describes the existing categories of designated uses. The Board proposed removing the wetlands use category. This removal, along with other changes in the rule regarding wetlands, was proposed to clarify the protection to be afforded to wetlands by these standards. Currently, waters in the wetlands use category are to be protected by the numeric standards designed to protect warmwater aquatic life. While these values would be appropriate most of the time, that categorization does not recognize the other important existing and potential functions and values of wetland habitats. By removing the wetlands use category it is the Board's intention to emphasize that in implementing these standards, that other use designations may be appropriate for categorizing wetlands.

Comments and Responses

Commenters questioned the need for removal of the Wetlands category (B4) from the designated use section. The Board has determined that until specific numeric criteria are developed for wetlands, that retaining the B4 category, with the protection of the warmwater aquatic life criteria, will be fully protective of wetlands.

Board Action

6.1 Proposal deleted.

6.1.a-d. Proposal adopted.

6.2. Proposal deleted.

SECTION 46-1-7 West Virginia Waters.

Existing Rule

This section includes a list of the major river basins in the state, describes the applicability of the water quality standards to waters of the state and includes a list of site specific criteria, variances and use removals.

Proposed Changes

7.2.a.A. This section describes how waters are to be classified and protected by numeric criteria based on their classification. The Board has proposed adding the words "including wetlands" in this section to emphasize that wetlands, as all other waters, are to be classified and protected based on the applicability of any water use category.

7.2.c.C. This subsection describes an exception to the application of the water quality standards within the zone of initial dilution of a mixing zone. The ZID is an area within the mixing zone in which initial mixing occurs, and at the edge of which numeric criteria must be met.

7.2.d. This subsection describes site specific exceptions to the application of numeric criteria which have been granted by the Board. EPA disapproved this section of the rule based on the Board's lack of adequate legal authority in the rule for granting variances, as well as failure to establish scientifically defensible site-specific criteria to support designated uses.

Proposed changes in 7.2.d correct the deficiencies outlined by EPA by identifying and three types of site-specific exceptions: site-specific numeric criteria, variances and use removals.

Site-specific numeric criteria are a type of exception to numeric water quality standards which recognize that local water chemistry may have an effect on certain constituents, sometimes rendering them less toxic than under normal circumstances. Site-specific numeric criteria may be granted by the Board where a demonstration is made that a less stringent numeric value for a given criteria than the one published in appendix E will be fully protective of aquatic life, and fully protective of the use category designated for the stream. This demonstration can be made by conducting a Water Effect Ratio (WER) study according to the guidelines published by USEPA (Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals, February 1994).

A variance from numeric water quality standards may be granted to a specific discharger where a demonstration is made that compliance with the existing numeric standard will result in substantial and widespread economic impact. Variances must be reviewed and rejustified every three years.

Designated uses which are not existing uses may be removed from a stream only after a Use Attainability Analysis has been conducted and only where the removal is consistent with the criteria outlined in section 6.1.b.A-F.

Anyone seeking a site specific numeric criterion, a variance or removal of a use must follow the procedural requirements outlined in 46 CSR 6, the Board's procedural rule governing site specific water quality standards.

7.2.d.B.b. The Board has proposed a site-specific numeric criterion of 500 ug/L for aluminum for the section of Opequon Creek from Turkey Run to the Potomac River. The stream is designated as a trout stream; the Board promulgated a numeric criteria for aluminum of 87 ug/l for that use category in August 1993.

This proposal is based on the results of a Water Effect Ratio study conducted by 3M Company. The study was conducted in the spring of 1994 and demonstrated that due to the local water chemistry of Opequon Creek, that a concentration of as high as 870 ug/l of aluminum had no negative effect on aquatic species in the stream. Because 3M is currently operating pursuant to an NPDES permit limit for aluminum of 500 ug/l, the Board determined that that value was appropriate for the site-specific criterion.

Comments and Responses

7.2.a.A. No comments received.

7.2.b C. One commenter suggesting deleting the proposed language which limits the exception from water quality standards to the zone of initial dilution, and retaining the existing language which exempts the entire mixing zone from the application of numeric standards.

The revised mixing zone language provides that either acute or chronic criteria must be met in the mixing zones except within the zone of initial dilution which is the area immediately surrounding the discharge outfall. To retain the existing exemption of the entire mixing zone from application of numeric standards would be inconsistent with the proposed mixing zone provisions.

7.2.c. EPA commented that the exceptions from water quality standards in this subsection are only to be exceptions from the numeric standards in Appendix E, all other narrative standards in the rule are to apply. The Board agrees and amended the language in this section to make clear that the exceptions listed are exceptions from the application of numeric standards only.

7.2.d. Two commenters requested that the Board identify each of the existing site specific exceptions in 7.2.d. as site-specific numeric criteria, variances or use removals. Another commenter suggested adding a section at 8.4 which describes site-specific numeric criteria. The Board agrees with both commenters and amends the rule to comply with those requests.

7.2.d.B.b. One comment received in support of this section.

Board Action

7.2.a.A Board adopted as proposed.

7.2.c. Language amended to refer to numeric water quality standards.

7.2.d. The Board amended the rule to identify most of the existing "variances" as site-specific numeric criteria. The Board also added section 8.4 to describe site-specific numeric criteria.

7.2.d.B.b Board adopted as proposed.

SECTION 7.3

Existing Rule

This section provides a list of waters occurring in the state which have been classified or designated by state or federal agencies for a particular purpose. The list includes definitions for waters to be protected pursuant to the antidegradation provisions in the rule.

Proposed Changes

7.3.a. This subsection addresses high quality waters, which are defined in section 2.4 of this rule. The Board proposed amending this section by including the words "where quality conditions are consistent with" to clarify the definition in section 2.4 of the rule. This proposal is consistent with the Board's efforts to clarify the antidegradation provisions in the standards.

7.3.d. The Board proposed this new section to add a new category of waters for protection by the antidegradation provisions in the standards. This new category, entitled "waters of special concern" is intended to correspond to the "Tier 2.5" level of protection recognized by EPA. This level of protection is an interim level between that afforded high quality waters (Tier 2) and Outstanding National Resource Waters (Tier 3).

Subsections A, B and C of 7.3.d provides a list of "special waters". These include Federal Wild and Scenic Rivers, naturally reproducing trout streams, and streams within State and National Forests and Recreation Areas. Those three categories of waters are currently considered National Resource Waters.

7.3.e. The Board has proposed amending this National Resource Waters section to Outstanding National Resource Waters. This change is proposed in order to make this category correspond to the federal "Tier 3" antidegradation designation.

In addition, the Board has proposed moving the waters identified in subsections A, B and C in the National Resource Waters category into the proposed Special Waters category.

For further discussion of the proposed amendments to the antidegradation provisions, see discussion of Section 4, above.

Comments and Responses

As discussed above in the antidegradation section (46-1-4)

comments received suggested reorganizing this section by moving the waters identified here to the appropriate categories of the antidegradation section.

Board Action

The Board amended the rule by incorporating the provisions in this section into the antidegradation section, and deleting section 7.3. See further discussion at 46-1-4.

SECTION 46-1-8

Existing Rule

This section refers to and explains the application of the numeric water quality standards which are outlined in Appendix E of the rule.

Proposed Changes

8.1.c. This section describes the application of numeric criteria to the use categories outlined in sections 6 and 7 of the rule. The Board proposed amending the rule to clarify that the criteria shall apply "to the waters of the state, including wetlands". As explained before in this document, the addition of wetlands to this provision does not substantively alter the application of the rule, because wetlands are included in the definition of waters of the state which has been codified for some time. Instead, this amendment is intended to clarify the application of this rule.

8.2. This section explains the application of the numeric criteria for carcinogenic substances which are to be applied for the protection of human health. The Board proposed an amendment to Section 8.2.a which includes category C (Recreation) waters to those waters which are to be protected by the human health values for carcinogens. A corresponding change was proposed in section 8.2.b which addresses the application of numeric criteria for carcinogens for the protection humans exposed to carcinogens by eating fish. The Board amended that section by changing the applicable water use category from B (warmwater aquatic life) to C (water contact recreation).

An additional amendment in 8.2.a was proposed which corrects the notation by which carcinogens are identified in Appendix E.

8.3. This new section of the rule was proposed by the Board to respond to EPA's disapproval of the standards. In disapproving portions of section 7.2.d of the rule, EPA determined that the Board has granted variances from water quality standards without sufficient legal authority to do so. While the existing language in Section 7.2.d provides for site specific water quality standards, it does not specifically address variances. (For discussion of site-specific criteria, variances and use removals, see Proposed Changes, Section 7.2.d, above).

The elements of the variance provisions include reference to

Section 6.1 of this rule which describes the conditions which must be met before a variance can be granted to a discharger; requirements that variances be discharger specific and that the Board review each variance every three years, and that the procedures cited in West Virginia Code 22B-3-4 and 46 CSR 6 (Boards procedural rules for site specific water quality standards) are followed.

8.4. This new section of the rule was proposed by the Board at the request of the Office of Mining of the Division of Environmental Protection. This section addresses provisions for variances from water quality standard for holders of NPDES remaining permits. This section provides that an applicant for such permit may request alternate effluent limits for iron, manganese and pH, and those may be granted upon demonstration to the chief that the remaining operation will result in improved water quality, and subject to the prohibitions outline. The alternate standards are also subject to approval by the Board and EPA.

Comments and Responses

8.1.c. Because the Board retained the wetlands B4 category, the change proposed here is unnecessary.

8.2. No comments received.

8.3. One commenter suggested that in addition to the new variance provisions proposed in this section, that the Board include similar provisions describing site-specific numeric criteria. The Board agrees. (See section 7.2 for discussion of site-specific numeric criteria.

8.4. Several commenters supported the new provisions for remaining variances. One commenter who supported the provisions generally, suggested altering the language regarding the provision for approval of a variance by the Board and EPA to review by the Board and EPA. In addition that commenter suggested striking the last sentence in paragraph a, which provides that any alternate limits granted in a remaining permit be more stringent than the existing degraded water quality. The commenter indicated that while there will be instances where remaining will result in improved water quality, but that the operator will still be unable to meet the more stringent standard.

Other commenters who generally supported the provision suggested amending the provision requiring a demonstration that water quality would be improved to require a demonstration of the potential for improved water quality. The commenter indicated that that amendment would render the proposal consistent with Section 301(p)(2) of the Clean Water Act.

Several commenters expressed concern regarding the blanket nature of the provision. Specific concerns included the provision that the demonstration to the chief be the only one needed for approval of the variance.

EPA commented extensively on this provision. They found the provision unacceptable in two respects. Their position is that

States may neither set effluent limits a water quality standards regulation, nor provide automatic exceptions from water quality standards. They suggest that States may allow exceptions to water quality standards for remining activities if the operators can demonstrate that irretrievable and human-induced conditions exist. Upon such demonstration the Board may either grant a variance from numeric standards or remove the designated use from the stream after conducting a Use Attainability Assessment.

While the Board recognizes the potential for water quality to be improved as a result of remining activities carried out pursuant to NPDES remining permits, they also recognize that the variance provision as written does not establish an adequate procedure to waive the application of existing water quality standards. The Board will continue to work with staff of the Division of Environmental Protection and US EPA to develop a mechanism for providing some relief from the requirements of meeting water quality standards for remining operators where they are appropriate, and at the same time ensure that the fundamental objectives of the water quality standards are met.

Board Action

8.1.c. Proposed language deleted.

8.2. Proposal adopted.

8.3. New language added (8.4) to describe site-specific numeric criteria.

8.4. Proposed remining variance language deleted. New language proposed describing site-specific numeric criteria.

APPENDIX E Specific Water Quality Criteria

Existing Rule

Appendix E contains a table of use categories and the numeric criteria which apply to each use.

Proposed Changes - General

EPA disapproved Appendix E based on lack of acute numeric values for aquatic life protection. To correct this deficiency, the Board proposed acute numeric values for a number of criteria. See discussion of specific criteria, 8.1 et seq. The chronic values are the more stringent values which are to be met at the edge of the mixing zone and are to apply throughout the waterbody. Acute values are to be met at the edge of the Zone of Initial Dilution and are to apply throughout the remainder of the mixing zone.

The format of Appendix E has been modified in two respects. First, the existing warmwater and troutwater use designation columns have each been expanded to include separate columns for acute and chronic values. In addition, the warm water categories

B1 and B3 and the trout water use category, B2 have been identified in the table as aquatic life uses and the recreation category C and public water supply category A have been identified as human health uses.

Comments and Responses

One commenter indicated that the acute values are to be applied as one hour average concentrations not to be exceeded more than once every three years and the chronic values applied as four day average concentrations not to be exceeded more than once every three years. Those provisions are included in Appendix E as footnotes to the "acute" and "chronic" headings in the table.

Board Action

Proposal adopted.

Existing Rule

8.1. Aluminum: Not to exceed 748 ug/l in categories B1, B3 and B4; Not to exceed 87 ug/l in category B2.

Proposed Changes

The Board proposed adopting the values published in USEPAs criteria document for aluminum:

Categories B1, B3 and B4 - acute value: 750 ug/l, chronic value: 87 ug/l.

Category B2 - acute value: 750 ug/l; 87 ug/l retained as chronic value.

Comments and Responses

One commenter indicated that the chronic value of 87 ug/l is more stringent than necessary as applied to the warmwater categories B1, B3 and B4; and further that both the Ohio and Kanawha Rivers often exceed the proposed chronic and acute criteria when measured as total values.

These issues have been raised in the past when the Board made efforts to revise the aluminum standard to comply with existing federal guidelines. The Board recognizes that there may be circumstances that render compliance with this more stringent standard difficult for individual dischargers. There are provisions in the rule, however, which provide avenues for seeking a waiver of water quality standards where the numeric values are not appropriate. Specifically, a site-specific criterion may be sought where a discharger can demonstrate, by conducting a Water Effect Ratio study, that increased concentrations of aluminum have no negative effects on aquatic life in the stream. Another alternative is to seek an economic variance from numeric standards.

It is the Board's position that the proposed numeric values are appropriate for regulation of aluminum in the state's waters. Rather than lower the state-wide standard to accommodate dischargers who may have difficulty complying, the Board believes

that the more responsible decision is to adopt the standard state-wide, then work with individual dischargers who may wish to request a site-specific numeric criteria or variance from the numeric standard.

Board Action

Proposal adopted.

Existing Rule

8.2 Ammonia: Category B1, B3 and B4 - The concentration of un-ionized ammonia shall not exceed 50 ug/l; Category B2 - The concentration of un-ionized ammonia shall not exceed 20 ug/l.

Proposed Changes

The Board proposed adopting values recommended by USEPA as follows:

Category B1, B2, B3 and B4: acute value - 50 ug/l, chronic value - 20 ug/l.

Comments and Responses

Several commenters questioned these changes and indicated that the proposed values are too stringent because they essentially apply values designed to protect trout waters to warmwater streams. USEPA's criteria document for ammonia provides criteria tables for ammonia based on pH and temperature, with separate lists for trout and not trout waters.

The Board agrees with the comments received.

Board Action

The Board incorporated the tables and formulae in the National Criteria section of EPA's "Ambient Water Quality Criteria for Ammonia - 1984" as the acute and chronic values for ammonia.

Existing Rule

8.3. Antimony: Not to exceed 14 ug/l - applicable to Public A category waters.

Proposed Changes

The Board proposed adopting USEPA's human health value developed for protection of humans based on ingestion of water and fish, which is published as a recalculated value in the Gold Book as follows:

Category C - 4300 ug/l.

Comments and Responses

No comments received.

Board Action

Proposal adopted.

Existing Rule

8.4 Arsenic: Not to exceed 50 ug/l (Public A); Not to exceed 190 ug/l trivalent arsenic (categories B1, B2, B3, B4 and C); not to exceed 100 ug/l (category D).

Proposed Changes

The Board proposed values of .018 ug/l for category C, 0.14 ug/l for category A. Additionally, the Board proposed an acute value of 360 ug/l for trivalent arsenic for categories B1, B2, B3 and B4. These values reflect the values published in the EPA Gold Book.

Comments and Responses

One commenter noted that the human health values for categories A and C appeared to be transposed. Other commenters indicated that the EPA Science Advisory Board has recommended to the Administrator of EPA that the existing human health values for arsenic may not be valid, and further recommended that EPA re-evaluate its risk assessment for arsenic. Commenters suggested retaining the 50 ug/l human health value until EPA's reevaluation is completed.

The Board agrees with the comments regarding the proposed human health values for arsenic.

Board Action

Categories A and C: The Board adopted human health value of 50 ug/l.

Categories B1, B2, B3 and B4: Adopted the acute and chronic values for aquatic life as proposed.

Existing Rule

8.6 * Beryllium: categories B1, B2, B3 and B4 - 130 ng/l; category A - 7.7 ng/l. (Asterisk indicates parameter in a carcinogen)

Proposed Changes

The Board proposed changing the unit measurement for beryllium from nanograms (ng) to micrograms (ug). Further, the Board made a corresponding change in the category A numeric value from 7.7 to .0076. These changes were proposed because the expression of the aquatic life value of 130 in nanograms was an error. Only the human health value of 7.7 was intended to be expressed as nanograms. By changing the units to micrograms (the correct units for the 130 value) it was necessary to change the numeric value of

7.7 to reflect the change in units, by moving the decimal point three places to the left.

In addition, because beryllium is no longer classified as a human carcinogen by EPA (National Toxics Rule December 1992) the Board removed that designation as well.

Comments and Responses

Commenters questioned the retention of the existing human health value, one noting that the Board had in fact made it slightly more stringent, in light of the fact that EPA has lifted its classification as a carcinogen and declined to promulgate any human health value for beryllium in the National Toxics Rule.

The Board has retained the human health value in order to ensure that the public will be protected from any non-carcinogenic effects that exposure to beryllium may cause. However, the Board agrees that the slight change in the human health value is not necessary.

Board Action

Changes adopted as proposed except that the human health value for beryllium proposed is .0077 ug/l.

Existing Rule

8.7 Cadmium. 8.7 through 8.7.3 provide numeric values for cadmium for categories A, B1, B2, B3, B4 and C.

Proposed Changes

The Board proposed adopting an acute aquatic life numeric value to apply to categories B1, B2, B3 and B4 as follows:

8.7.4 The one-hour average concentration of total recoverable cadmium shall not exceed the value determined by the following equation: $Cd = e^{(1.128[\ln(\text{hardness})] - 3.828)}$

Comments and Responses

Comments received regarding cadmium addressed the human health values, indicating that because EPA had declined to publish human health values for cadmium in the National Toxics Rule, that the Board should set none for West Virginia.

While the Board is aware that EPA is currently reevaluating the toxicity of cadmium from exposure to water, the Board is reluctant to remove the existing human health value until EPA's reevaluation is complete. The Board will have an opportunity to reconsider this issue during the next triennial review.

No comments were received regarding the proposed acute aquatic life criterion.

Board Action

Proposal adopted.

Existing Rule

8.8 Chloride: Not to exceed 250 mg/l; to apply in categories A, B1, B2, B3, B4 and C.

Proposed Changes

The Board proposed adopting EPAs published aquatic life criteria for chloride as follows:

For categories B1, B2, B3 and B4: acute value - 860 mg/l; chronic value - 230 mg/l.

Comments and Responses

One commenter expressed concern about the relatively high acute value in light of the existence of oil and gas brine discharge permits and Department of Highways salt storage piles as potential sources of high chloride discharges. The Board notes that the proposed values are those published by EPA in the document "Ambient Water Quality Criteria for Chloride - 1988". Further, all aquatic life criteria developed by EPA are developed using procedures outlined in their own document entitled "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (Stephan et al. 1985). Based on its understanding of the documents cited, the Board believes that the numeric values proposed, if implemented as outlined in this rule, will be fully protective of aquatic life in the States waters.

Board Action

Proposal adopted.

Existing Rule

8.9 Copper. Section 8.9 and 8.9.1 provide numeric standards for copper to apply in categories A, B1, B2, B3 and B4.

Proposed Changes

The Board proposed adopting an acute aquatic life criterion to apply in categories B1, B2, B3 and B4 as follows:

8.9.2 The one-hour average concentration of total recoverable copper shall not exceed the value determined by the following equation^a: $Cu = e^{(0.9422[\ln(\text{hardness})] - 1.464)}$

In addition the Board proposed in 8.9.1 to add the requirement that the standard be applied as a four day average concentration. (see further discussion at Appendix E, General, Comments and responses).

Comments and Responses

None received.

Board Action

Proposal adopted.

Existing Rule

8.10 Cyanide: (As Free cyanide HCN + CN⁻): Not to exceed 5 mg/l. Applicable to categories A, B1, B2, B3, B4 and C.

Proposed Changes

The Board proposed changing the requirement for measuring cyanide as free cyanide to a requirement for expression as total cyanide. In addition, the Board proposed adopting an acute aquatic life criterion of 22 ug/l, and changing the existing aquatic life value of 5.0 to serve as the chronic criterion for protection of aquatic life; both changes apply to categories B1, B2, B3 and B4.

Comments and Responses

Commenters questioned the need to change the measurement of cyanide from free to total cyanide citing lack of supportable scientific justification. In support of their position commenters cited the following language in EPA's criteria document, entitled "Ambient Water Quality Criteria for Cyanide - 1984":

EPA believes that a measurement such as free cyanide would provide a more scientifically correct basis upon which to establish criteria for cyanide. The criteria were developed on this basis. However, at this time, no EPA approved methods for such a measurement are available to implement the criteria through the regulatory programs of the Agency and the States. The Agency is considering development and approval of methods for a measurement such as free cyanide. Until available, however, EPA recommends applying the criteria using the total cyanide method. These criteria may be overly protective when based on the total cyanide method.

The Board agrees with the commenters and has determined that for the present, measurement of cyanide as free cyanide is appropriate. The Board will continue to review and consider any new information provided by EPA and other sources on this issue.

Board Action

Proposal deleted.

Existing Rule

8.14 Hexavalent chromium: Not to exceed 50 ug/l (category A);

Not to exceed 10 ug/l (categories B1, B3 and B4); Not to exceed 7.2 ug/l (category B3).

Proposed Changes

The Board proposed adopting acute aquatic life criteria of 16 ug/l to apply to categories B1, B2, B3 and B4 and adopting the existing aquatic life values to be applied as chronic criteria. In addition the Board proposed amending the 10 ug/l value in the B1, B3 and B4 category to 11 ug/l to correspond to EPAs chronic aquatic life value.

Comments and Responses

No comments received.

Board Action

Proposal adopted.

Existing Rule

8.15 and 8.15.1 These sections provide human health and aquatic life criteria for iron.

Proposed Changes

The Board proposed adopting provisions for allowing effluent limitations greater than 1.5 mg/l for iron for dischargers operating pursuant to an NPDES reming permit issued by the Chief. This variance from water quality standards would be granted only upon a demonstration by the permittee that the reming operation will result in improved water quality and is subject to approval by the Board and EPA. The exception would not apply to trout waters.

Comments and Responses

See discussion at 46-1-8.4.

Board Action

Proposal deleted.

Existing Rule

8.16 Lead. 8.16 and 8.16.1 provide numeric criteria for lead for use categories A, B1, B2, B3 and B4.

Proposed Changes

The Board proposed a new section 8.16.2 which includes an acute aquatic life criterion for lead as follows:

8.16.2 The one-hour average concentration of total recoverable lead shall not exceed the value determined by

the following equation^a: $Pb = e^{(1.273[\ln(\text{hardness})]-1.46)}$

The Board also made a corresponding change to 8.16.1, to change the existing aquatic life values to become the chronic values for the protection of aquatic life.

Comments and Responses

No comments received.

Board Action

Proposal adopted.

Existing Rule

8.17 Manganese. The existing rule provides numeric criteria for manganese to apply in categories A, B1, B2, B3 and B4.

Proposed Change

The Board proposed a provision for alternate effluent limits for remaining NPDES permit holders. See section 8.15 for discussion.

Comments and Responses

See section 46-1-8.4 for discussion.

Board Action

Proposal deleted.

Existing Rule

8.18 Mercury - provides total organism body burden value of 0.5 ug/g as methylmercury, to be applied in use categories B1, B2, B3 and B4.

8.18.1 - provides numeric values of .20 ug/l total mercury for use categories A and C.

Proposed Change

8.18 The Board proposed amending this section by deleting the values from the B categories and applying them in categories A and C, because the fish body burden values are developed for the protection of human health, not for protection of aquatic life.

8.18.1 The Board proposed amending these values to reflect EPA's current mercury values of .14 for category C and .15 for category A.

Comments and Responses

8.18 One commenter suggested using the less stringent value of 1 mg/kg, which was used by EPA in the National Toxics rule promulgation. That value is the fish tissue concentration developed by the Federal Food and Drug Administration.

8.18.1. No comments received.

Board Action

Proposal adopted.

Existing Rule

8.19, 8.19.1 and 8.19.2 establish values for nickel to apply in categories A, B1, B2, B3 and B4.

Proposed Changes

The Board proposed adopting the following acute aquatic life criterion for nickel for use categories B1, B2, B3:

8.19.2 The one-hour average concentration of total recoverable nickel shall not exceed the value determined by the following equation^a: $Ni = e^{(0.846[\ln(\text{hardness})]+3.361)}$.

In addition, the Board proposed the corresponding change of moving the existing aquatic life value for category B waters into the chronic criteria column.

In addition, the Board proposed a human health value of 4600 for category C waters as recommended by EPA.

Comments and Responses

No comments received.

Board Action

Proposal adopted

Existing Rule

8.22 Organics. This section establishes criteria for organic parameters based upon a cancer risk level of 10^{-5} (one cancer case per one million people). Values for the protection of aquatic life are included where available.

Proposed Changes

The following changes were made to existing criteria:

Chlordane - adopt acute aquatic life criterion of 2400 ng/l; amend existing aquatic life value of .46 ng/l to 4.3 ng/l to apply as chronic criteria.

DDT - adopt acute aquatic life criterion of 1100 ng/l; amend existing aquatic life value of .024 ng/l to 1.0 ng/l to apply as chronic criteria.

Aldrin - adopt acute aquatic life criterion of 3.0 ng/l.

Dieldrin - adopt acute aquatic life criterion of 2500 ng/l; amend existing aquatic life value of .071 ng/l to 1.9 ng/l to apply as chronic criteria.

Endrin - adopt acute aquatic life criterion of 180 ng/l.

Toxaphene - adopt acute aquatic life criterion of 730 ng/l; change existing aquatic life value of 0.71 ng/l to 0.2 ng/l to apply as a chronic criterion; change existing human health value of .71 ng/l to .73 ng/l.

PCB - change existing aquatic life value of .079 ng/l to 14.0 ng/l; change existing human health value of .079 ng/l to .045 ng/l for use category C and .044 ng/l for use category A.

Dioxin - delete .014 pg/l value from categories B1, B2, B3 and B4. That numeric value is intended for the protection of human health; its inclusion in the aquatic life categories is inappropriate. EPA has not developed numeric values for the protection of aquatic life for dioxin.

Acrylonitrile - delete aquatic life value of .77 ug/l from categories B1, B2, B3 and B4. EPA currently has no aquatic life numeric criteria for acrylonitrile. Adopt human health value of 0.66 ug/l for category C waters.

Benzene - delete 40 ug/l from B categories; adopt human health value of 71 ug/l for category C.

1,2-dichlorobenzene - move 17 mg/l human health value from aquatic life categories to category C waters.

1, 3-dichlorobenzene and 1, 4-dichlorobenzene - move 2.6 mg/l human health value from aquatic life categories to category C.

2, 4-dinitrotoluene - move 9.1 ug/l human health value from aquatic life categories to category C.

Hexachlorobenzene - delete .74 ng/l value from aquatic life categories, adopt .77 ng/l human health value for category C.

Carbon tetrachloride - move 4.4 ug/l human health value from aquatic life categories to category C.

Chloroform - delete 15.7 ug/l value from aquatic life categories; adopt human health value of 470 ug/l for category C.

Halomethanes - move 15.7 ug/l human health value from aquatic life categories to category C.

1, 2-dichloroethane - delete 98.6 ug/l value from aquatic life categories; adopt human health value of 99 ug/l for category C.

1, 1, 1-trichloroethane - delete 67.3 value from aquatic life categories; amend human health value of 1.2 mg/l to 12 mg/l in category A.

1, 1-dichloroethylene - delete 1.9 ug/l value from aquatic life categories; adopt human health value of 3.2 ug/l for category C.

Trichloroethylene - delete 92.4 ug/l value from aquatic life categories; adopt human health value of 81 for category C.

Tetrachloroethylene - delete 8.9 ug/l value from aquatic life categories; adopt human health value of 8.85 for category C.

Toluene - delete 4.4 mg/l value from aquatic life categories; adopt human health value of 200 mg/l for category C; replace 14.3 ug/l human health value with 6.8 mg/l value for category A.

Polynuclear Aromatic Hydrocarbons - move 31.1 ng/l value from aquatic life categories to Category C, with change in units from ng/l to ug/l.

Vinyl chloride - moved human health value of 525 ug/l from aquatic life categories to category C (recreation).

The following new parameters and associated criteria were adopted:

alpha-BHC(alpha-Hexachlorocyclohexane - human health criteria of .013 ug/l for category C and .0039 ug/l for category A.

beta-BHC (beta-Hexachlorocyclohexane - human health criteria of .046 for category C and .014 for category A.

gamma-BHC (gamma-hexachlorocyclohexane) - acute aquatic life criteria of 2.0 ug/l for categories B1, B2, B3 and B4, chronic aquatic life criteria of .08 ug/l for categories B1, B2, B3, and B4, human health criteria of .063 ug/l for category C and .019 for category A.

Chlorobenzene - human health criteria of 21 mg/l for category C and .68 mg/l for category A.

Ethylbenzene - human health criteria of 29 mg/l for category C and 3.1 mg/l for category A.

Heptachlor - acute aquatic life criteria of 520 ng/l for categories B1, B2, B3 and B4, chronic aquatic life criteria of 3.8 ng/l for categories B1, B2, B3 and B4, human health criteria of 0.21 ng/l for categories A and C.

2-methyl-4,6-Dinitrophenol - human health criteria of 765 ug/l for category C and 13.4 ug/l for category A.

Fluoranthene - human health criteria of 370 ug/l for category C and 300 ug/l for category A.

Comments and Responses

Polynuclear Aromatic Hydrocarbons (PAHs). Commenters suggested adopting individual human health criteria for carcinogenic PAHs rather than the "total" PAH value in the existing rule. The Board will take this comment under advisement and will consider alternate PAH values during the next triennial review.

A commenter noted that the Board did not include EPAs recommended human health value of 11 ug/l for 1,1,2,2 tetrachloroethane for category C waters. That value was inadvertently omitted in the Board's proposed rule. Board agrees that that value should be included in Appendix E.

Board Action

Proposed changes adopted.

In addition, the Board adopted a human health criteria of 11 ug/l for 1,1,2,2 tetrachloroethane for category C.

Existing Rule

8.23 Provides aquatic life and human health criteria for iron.

Proposed Changes

The Board proposed adding provisions to this section which would allow exceedences of the existing numeric criteria for National Pollution Discharge Elimination System (NPDES) remaining operations. See discussion at section 8.4 above.

Comments and Responses

See discussion at section 8.4 above.

Board Action

The Board removed the proposed language from this section.

Existing Rule

8.26 Provides aquatic life and human health criteria for selenium.

Proposed Changes

The Board proposed adopting EPA's published acute aquatic life

criterion of 20 ug/l for categories B1, B2, B3 and B4.

Comments and Responses

Comments received addressed the human health criterion for selenium, for which no change is proposed at this time.

Board Action

Proposal adopted.

Existing Rule

8.27 Provides aquatic life and human health criteria for silver.

Proposed Changes

The Board proposed adopting EPAs published acute aquatic life criterion for silver which is expressed by the following equation:
 $Ag = e^{(1.72[\ln(\text{hardness})] - 6.52)}$

Comments and Responses

Comments received referred to the human health criterion for silver ; for which no change is proposed at this time.

Board Action

Proposal adopted.

Existing Rule

8.29 Provides a human health value for thallium of 1.7 ug/l for category A.

Proposed Changes

The Board proposed adopting EPAs published human health value (based on fish consumption) of 6.3 ug/l for category C.

Comments and Responses

No comments received.

Board Action

Proposal adopted.

Existing Rule

8.31 Provides aquatic life and human health criteria for total residual chlorine.

Proposed Changes

The Board proposed adopting EPAs published acute aquatic life criterion of 19 ug/l for categories B1, B2 and B2 and amending the existing chronic value of 10 ug/l to 11 ug/l for categories B1, B2 and B3. In addition, the Board proposed deleting section 8.31.2 which allows the use of the "Mattice and Zittle Scale" for deriving criteria.

Comments and Responses

None received.

Board Action

Proposal adopted.

Existing Rule

8.33 Provides aquatic life and human health criteria for zinc.

Proposed Changes

The Board proposed adopting EPAs acute aquatic life criterion for categories B1, B2, B3 and B4, which is expressed by the following equation:

$$Zn = e^{(0.8473 [\ln(\text{hardness})] + 0.9604)}$$

Comments and Responses

No comments received. The Board reconsidered this proposal and determined that adopting EPAs chronic criteria for categories B1, B2, B3 and B4 waters would be appropriate at this time.

Board Action

Proposal adopted. In addition the Board deleted the existing aquatic life value of 47 ug/l from category B2 and the values listed in 8.33.1 for categories B1, B3 and B4 and replaced them with the following:

8.33.1 The four-day average concentration of total recoverable zinc shall not exceed the value determined by the following equation^a:

$$Zn = e^{(0.8473 [\ln(\text{hardness})] + 0.7641)}$$

FISCAL NOTE FOR PROPOSED RULES

Rule Title: Title 46-Series 1-Requirements Governing Water Quality Standards

Type of Rule: X Legislative Interpretive Procedural

Agency Dept. of Commerce, Labor & Environmental Resources

Water Resources Board

Address 1615 Washington Street, East, Suite 301

Charleston, WV 25311-2126

1. Effect of Proposed Rule

	ANNUAL FISCAL YEAR				
	INCREASE	DECREASE	CURRENT	NEXT	HEREAFTER
<u>ESTIMATED TOTAL COST</u>	\$	\$	\$	\$	\$
PERSONAL SERVICES					
CURRENT EXPENSE					
REPAIRS & ALTERNATIONS		<u>NONE</u>			
EQUIPMENT					
OTHER					

2. Explanation of above estimates:

N/A

3. Objectives of these rules: To meet federally-mandated changes in water quality criteria which insure the protection and maintenance of the State's water resources.

Rule Title: Titles 46- Series 1-Requirements Governing Water Quality Standards

4. Explanation of Overall Economic Impact of Proposed Rule.

A. Economic Impact on State Government.

None.

B. Economic Impact on Political Subdivisions; Specific Industries; Specific groups of Citizens.

The proposed rule may increase wastewater treatment costs for some industries including coal mining and electric power production.

C. Economic Impact on Citizens/Public at Large.

Cost of improved wastewater treatment may be passed on to utility customers. Improved water quality may enhance the attractiveness of West Virginia as a travel destination and thereby increase the State's economic base.

Date: June 1, 1994

Signature of Agency Head or Authorized Representative

Frances E. Hunter

PROPOSED
LEGISLATIVE RULES
WATER RESOURCES BOARD
ENVIRONMENTAL QUALITY BOARD

SERIES 1
REQUIREMENTS GOVERNING WATER
QUALITY STANDARDS

§46-1-1. 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 ~~§20-5A-1~~ 22-11-2)

1.2. Authority. -- W. Va. Code ~~§20-5A-3~~ 22B-3-4

1.3. Filing Date. -- ~~July 26, 1993~~

1.4. Effective Date. -- ~~August 25, 1993~~

1.5. Repeal of former rule. -- This legislative rule repeals West Virginia Administrative Regulations, State Water Resources Board, ~~Chapter 20-5 and 5A Title 46, Series 1 (1991), "Requirements Governing Water Quality Standards", filed May 20, 1991~~ July 26, 1993.

§46-1-2. Definitions.

The following definitions in addition to those set forth in W. Va. Code ~~§20-5A-2~~ 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 State Health Department to assure that the water is safe for human consumption.

2.2. "Cumulative" means a pollutant which increases

in concentration in an organism by successive additions at different times or in different ways (bio-accumulation).

2.3. "Designated uses" are those uses specified in water quality standards for each water body or segment whether or not they are being attained. (See section 6.2)

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

2.35. The "Federal Act" means the Clean Water Act (also known as the Federal Water Pollution Control Act) Public Law 92-500, as amended by Public Law 100-4, 33 U.S.C. 1251, et seq.

2.46. "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. Included are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.

2.57. "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.

2.68. "Outstanding national resource waters" are those whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or State resource. (See section 7.3.)

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

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

b. Those water quality values which exist unaffected by the discharge, or direct or indirect deposit of, any solid, liquid or gaseous substance by any person.

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

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

2.102. "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.

2.113. "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.

2.124. The "State Act" or "State Law" shall mean the West Virginia Water Pollution Control Act, W. Va. Code §20-5a-1 22-11-1.

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

2.146. "Trout waters" are streams or stream segments which sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.

2.157. "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.

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

2.179. "Wetlands" include such areas as swamps, marshes, bogs, and other land subject to frequent saturation or inundation, and which normally support a prevalence of vegetation typically found where wet soil conditions prevail. 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.

2.1820. "Wet weather streams" are streams that flow only in direct response to precipitation or whose channels are at all times above the water table.

§46-1-3. 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 ~~State Water Resources~~ Environmental Quality Board 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:

- a. Distinctly visible floating or settleable solids, suspended solids, scum, foam or oily slicks;
- b. Deposits or sludge banks on the bottom;
- c. Odors in the vicinity of the waters;
- d. Taste or odor that would adversely affect the designated uses of the affected waters;
- e. Materials in concentrations which are harmful, hazardous or toxic to man, animal or aquatic life;
- f. Distinctly visible color;
- g. Concentrations of bacteria which may impair or interfere with the designated uses of the affected waters;
- h. Requiring an unreasonable degree of treatment for the production of potable water by modern water treatment processes as commonly employed; and
- 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.

§46-1-4. Anti-Degradation Policy.

4.1. It is the policy of the State of West Virginia that ~~instream water uses~~ the waters of the state shall be

maintained and protected as follows:

a. Existing instream 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 the water body on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards. ~~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. (See subsection d.)~~

~~b. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under Sections 301 (b) and 306 of the Federal Clean Water 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 body 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:~~

~~A. 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~~

~~B. Naturally-occurring pollutant concentrations prevent the attainment of the use; or~~

~~C. 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~~

~~D. 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~~

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

~~F. Physical conditions related to the natural features of the water body, 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.~~

~~G. 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.~~

~~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 Board shall follow the requirements for revision of water quality standards as required by W. Va. Code §20-5A-3 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 Board's administrative procedural regulations for applying for less restrictive uses or criteria shall be followed.~~

~~eb. With the exception of the provisions of Section 7.2.c of this series, t The existing trout and other high quality waters of the State must be maintained at their existing high quality unless it is determined after consultation with EPA and the Chief 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.~~

~~f. In addition, ¶the Board and the chief 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 for non-point source control.~~

A. High quality waters are those waters meeting

the definition at section 2.6 herein, and

B. High quality waters include but are not limited to the following:

(a) Streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code Section 22-13-1, and

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

c. In waters which constitute a water of special concern, no activities which result in the reduction of ambient water quality shall be allowed. Waters of special concern include:

A. All Federally designated rivers under the "Wild and Scenic Rivers Act" Public Law 95-542 as amended, 16 U.S.C. 1271, et seq.

B. All naturally reproducing trout streams.

C. All streams and other bodies of water in State and National Forests and Recreation Areas.

D. National Rivers. "National Parks and Recreation Act of 1978." Public Law 95-625, as amended, 16 U.S.C.1, et seq.

gd. In all cases, waters which constitute an outstanding national resource as designated in subsection 7.3.d 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 boundries of Wilderness Areas designated by The Wilderness Act (16 U.S.C. 1131 et seq.) within the State.

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

e. 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.

§46-1-5. Mixing Zones.

5.1. In the permit review and planning process or

upon the request of a permit applicant or permittee, the chief may establish on a case-by-case basis an appropriate mixing zone.

~~5.2. The following criteria shall be applied to the establishment of mixing zones:~~

~~a. Mixing zones shall:~~

~~A. Be kept as small as practical in area and length;~~

~~B. Not be used for, or considered as, a substitute for waste treatment;~~

~~C. Provide for as rapid a mixing as practical;~~

~~D. Not prevent the free passage of aquatic species or include spawning or nursery areas;~~

~~E. Not overlap a public water supply intake;~~

~~F. Not cause or contribute to any of the conditions prohibited in Section 3; and~~

~~G. Not interfere with any designated water use category.~~

~~5.3. The boundaries of the mixing zone shall reflect:~~

~~a. Receiving water body characteristics such as:~~

~~A. Water quality,~~

~~B. Local meteorology,~~

~~C. Flow regime (including low-flow records),~~

~~D. Magnitude of water exchange at point of discharge,~~

~~E. Stratification phenomena,~~

~~F. Waste capacity of the receiving system including retention time,~~

~~G. Turbulence and speed of flow,~~

~~H. Morphology of the receiving system as related to plume behavior and biological phenomena,~~

- ~~I. Designated water use categories, and~~
- ~~b. Discharge characteristics such as:
 - ~~A. Flow regime,~~
 - ~~B. Volume,~~
 - ~~C. Design,~~
 - ~~D. Location,~~
 - ~~E. Rate of mixing and dilution, and~~
 - ~~F. Plume behavior and mass-emission rates of constituents including knowledge of their persistence, toxicity, and chemical or physical behavior with time.~~~~

~~5.4. Where the seven (7) day, ten (10) year return frequency is 5 cfs or less, no mixing zone may be established.~~

~~5.5. In order to facilitate a determination or assessment of a mixing zone pursuant to this section, the chief may require a permit applicant or permittee to submit such information as deemed necessary.~~

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

a. The chief 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 chief in accordance with this section.

b. Concentrations of pollutants which exceed the acute criteria for protection of aquatic life set forth in Appendix E 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 chief. 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. 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 and criteria for the protection of human health from the consumption of fish tissue may be exceeded within the mixing zone but shall be met at the edge of the assigned mixing zone.

c. 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 endangered species.

d. 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.

e. 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.

f. 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 body.

g. Mixing zones shall not:

A. Be used for, or considered as, a substitute for technology-based requirements of the Clean Water Act and other applicable State and Federal laws.

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

C. Cause or contribute to any of the conditions prohibited in Section 46-1-3.

D. Be granted where instream waste concentration of a discharge is greater than 80%.

E. Overlap one another.

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

i. The Chief may waive the requirements of subsections (d) and (g)(B) above if a discharger provides an

acceptable demonstration of:

A. Information defining the actual boundaries of the mixing zone in question; and

B. Information and data proving no violation of subsection (c) and (f) above by the mixing zone in question.

j. Upon implementation of a mixing zone in a permit, the permittee shall provide documentation that demonstrates to the satisfaction of the Chief that the mixing zone is in compliance with the provisions outlined in subsections (b), (d) and (g)(B).

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

§46-1-6. 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 Clean Water 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.

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. (See subsection 4.1.d.)

b. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under Sections 301 (b) and 306 of the Federal Clean Water 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 body 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:

A. 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

B. Naturally-occurring pollutant concentrations prevent the attainment of the use; or

C. 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

D. 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

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

F. Physical conditions related to the natural features of the water body, 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.

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.

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 Board shall follow the requirements for revision of water quality standards as required by W. Va. Code §20-5A-322B-3-4 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 Board'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:

- a. All community domestic water supply systems;
- b. All non-community domestic water supply systems, (i.e. hospitals, schools, etc.);
- c. All private domestic water systems;
- d. All other surface water intakes where the water is used for human consumption; and
- e. Shall apply to the stream segment extending upstream from the intake for a distance as defined in subsection 7.2.a.B of this series. (See Appendix B for partial listing)

6.3. Category B -- Propagation and maintenance of fish and other aquatic life. -- This category includes:

- a. Category B1 -- Warm water fishery streams. -- Streams or stream segments which contain a fish population composed overwhelmingly of warm water species. (These are primarily sport fisheries and may be stocked with trout seasonally.)
- b. Category B2 -- Trout Waters. -- As defined in Section 2.146 (See Appendix A for a representative list.)
- c. Category B3 -- Small non-fishable streams. -- Streams or stream segments which because of their size or flow patterns do not offer sport fishing; they generally contain only populations of minnows, darters, aquatic invertebrates, etc.
- d. Category B4 -- Wetlands. -- As defined in section 2.17; certain numeric stream criteria may not be appropriate for application to wetlands (see Appendix E).

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.

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

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

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

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.

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

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

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)

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.

\$46-1-7. 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).

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

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:

A. S - Shenandoah River and all its

tributaries arising in West Virginia to the West Virginia - Virginia State line.

B. PC - Cacapon River and all its tributaries.

C. PSB - South Branch and all its tributaries.

D. PNB - North Branch and all tributaries to the North Branch arising in West Virginia.

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:

A. MC - Cheat River and all its tributaries except those listed below:

(a) MCB - Blackwater River and all its tributaries.

B. MW - West Fork River and all its tributaries.

C. MT - Tygart River and all its tributaries except those listed below:

(a) MTB - Buckhannon River and all its tributaries.

(b) MTM - Middle Fork River and all its tributaries.

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

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.

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

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

(a) LKH - Hughes River and all its

tributaries.

B. 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.

C. 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:

(a) KP - Pocatalico River and all its tributaries.

(b) KC - Coal River and all its tributaries.

(c) KE - Elk River and all its tributaries.

(d) KG - Gauley River. The Gauley River and all its tributaries excluding the following major tributaries which are designated as follows:

(A) KG-19 - Meadow River and all its tributaries.

(B) KG-34 - Cherry River and all its tributaries.

(C) KGC - Cranberry River and all its tributaries.

(D) KGW - Williams River and all its tributaries.

(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:

(A) KNG - Greenbrier River and all its tributaries.

(B) KNB - Bluestone River and all its tributaries.

(C) KN-60 - East River and all its tributaries.

(D) K(L)-81-(1) - Bluestone Lake.

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

(a) OGM - Mud River and all its tributaries.

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:

(a) 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:

a. Water Use Categories as described in Section 6.

A. 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.

B. Each segment extending upstream from the intake of a water supply public (Water Use Category A), for a distance of five (5) miles 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. Provided, however, that within a zone extending one half (1/2) mile above the intake, the Chief, Water Resources Section, Division of Natural Resources, may establish for any discharge, effluent limitations for the protection of human health that require additional removal of those pollutants. (If a watershed is not significantly larger than either of the two (2) zones above the intake, the water supply section may include the entire upstream watershed to its headwaters.

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: Exceptions do not apply to trout waters nor the requirements of Section 3.

c. Exceptions: Numeric Wwater quality standards

shall not apply: (See section 7.2.d for site specific revisions)

A. When the flow is less than 7Q10;

B. 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;

C. In the zone of initial dilution of any mixing zones which are established pursuant to Section 5 of these rules;

D. Where lesser quality is due to natural conditions. In such cases the naturally occurring values shall be the applicable criteria.

d. Site-specific applicability of water use categories and water quality criteria - State-wide water quality standards shall apply except where site-specific ~~water quality standards numeric criteria, variances or use removals~~ have been adopted for the State's waters as follows: approved following application and hearing, as provided in 46 C.S.R. 6. (See §§ 8.3 and 8.4) The following are approved site-specific criteria, variances and use removals:

A. James River - (Reserved)

B. Potomac River

(a) Except for the unnamed tributary of the South Branch of Buzzard Run above and below Prather Pond shall not have Water Use Category A; therefore may contain fluoride not to exceed 2.0 mg/l.

(b) Except that 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.

C. Shenandoah River - (Reserved)

D. Cacapon River - (Reserved)

E. South Branch - (Reserved)

F. North Branch

(a) Except that the Stony River downstream from the limit of the thermal mixing zone (as established by Board Order of 11/20/75) for the Mount Storm Lake

wastewater treatment facility to its confluence with the North Branch of the Potomac River is exempt from the 5°F above natural temperature rise; however, the maximum temperature outside the mixing zone shall not exceed 87°F at any time during the months of May through November and not exceed 73°F at any time during the months of December through April.

G. Monongahela River

(a) Except that flow in the main stem of the Monongahela River, as regulated by the Tygart Reservoir, operated by the U. S. Army Corps of Engineers, is based on a minimum flow of 345 cfs at Lock and Dam No. 8, river mile point 90.8. This exception does not apply to tributaries of the Monongahela River.

(b) Except that site-specific numeric criteria shall apply to ~~for~~ an unnamed tributary to the Monongahela River mainstem at approximately 3700 feet upstream of mile point 125, which may contain suspended solids not to exceed 60 mg/l, oil and grease not to exceed 15 mg/l, Ammonia-Nitrogen not to exceed 30 mg/l, total phenols not to exceed .10 mg/l, total cyanide not to exceed .05 mg/l, total manganese not to exceed 4 mg/l, total zinc not to exceed 1.5 mg/l, total copper not to exceed 1.0 mg/l, Benzene not to exceed .05 mg/l, Napthalene not to exceed .05 mg/l and Benzo (a) Pyrene not to exceed .05 mg/l and iron not to exceed 4 mg/l for the months June through November and 7 mg/l for the months of December through May.

H. Cheat River - (Reserved)

I. Blackwater River - (Reserved)

J. West Fork River - (Reserved)

K. Tygart River - (Reserved)

L. Buckhannon River - (Reserved)

M. Middle Fork River - (Reserved)

N. Youghiogheny River

(a) Water Use Categories A and E are excluded from the tributaries of the Youghiogheny River in West Virginia which flow into Maryland.

O. Ohio River Main Stem - (Reserved)

P. Ohio River Tributaries.

(a) Except that a 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 arsenic not to exceed 200 ug/l; selenium not to exceed 62 ug/l; and iron not to exceed 3.5 mg/l as a monthly average and 7 mg/l as a daily maximum.

(b) Except that site-specific numeric criteria shall apply to for that segment of Harmon Creek (0-97) from its confluence with the Ohio River to a point 2.2 miles upstream, which shall not have the Water Use Category A designation. Therefore, at any time the temperature shall not exceed 100°F, total iron shall not exceed 4.0 mg/l and total fluoride shall not exceed 2.0 mg/l, each as thirty (30) day average values to be determined from four (4) weekly samples.

(c) Except in the stretch of Cow Creek (0-55) from its mouth to a point approximately 2,300 feet upstream, the Water Use Category A shall not apply.

Q. Little Kanawha River. - (Reserved)

R. Hughes River - (Reserved)

S. Kanawha River Zone 1 - Main Stem

(a) For the Kanawha River main stem, Zone 1, Water Use Category A shall not apply; and

(b) The minimum flow shall be 1,960 cfs at the Charleston gauge.

T. Kanawha River Zone 2 and Tributaries.

(a) For the main stem of the Kanawha River only, the minimum flow shall be 1,896 cfs at mile point 72.

(b) Except the stretch between the mouth of Little Scary Creek (K-31) and the Little Scary impoundment shall not have Water Use Category A or B1 and shall have Water Use Category B3.; ~~therefore may contain~~ The following site-specific numeric criterion shall apply to that section: arsenic not to exceed 200 ug/l and selenium not to exceed 62 ug/l; and copper not to exceed 105 ug/l as a daily maximum nor 49 ug/l as a 4-day average.

(c) Except for Ward Hollow (K-39-A), a small tributary of Davis Creek which may contain chlorides not to exceed 540 mg/l.

(d) Except for Simmons Creek (K-54) from

its mouth to a point 1200 feet upstream to which the following site-specific numeric criterion shall have apply: a maximum daily temperature not to exceed 38°C (100°F) nor a monthly average temperature to exceed 34°C.

- U. Pocatalico River - (Reserved)
- V. Coal River - (Reserved)
- W. Elk River - (Reserved)
- X. Gauley River - (Reserved)
- Y. Meadow River - (Reserved)
- Z. Cherry River - (Reserved)
- AA. Cranberry River - (Reserved)
- BB. Williams River - (Reserved)
- CC. New River

(a) Except the stretch of Laurel Creek (KN-5), a tributary of the New River, from the confluence of Dempsey Branch and Laurel Creek to a point 1.7 miles below, where the site-specific numeric criterion for iron shall be 2.0 mg/l total iron, and from that point to the confluence of Laurel Creek and the New River, the site-specific numeric criterion for iron shall be 1.0 mg/l total iron.

- DD. Greenbrier River

(a) Water Use Category A and B2 shall not apply to that segment of the East Fork of the Greenbrier River (KNG-78) from the reservoir located at the tannery to the confluence with the West Fork; Provided that all trout water (B2) standards shall not be violated in the mainstem Greenbrier River.

- EE. Bluestone River - (Reserved)
- FF. Bluestone Lake

(a) Category E Water Uses are deleted in Bluestone Lake and temperature rise shall be limited to no more than 3°F above natural not to exceed 81°F at any time during the months of May through November and not to exceed 73°F at any time during December through April.

- GG. East River - (Reserved)

HH. Guyandotte River - (Reserved)

II. Mud River - (Reserved)

JJ. Big Sandy River - (Reserved)

KK. Tug Fork River - (Reserved)

~~7.3. Classified waters of the State.~~

~~a. High quality waters. High quality waters shall include but are not limited to all waters defined in Section 2.4.~~

~~b. All streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code §20-5B-1.~~

~~c. West Virginia High Quality Streams Fifth Edition, prepared by the Wildlife Resources Division, Department of Natural Resources (1986).~~

~~d. National Resource Waters. National Resource Waters include, but are not limited to, the following waters of the State:~~

~~A. All Federally designated rivers under the "Wild and Scenic Rivers Act", Public Law 95-542, as amended, 16 U.S.C. 1271, et seq.~~

~~e. National Rivers. "National Parks and Recreation Act of 1978." Public Law 95-625, as amended, 16 U.S.C. 1, et seq.~~

§46-1-8. Specific Water Quality Criteria.

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

a. Specific state (i.e. total, total recoverable, 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. (See also Series II, Section 7.3 of these regulations)

b. An "X" or numerical value in the use columns of Appendix E shall represent the applicable criteria.

c. Charts of water quality criteria in Appendix E shall be applied in accordance with major stream and use applications, Sections 6 and 7.

8.2. Criteria for Toxicants.

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 death case per one million persons (10^{-6}) and are indicated in Appendix E by an asterisk (*) with an endnote (b).

b. For Water Use Category B C, the criteria for organic carcinogens are for the protection against accumulation of those carcinogens in fish flesh in excess of the amount that would produce a cancer risk level of one in one million (10^{-6}) in humans.

c. 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.

8.3. Variances from Specific Water Quality

Criteria

a. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that the conditions outlined in subsections 6.1.b.A - F 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 Board at least every three years. In granting a variance, the requirements for revision of water quality standards in 46 CSR Series 6 shall be followed.

8.4. Site-specific numeric criteria. The Board may establish numeric criteria different from those set forth in Appendix E 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 Effects Ratio study pursuant to the procedures outlined in EPAs "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 Board. In adopting site-specific numeric criteria, the requirements for revision of water quality

standards set forth in 46 CSR 6 shall be followed.

§46-1-9. 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 and B2, such discharge may be regulated by the chief where necessary to protect State water 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 chief 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 chief 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:

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.

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 chief and shall submit all of the following in writing to the chief:

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

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

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: ~~EPA Ecological Research Series Publication, Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (600/4-85/013) 3rd Edition, March 1985~~ 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 (~~17th~~ 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 chief.

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 2.14.

<u>River Basin</u>	<u>County</u>	<u>Stream</u>
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	"	Evirtt'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	"	Mcores 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-	North Fork South Branch
	Pendleton	
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)
PSB	"	Seneca Creek
PSB	"	Laurel Fork
PSB	"	Big Run
PNB	Mineral	North Fork Patterson Creek
PNB	"	Fork 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	"	Eisey 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	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
MT	"	Big Run
MTB	Upshur-Randolph	Right Fork Buckhannon River
MTB	Lewis	
MTB	Upshur	Buckhannon River (Above Beans Mill)
MTB	Upshur	French Creek
MTB	Upshur- Randolph	Left Fork Right Fork
MIM	Upshur	Right Fork Middle Fork River
MIM	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	Webster	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	"	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	"	Middle Clear Creek and Laurel Run
KG	"	Leadow Creek
KG	Fayette	Wolf Creek
KG	Nicholas	Cherry River
KG	Greenbrier- Nicholas	Laurel Creek
KG	Greenbrier- Nicholas	North Fork Cherry River
KG	Greenbrier	Summit Lake (Impoundment)
KG	Greenbrier- Nicholas	South Fork Cherry 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

CATEGORY A - WATER SUPPLY PUBLIC

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

River Basin	County	Operating Company	Source
Shenandoah River			
S	Jefferson	Charlestown Water	Shenandoah River
Potomac River			
P	Jefferson	3-M Company	Turkey Run
P	"	Shepardstown 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, Imp.
PSE	"	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 R.
M	"	Morgantown Ordinance Works	Monongahela R.
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 Country Club	Cheat Lake - Lake Lynn
MC	"	Union District PSD	Cheat Lake - Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	"	Hopemount State Hospital	Snowy Creek
MC	"	Rowlesburg Water	Keyser Run & Cheat River
MC	"	Albright	Cheat River
MC	Tucker	Parsons Water	Shavers & Elk Lick Fork

APPENDIX B
CATEGORY A - WATER SUPPLY PUBLIC

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

River Basin	County	Operating Company	Source
Shenandoah River			
S	Jefferson	Charlestown Water	Shenandoah River
Potomac River			
P	Jefferson	B-M Company	Turkey Run
P	"	Shepardstown 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, Imp.
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 R.
M	"	Morgantown Ordinance Works	Monongahela R.
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	Black Run
MC	Preston	Fibair Inc.	Impoundment
MC	Monongalia	Cheat Neck PSD	Cheat Lake
MC	"	Lakeview Country Club	Cheat Lake - Lake Lynn
MC	"	Union District PSD	Cheat Lake - Lake Lynn
MC	"	Cooper's Rock State Park	Impoundment
MC	Preston	Kingwood Water	Cheat River
MC	"	Hopemount State Hospital	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	"	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 Park	Blackwater River
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	Deacons & Hinkle Creek
MW	"	Salem Water Bd.	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 Compressor 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	"	Easter 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

Ohio River

O	Zone 1	Hancock	Chester Water & Sewer	Ohio River
O	" "	Brooke	City of Weirton	Ohio River
O	" "	"	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	Cameron Water	Glass House Hollow
O	" "	"	New Urindahana Water System	Wheeling Creek
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 R.
LKH	"	Harrisville Water	North Fork Hughes R.
LKH	"	Pennsboro Water	North Fork Hughes R.

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.- Beards Fork	Unnamed Tributary Kanawha River
K	Kanawha	Midland Trail School	Impoundment
K	"	Cedar Coal Co.	Impoundment
K	Fayette	Elkem Metals Co.	Kanawha River
K	"	Deepwater PSD	Kanawha River
K	"	Kanawha Falls PSD	Kanawha River
K	"	W.V. Water-Monthomery	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	"	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 Dist.	Elk River
KE	Kanawha	Pinch PSD	Elk River
KE	Clay	Clay Waterworks	Elk River
KE	"	Proccious PSD	Elk River
KE	Braxton	Flatwoods-Cancee 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 R.

New River

KN	Fayette	Ames Heights Water	Mill Creek
KN	"	Mt. Hope Water	Impounded Mine (Surface)
KN	"	Ansted Municipal Water	Mill Creek
KN	"	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- Brush Creek
KNB	"	Lashmeet PSD	Impoundment
KNB	"	Pinnacle Water Assoc.	Mine
KNB	"	W.V. Water Bluefield	Impoundment

Greenbrier River

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

Guyandotte River

OG	Cabell	Salt Rock PSD	Guyandotte River
OG	Lincoln	West Hamlin Water	Guyandotte River
OG	Logan	Logan Water Board	Guyandotte River
OG	"	Man Water Works	Guyandotte River
OG	"	Buffalo Creek PSD	Buffalo Creek/ Mine/Wells
OG	"	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	"	Pineville Water	Pinnacle Creek/Guyandotte River

OG	Raleigh	Raleigh Co. PSD-Amigo	Tommy Creek
OGM	Cabell	Milton Water Works	Guyandotte River
OGM	"	Culloden PSD	Indian Fork Creek
OGM	Putnam	Hurricane Municipal Water	Impoundment
OGM	"	Lake Washington PSD	Lake Washington
Big Sandy River			
ES	Wayne	Kenova Municipal Water	Big Sandy River
ES	"	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.

<u>River Basin</u>	<u>County</u>	<u>Station Name</u>	<u>Operating Company</u>
Monongahela River			
M	Monongalia	Fort Martin Station	Monongahela Power
M	Marion	Rivesville Station	Monongahela Power
MC	Preston	Albright Station	Monongahela Power
MW	Harrison	Harrison Station	Monongahela Power
Potomac	Grant	Mt. Storm Power Station	Virginia Electric & Power Company
Ohio River			
O	Zone 1	Wetzel	Hannibal(Hydro)
O	" "	Marshall	Kamer
O	" "	"	Mitchell
O	" "	Pleasants	Pleasants Station
O	" "	"	Willow Island Station
O	" "	Mason	Phillip Sporn Plant
O	" "	"	Racine (Hydro)
O	" "	"	Mountaineer
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.

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
Monongahela			
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 MW-38	West Fork River Stonecoal Creek/ Stonecoal Lake	Harrison Lewis
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	R D Bailey Lake	Wycming
	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-46-Q	Stephens Branch/ Lake Stephens	Raleigh
	KE	Elk River	Kanawha/Clay/ Braxton/Webster/ Randolph
	KE	Sutton Lake	Braxton
	KN	New River	Fayete/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
	KNB	Blueston River/ Bluestone Lake	Summers
	KNB	North Fork Brush Creek	Mercer
	KG	Gauley River	Webster
	KG	Gauley River/ Summersville Lake	Nicholas
	XGW	Williams River	Webster

APPENDIX E

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

8.1 Aluminum (ug/l) Not to exceed:	<u>750</u>	<u>748</u> <u>87</u>	<u>750</u>	87		
8.2 Ammonia (ug/l): Un-ionized ammonia (UA) shall be determined from values of total ammonia-N, pH and temperature according to the following equation: $UA = \frac{1.2(\text{total ammonia-N})}{1+10^{(pKa-pH)}}$ where pKa = 0.0902 + 2730/(273.2 + T) and T = temperature (°C) The concentration of un-ionized ammonia (NH3) shall not exceed 50 ug/l. The concentration of un-ionized ammonia shall not exceed 20 ug/l.		50				50 20

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

8.2.1 Acute and chronic aquatic life criteria for ammonia shall be determined using the tables and formulae in the National Criteria section of USEPAS Ambient Water Quality Criteria for Ammonia - 1984 (EPA 440/5-85-001, January 1985)	X	X	X	X						
8.3 Antimony (ug/l) Not to exceed:							4300	14		
8.4 Arsenic ^b (ug/l) Not to exceed:							50	50	100	
8.4.1 Trivalent Arsenic Not to exceed:	360	190	360	190			190			
8.5 Barium (mg/l) Not to exceed:								1.0		
8.6 Beryllium ^b (ngug/l)		130		130				7.7	.0077	

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

8.7 Cadmium (ug/l) Hardness Soluble Cd (mg/l CaCO ₃) 0 - 35 1.0 36 - 75 2.0 76 - 150 5.0 > 150 10.0							X		
8.7.1 Not to exceed 10 ug/l in the Ohio River (0 Zone 1) main stem (see section 7.1.d)									X
8.7.2 Not to exceed 0.4 ug/l where hardness is less than 75 mg/l as CaCO ₃ and 1.2 ug/l in water where hardness is greater than 75 mg/l as CaCO ₃						X			
8.7.3 The four-day average concentration of total recoverable cadmium shall not exceed the value determined by the following equation: $Cd = e^{(0.7852[\ln(\text{hardness})] - 3.490)}$							X	X	X

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

8.7.4 <u>The one-hour average concentration of total recoverable cadmium shall not exceed the value determined by the following equation:</u> $Cd = e^{(1.128[\ln(\text{hardness})] - 3.826)}$	X			X				
8.8 Chloride (mg/l) Not to exceed:	860	250 230	860	250 230	250	250	250	
8.9 Copper (ug/l) Not to exceed:						1000		
8.9.1 <u>Not to exceed the four-day average concentration of total recoverable copper shall not exceed the value determined by the following equation^a:</u> $Cu = e^{(0.8545[\ln(\text{hardness})] - 1.465)}$	X			X				

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

8.9.2 The one-hour average concentration of total recoverable copper shall not exceed the value determined by the following equation ^a : $Cu = e^{(0.9422(\ln(\text{hardness})) - 1.464)}$									
8.10 Cyanide (ug/l) (As free cyanide HCN+CN ⁻) Not to exceed:	X								
8.11 Dissolved Oxygen ^f : not less than 5 mg/l at any time.	22	5.0		22	5.0	5.0	5.0		
8.11.1 Kanawha River main stem, Zone 1 - Not less than 4.0 mg/l at any time.		X					X		

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

<p>8.11.2 Ohio River main stem - the average concentration shall not be less than 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time or place outside any established mixing zone - provided that a minimum of 5.0 mg/l at any time is maintained during the April 15-June 15 spawning season.</p>								
<p>8.11.3. Not less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.</p>	X			X				

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

<p>8.12 Fecal Coliform: Maximum allowable level of fecal coliform content for Primary 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.</p>								
<p>8.12.1 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.</p>					X	X	X	

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

8.13 Fluoride (mg/l) Not to exceed:								1.4	
8.13.1 Not to exceed 2.0 for category D uses									X
8.14 Hexavalent chromium (ug/l) Not to exceed:	16	10 11	16	7.2	50				
8.15 Iron ^c (mg/l) Not to exceed:		1.5		0.5				1.5	

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

<p>8.15.1 Effluent limitations which may result in a concentration of up to 3.5 mg/l total iron in the stream are allowable upon a demonstration to the Chief by the applicant that such concentration will not have an adverse impact upon designated stream uses. This demonstration is subject to EPA approval and must show either: (1) that the stream is supporting designated uses while containing total iron concentrations higher than the applicable criteria or (2) the stream does not have an aquatic life use to protect. Notwithstanding Section 4 herein, this demonstration shall be the only demonstration required before the Chief and the Board with respect to</p>							
---	--	--	--	--	--	--	--

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

water quality related effluent limitations. This exception does not apply to trout waters.									
8.16 Lead (ug/l) Not to exceed:			X						50
8.16.1 The four-day average concentration of <u>total recoverable lead</u> shall not exceed the value determined by the following equation ^a : $Pb = e^{(1.273[\ln(\text{hardness})]-4.705)}$							X		
8.16.2 The one-hour average concentration of <u>total recoverable lead</u> shall not exceed the value determined by the following equation ^a : $Pb = e^{(1.273[\ln(\text{hardness})]-1.46)}$								X	
8.17 Manganese (mg/l) Not to exceed:									1.0
									1.0

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

<p>8.17.1 Effluent limitations which may result in a concentration up to 2.0 mg/l Mn in the stream are allowable upon a demonstration to the Chief by the applicant that such concentration will not have an adverse impact upon designated stream uses. This demonstration is subject to EPA approval and must show either: (1) the stream is supporting designated uses while containing Mn concentrations higher than the applicable criteria, or (2) the stream does not have an aquatic life use to protect. Notwithstanding § 4 herein this demonstration shall be the only one required before the Chief and Board regarding water quality related effluent limitations.</p>						X
---	--	--	--	--	--	---

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

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 shall not exceed (ug/l):	2.4		2.4					0.20 0.15	0.5 0.14
8.18.2 Methylmercury (water column) Not to exceed (ug/l):					.012				
8.19 Nickel (ug/l) Not to exceed:						50	4600	510	
8.19.1 The four-day average concentration of nickel shall not exceed the value determined by the following equation ⁷ : $Ni = e^{(0.846[\ln(\text{hardness})] + 1.1645)}$					X				

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

8.19.2 The one-hour average concentration of total recoverable nickel shall not exceed the value determined by the following equation ^a : $Ni = e^{(0.847[\ln(\text{hardness})]+3.361)}$	X				X				
8.20 Nitrate (as Nitrate-N) (mg/l)							10		
8.21 Nitrite (as Nitrite-N) (mg/l) Not to exceed:	1.0				.060				
8.22 Organics									
Chlordane ^b (ng/l)	<u>2400</u>	<u>0.46</u> <u>4.3</u>	<u>2400</u>		<u>0.46</u> <u>4.3</u>	<u>0.46</u>		<u>0.46</u>	<u>0.46</u>
DDT ^b (ng/l)	<u>1100</u>	<u>0.024</u> <u>1.0</u>	<u>1100</u>		<u>0.024</u> <u>1.0</u>	<u>0.024</u>		<u>0.024</u>	<u>0.024</u>
Aldrin ^b (ng/l)	<u>3.0</u>	<u>0.071</u>	<u>3.0</u>		<u>0.071</u>	<u>0.071</u>		<u>0.071</u>	<u>0.071</u>
Dieldrin ^b (ng/l)	<u>2500</u>	<u>0.071</u> <u>1.9</u>	<u>2500</u>		<u>0.071</u> <u>1.9</u>	<u>0.071</u>		<u>0.071</u>	<u>0.071</u>

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

Endrin (ug ng/l)	<u>180</u>	<u>0.023</u> 2.3	<u>180</u>	<u>0.023</u> 2.3	<u>0.023</u> 2.3	<u>0.023</u> 2.3	<u>0.023</u> 2.3	<u>0.023</u> 2.3
Toxaphene ^b (ng/l)	<u>730</u>	<u>0.71</u> 0.2	<u>730</u>	<u>0.71</u> 0.2	<u>0.71</u> 0.73	<u>0.71</u> 0.73	<u>0.71</u> 0.73	<u>0.71</u> 0.73
PCB ^b (ng/l)		<u>0.079</u> 14.0		<u>0.079</u> 14.0	<u>0.079</u> 0.045	<u>0.079</u> 0.044	<u>0.079</u> 0.044	<u>0.079</u> 0.045
Methoxychlor (ug/l)		<u>0.03</u>		<u>0.03</u>	<u>0.03</u>	<u>0.03</u>	<u>0.03</u>	<u>0.03</u>
Dioxin (2,3,7,8-TCDD) ^b (pg/l)		<u>0.014</u>		<u>0.014</u>	<u>0.014</u>	<u>0.014</u>	<u>0.014</u>	<u>0.014</u>
Acrylonitrile ^b (ug/l)		<u>0.77</u>		<u>0.77</u>	<u>0.66</u>	<u>0.66</u>	<u>0.66</u>	<u>0.66</u>
Benzene ^b (ug/l)		<u>40</u>		<u>40</u>	<u>71</u>	<u>71</u>	<u>71</u>	<u>71</u>
1,2-dichlorobenzene (mg/l)		<u>17</u>		<u>17</u>	<u>17</u>	<u>17</u>	<u>17</u>	<u>17</u>
1,3-dichlorobenzene (mg/l)		<u>2.6</u>		<u>2.6</u>	<u>2.6</u>	<u>2.6</u>	<u>2.6</u>	<u>2.6</u>
1,4-dichlorobenzene (mg/l)		<u>2.6</u>		<u>2.6</u>	<u>2.6</u>	<u>2.6</u>	<u>2.6</u>	<u>2.6</u>
2,4-dinitrotoluene ^b (ug/l)		<u>9.1</u>		<u>9.1</u>	<u>9.1</u>	<u>9.1</u>	<u>9.1</u>	<u>9.1</u>

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

Hexachlorobenzene ^b (ng/l)		0.74			0.74	0.77		0.72	
Carbon tetrachloride ^b (ug/l)		4.4			4.4	4.4		0.25	
Chloroform ^b (ug/l)		15.7			15.7	470		0.19	
Halomethanes (ug/l)		15.7			15.7	15.7		0.19	
1,2-dichloroethane ^b (ug/l)		98.6			98.6	99		0.035	
1,1,1-trichloroethane ^b (mg/l)		67.3			67.3			1.2 12	
1,1,2,2-tetrachloroethane (ug/l)		10.7			10.7	11		0.17	
1,1-dichloroethylene ^b (ug/l)		1.9			1.9	3.2		0.03	
Trichloroethylene ^b (ug/l)		92.4			92.4	81		3.1 2.7	
Tetrachloroethylene ^b (ug/l)		8.9			8.9	8.85		0.8	

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

Toluene ^b (mg/l)		424			424		200		14.3 6.8	
Polynuclear Aromatic Hydrocarbons (PAH) ^b (ng ug/l)		31.1			31.1		0.031		2.8 .0028	
Phthalate esters (ug/l)		3.0			3.0					
Vinyl chloride ^b (chloroethene) (ug/l)		525			525		525		2.0	
alpha-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			0.08	2.0	0.063		0.019	
Chlorobenzene (mg/l)							21		0.68	
Ethylbenzene (mg/l)							29		3.1	
Heptachlor ^b (ng/l)	520	3.8			3.8	520	0.21		0.21	

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

2-methyl-4,6-Dinitrophenol (ug/l)						765	13.4	
Fluoranthene (ug/l)						370	300	
8.22.1 The organic chemicals listed in §8.22 shall not exceed the specified water quality criteria. When the specified criteria are less than the practical laboratory quantification level, instream values will be calculated from discharge concentrations and flow rates and from fish body burden, where applicable.								

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

8.22.2 The following body burden criteria shall not be exceeded in edible tissues of fish: <u>Parameter</u> <u>Body Burden</u> Chlordane 1.0 (ug/g) DDT 0.1 (ug/g) Aldrin 0.3 (ug/g) Dieldrin 0.3 (ug/g) Endrin 1.0 (ug/g) Toxaphene 2.0 (ug/g) PCB 6.4 (pg/g) Dioxin							
8.23 pH ^c No values below 6.0 nor above 9.0. Higher values due to photosynthetic activity may be tolerated.	X	X	X	X	X	X	X
8.24 Phenolic materials (ug/l) Not to exceed:			5				5

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

8.25 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
--	--	--	--	---	--	--	---	---

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

<p>8.25.1 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.</p>								
<p>8.26 Selenium (ug/l) Not to exceed:</p>	20	5	5	20	5	X	X	X
								10

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

8.27 Silver										
<u>Hardness</u>	<u>Silver (ug/l)</u>									
0-50	1									
51-100	4									
101-200	12									
>201	24			X						
8.27.1										
0-50	1									
51-100	4									
101-200	12									
201-400	24									
401-500	30									
501-600	43			X						
8.27.2 <u>The one-hour average concentration of total recoverable silver shall not exceed the value determined by the following equation:</u>										
$Ag = e^{(1.72[\ln(\text{hardness})] - 6.52)}$							X			
8.28 <u>Temperature rise shall be</u>										

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

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

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

<p>8.28.1 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.</p>	X				<p>8.28.2 For the Bluestone R (KNB), Bluestone Lake (KN-60) East River (KNE), New River (KN), Gauley R. (KG) and Greenbrier River (KNG): Temperature rise shall be limited to no more than 5°F above natural temperature, not to exceed 81°F at any time during the months of May through November and not to exceed 73°F at any time during December through April.</p>	X			
---	---	--	--	--	--	---	--	--	--

PARAMETER	USE DESIGNATION						ALL OTHER USES											
	AQUATIC LIFE			HUMAN HEALTH		CHRON ²												
	B1, 3, 4	B2	C ³	A ⁴														
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²														
<p>8.28.3 No heated effluents will be discharged in the vicinity of spawning areas. The maximum temperatures for cold waters are expressed in the following table:</p> <table border="1"> <thead> <tr> <th></th> <th>Daily Mean °F</th> <th>Hourly Max °F</th> </tr> </thead> <tbody> <tr> <td>Oct-Apr</td> <td>50</td> <td>55</td> </tr> <tr> <td>Sep-May</td> <td>58</td> <td>62</td> </tr> <tr> <td>Jun-Aug</td> <td>66</td> <td>70</td> </tr> </tbody> </table>		Daily Mean °F	Hourly Max °F	Oct-Apr	50	55	Sep-May	58	62	Jun-Aug	66	70				X		
	Daily Mean °F	Hourly Max °F																
Oct-Apr	50	55																
Sep-May	58	62																
Jun-Aug	66	70																

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

8.30 Threshold odor ^c Not to exceed a threshold odor number of 8 at 104°F as a daily average.		X			X		X	
8.31 Total Residual Chlorine (ug/l - measured by amperometric or equivalent method) Not to exceed 10/ug/l as measured by the amperometric or equivalent method. Not to exceed:	19							
8.31.1 No chlorinated discharge allowed						10	10	
8.31.2 The following chart may be used to derive the criteria instead of the above fixed (10 ug/l) figure: (Mattice and Zittle Scale)					X			

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

<p>8.32 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.</p>							
--	--	--	--	--	--	--	--

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

<p>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.</p>							

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

8.33.1							
0-50 40							
51-80 75							
81-120 90							
121-160 110							
161-200 130							
201-240 150							
241-280 175							
281-300 220							
301-320 270							
321-340 320							
341-400 370							
>401 600							
The four-day average concentration of total recoverable zinc shall not exceed the value determined by the following equation: Zn = e ^{(0.8773[ln(hardness)]+0.7614)}							X
							X

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

8.33.2 The one-hour average concentration of total recoverable zinc shall not exceed the value determined by the following equation ¹ : $Zn = e^{(0.8773(\ln(\text{hardness})) + 0.8604)}$									
8.33.3 Net to exceed 47 ug/l	X			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.
- 4 These criteria have been calculated to protect human health from toxic effects through drinking water and fish consumption, unless otherwise noted.

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

a Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use is this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.

b Known or suspected carcinogen. Human health standards are for a risk level of 10⁻⁶

c May not be applicable to wetlands (B4) - site-specific criteria are desirable.

BEFORE THE WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD

IN RE: Public Hearing on Proposed Amendments and
Revisions to Title 46 Legislative Rules
Water Resources Board Series 1

Transcript of public hearing held in the
above-styled matter at a hearing held before the West
Virginia Environmental Quality Board commencing at
7:00 p.m., on the 7th day of July, 1994, at the
hearing room located at 1615 Washington Street, East,
Charleston, West Virginia, pursuant to public notice
dated June 1, 1994.

RECEIVED

JUL 14 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

BOARD MEMBERS PRESENT:

DOCTOR CHARLES R. JENKINS, CHAIRMAN

DOCTOR EDWARD M. SNYDER,

SARAH LEE NEAL

ELIZABETH M. CHATFIELD, TECHNICAL ADVISOR

FRANCES E. HUNTER, EXECUTIVE SECRETARY

CAROLYN H. RAY
Certified Court Reporter
309 Eureka Road
Charleston, West Virginia 25314
(304) 346-4345

ORAL STATEMENTS	PAGE
Gene Current	5
Richard Herd	8
William Samples	11
K. O. Damron	16
Karen Price	19

CHAIRMAN JENKINS: Good evening. I want to welcome you all to this public hearing of the Environmental Quality Board. I'm Bob Jenkins, the Chairman of the Board. The lady in blue over here is Sarah Lee Neal from Greenbrier County and next to here is Ed Snyder from Shepherdstown. I'm from Monongalia County and we are the three members representing the board tonight.

In addition to the board members, we have Libby Chatfield here who is our technical advisor to the board, and the lady that keeps us all going straight, Fran Hunter back here, who has been with the board many years and is the one who I always think of as really knowing what's going on around here.

The purpose of this evening's meeting is to discuss proposed revisions to the water quality standards of Opequon Creek and revisions to the requirements governing the water quality standards generally.

Proper notice of this hearing has been published in the Charleston newspapers on June 1st and 3rd of 1994 and rules and notices were properly

filed with the Secretary of State's Office on June 1st, 1994.

There are in the room sign-in sheets. One for those of you who are attending the meeting and a second for those of you to wish to speak. I have the one right here for those who wish to speak and particularly if your name is not on this list, please come up and put your name on it at this time.

If you've reviewed our stream standard revisions, I hope you appreciate the work that Libby has done. There have been pretty extensive, I think, clarifications and modifications to these regulations to accommodate new EPA regulations. These changes have been incorporated and presented in this revision that most of you have. Is this a copy of the revisions here? So if you don't have a copy of the revisions, please feel free to take one.

We'll now proceed with the public comment period and I will be inviting you to come up to the podium here and speak. As you can observe, this is all being recorded by a court reporter and so at this time we'll proceed.

Is there anyone who wants to get their name

on this list to speak? Is there anyone who is not on our attendance sheet? We have someone there, Fran.

Okay, thank you.

Would Gene Current from Weirton Steel please come to the podium.

MR. CURRENT: Thank you. Good evening, my name is Gene Current and I'm Director of Environmental Control at the Weirton Steel Corporation. I do appreciate the opportunity to present comments to the Environmental Quality Board at this public meeting tonight.

Weirton Steel is an employee-owned company located in Weirton, West Virginia. It owns and operates an integrated steel making facility which draws water from and discharges treated effluents into the Ohio River. And Weirton Steel is West Virginia's largest industrial employer and taxpayer employing approximately 6,000 people. In addition to its employees, Weirton Steel indirectly supports virtually all of the surrounding businesses in the Weirton area. Weirton Steel is committed to a healthy environment.

During the past ten years we have expended

103 million dollars for environmental control facilities. That represents approximately 13 percent of the total capital expended over the ten-year period. As an example, I might say that the average, according to a Department of Commerce survey, is in the 7 to 8 percent range. Seventy three million dollars of these expenditures were specifically for waste water treatment facilities.

Weirton is here today because it is very concerned about the West Virginia DEP's interpretation of Section 7.2.A.B of the water quality standards. As originally envisioned by the Water Resources Board and as endorsed by the US Environmental Protection Agency, 7.2.A.B would protect public drinking water discharges or intakes, I should say, from undue adverse impacts caused by point source discharges. This protection would be balanced against legitimate need of industry to utilize our state's water resources by providing discharges with the opportunity to demonstrate that the discharges do not have an adverse impact on these intakes.

As currently interpreted by the West

Virginia DEP, however, 7.2.A.B is being used to impose overly stringent water quality based end of pipe effluent limitations on all discharges located within five miles upstream of a drinking water intake regardless of the actual impact or lack thereof on the intake. Last week on June 30, Weirton Steel was issued a renewal NPDES permit which imposes overly stringent water quality based effluent limitations on two of its discharges to the Ohio River. Weirton Steel considers the achievement of these limitations to be cost prohibitive and as a result the permit must be appealed. The successful appeal to this permit is essential to Weirton Steel because based on EPA's interpretation and the method in which it's imposed, this interpretation into the NPDES permit would have devastating economic and social consequences on Weirton Steel in the community and these consequences would occur despite the fact that Weirton Steel's discharges are not having an adverse impact on the downstream drinking water intakes, a fact which Weirton Steel has offered to demonstrate to the West Virginia DEP. To date, however, Weirton Steel has been informed that such a demonstration is

irrelevant under the DEP's interpretation of Section 7.2.A.B.

Weirton Steel urges the Environmental Quality Board to seriously reconsider this issue and to revise Section 7.2.A.B such that it is expressly consistent with the original intent of the Water Resources Board and the US Environmental Protection Agency.

In addition to submitting a comprehensive written document on this and related issues, Weirton Steel stands ready to provide additional information or otherwise participate in this process in any way the Environmental Quality Board sees fit. I thank you very much for your time and your consideration.

CHAIRMAN JENKINS: Thank you, Mr. Current.

Next is Richard Herd from Allegheny Power Service Corporation.

RICHARD HERD: Good evening. I am Richard Herd and I am supervisor of Water Quality and Solid Waste for Allegheny Power Service. I'm here representing Monongahela Power, an electric utility that services the northern half of West Virginia and the adjacent southeastern portion of Ohio.

In the interest of brevity, I've prepared a statement this evening but I think you folks can read it just as well as I can.

I'd like to point out several factors that are causing Monongahela Power serious adverse consequences, cost consequences in terms of the water quality based effluent limitations that are being issued in some of our NPDES permits.

We have six power stations in northern Virginia and six associated coal combustion disposal sites. These disposal sites for the most part discharge to very small flow streams. The streams have obviously very low assimilative capacity and the Office of Water is applying water quality based effluent limitations as end of pipe effluent limitations. We don't take issue with the approach that the office is pursuing. However, we are requesting in preliminary comments we submitted to you folks urging you to look at several ways that EPA is allowing states to relief in implementing water quality based effluent limitations. Namely, those are the fact that EPA now recognizes that criteria can be adopted at the state level in terms of

dissolved rather than a total concentration and the state's, the Board's Water Quality criteria are not defined as either total and/or dissolved metal concentration.

We would urge you to accept or adopt the EPA guidance on this issue and adopt at least the metal, metal alloy criteria as dissolved. We also urge the Board to recognize that some of your criteria are at or below the minimum analytical detection quantitation limit and when those are applied in permits we cannot accurately measure with a significant degree of competence and report that information to the state and feel that we're being adequately protected from enforcement action.

Some of those limitations that are being applied there are so much analytical variability at those low levels that there is approximately a 50 percent error rate of being either detected or not being in the sample at all, and this is resulting in what we consider to be adverse consequences or risks for the corporation.

We're concerned not only about the factor that there may be penalties applied but also recent

SEC, Securities and Exchange Commission rules require us to report any potential penalty that might result in \$100,000 cost in our SEC filings, and that potentially can adversely impact the financial standing in a corporation. So we're asking you to look at these two issues very closely.

They're not specifically water quality derivation issues. They're more the implementation issues and how these very low numbers are being applied in the permits.

I would urge you to read our comments, both the preliminary comments that provided EPA supporting information as well as the documentation we've submitted here tonight. Thanks.

CHAIRMAN JENKINS: Thank you.

Mr. Samples?

WILLIAM SAMPLES: My name is William Samples. I'm Director of Environmental Control for Wheeling-Pittsburgh Steel Corporation. Wheeling-Pittsburgh Steel is like Weirton, a major integrated steel producer. We specialize in flat rolled products. Our headquarters is in Wheeling and we have major facilities located along the Ohio River in

the northern panhandle and then across the river in Ohio as well, and we use the Ohio River very extensively. It's one of our major assets. We withdraw water for many of our processes and major amounts of cooling water from the river. Then after appropriate treatment, we discharge that back to the river and we think with very little consequence. So that our existence as a viable steel producer depends upon the Ohio River, it depends upon the quality of the river, not only for intake but for acceptance of our waste, and we feel that it's currently doing a very adequate job of both of those.

But as a major user of the Ohio River we are very concerned about its quality and then also about any proposed modifications to the regulations that govern that quality. In terms of the present proposals, we're also very concerned whether or not your proposals are in keeping with the policy as stated in the introduction to your regulations and, specifically, whether or not these proposals impact the expansion of employment opportunities as you state and also whether or not there is provision of permanent foundation for a healthy industrial

development.

Wheeling-Pittsburgh Steel thinks that they are indeed more stringent than necessary to assure the necessary purity and quality of the water and that they may indeed affect employment and industrial development.

In fact, we believe that they're so stringent that they could really deter both employment and industrial development and if you do have standards that are more stringent than necessary, it simply means more environmental expenditures that are not necessary.

Wheeling Pittsburgh for one and I doubt if we're alone in the state, we essentially need money now for new processes for modernization not only to assure our own corporate viability to but assure the continued employment of our employees.

So while we will be filing more formal written statements, I'd just like to talk about a couple of the points that really do bother us considerably about your proposals.

One of those is the same one that Weirton Steel had comment on, 7.2.A.B, the one about the

quality of the discharge if it's within five miles of a public water supply having to meet the water quality criteria at the end of the pipe. We have two discharges at Follansbee, West Virginia, that are within five miles of a public water discharge intake. That public water intake, by the way, is a brand new one. It's only a few months old. Hooverson Heights Public Water Service District installed a river intake only very recently and I think certainly they took into account quality of the Ohio River when they made the decision to do that.

Now, that they have installed the intake they're withdrawing the water, they are treating it, they are using it and as far as I know, it is perfectly acceptable. We have lots of employees of our company that drink that water. After all of this, is it now really necessary to force us to treat our waters any further? I really don't think it is.

In addition, we have just completed, in fact just last week, we put on line for the first time a new supplementary treatment facility at our coke plant, very inexpensive. Only eight and a half million dollars, all designed to meet the current

criteria out there for, in particular, cyanide. And you've taken your cyanide standard and converted it from free cyanide to total cyanide without changing the numerical limitation and since complex cyanides which make up a part of total cyanide are orders of magnitude less toxic than free cyanide, in many cases you have now made your new standard in that orders of magnitude more stringent.

Our new facility was built to meet the free cyanide standard. It is not designed, cannot be operated to meet the total cyanide standard and, frankly, we know of no technology that will help us do that. So these two points I think we need relief.

We will attempt between now and the deadline for submittal of written comments to make some suggestions as to how we feel that might be done. I'm hoping tonight to hear some suggestions from others that maybe they have been able to figure this out. Anyway, we do recognize the task that lies before you as a board and we sympathize with you but we do urge you very very much to look at this very seriously not only from a water quality point of view but from the economic needs of West Virginia as well

and in particular those in the northern panhandle.
Thank you very much.

CHAIRMAN JENKINS: Thank you, Mr. Samples.

David Yaussy? Is David here?

MR. YAUSSY: I must have ended up signing
the wrong list.

CHAIRMAN JENKINS: K. O. Damron.

MR. DAMRON: Good evening. I'm K. O.
Damron, Vice-President of West Virginia Mining and
Reclamation Association. Our trade association has
125 member companies that are coal companies and 200
other companies that provide products and services to
the coal industry. We greatly appreciate the
opportunity to speak publicly about the proposed new
rule.

The West Virginia coal industry, as many of
you know, is an industry that has very fragile
economics. The days of us having a small opportunity
to mine and sell our coal and have it used in close
proximity to home and kind of have a captured market
are days of the past. We are in fact not only in
direct competition with other states who have
producing coal companies but we're in competition

with the entire world and that's certainly evidenced by the fact that West Virginia is the largest exporting state for coal in the United States and in 1993 the United States imported over 7 million tons of coal from other countries. Countries like Columbia, Venezuela, Indonesia, places that do not hold the same environmental standards, safety standards or quality of life that we offer both the citizens around our operations and offer our employees.

So we ask you to take in consideration the fact that any change of any standard in West Virginia that might be a negative change will significantly negatively impact our industry.

A recent study by the West Virginia Coal Association, a sister trade organization to my association, has revealed that one in every three business tax dollars collected in West Virginia comes from the coal industry and one in every ten dollars of payroll in West Virginia is paid by the West Virginia Coal Industry. So we are still a significant player and we hope that you will consider that with the new changes that you make.

I have some preliminary written comments for you today that involve some of the definitions that you have in the new proposed rule. I still have comment letters out to the members of our organization and anticipate response by early in the week and I understand your comment period will end on the 13th and I will have a more comprehensive written document for you at that time.

We do applaud your efforts to include two new definitions of re-mining in your standards. However, your definitions are more restrictive than we find in the federal standard and the Federal Register based on the Federal Energy Act of 1992 and we'd ask that you re-visit that. That may well have been an oversight on your part and not intentional.

We are also concerned any time that you change the definition of protected stream or protected watershed or how a new stream gets on the list of protected watersheds because protected areas have a connotation of no commercial or industrial use and there are a large number of areas in West Virginia today that are not open for commercial or industrial use. Any time you add a protected area,

you restrict the opportunities for jobs in West Virginia.

There are some other definitions that need to be reviewed. We are reviewing those now and I hope to provide those to you by no later than the 13th. We do again thank you for the opportunity to appear publicly and to present our written comments and we hope that you'll remember that coal is an important part of West Virginia and we respect the fact that this board may well understand that. Thank you very much.

CHAIRMAN JENKINS: Thank you, Mr. Damron.

The next speaker is Karen Price from the West Virginia Manufacturers Association.

MS. PRICE: Thank you. My name is Karen Price and I'm President of the West Virginia Manufacturers Association and on behalf of the association I want to thank the board for the opportunity to comment on the proposed revisions to West Virginia's water quality standards.

As my colleague, K. O. Damron pointed out, the information that he provided you on the coal industry and its employment and economic benefit to

the state of West Virginia, I'd like to remind you also about manufacturing and the important role it plays in West Virginia. We've lost about 35,000 jobs in manufacturing since 1980 while our sister states are growing in manufacturing jobs and I think it's very important that as we look at the environmental regulations that we place in force in this state that we're not more restrictive or more stringent than other states or federal standards except when there are really reasons for us to be that way. Let's not make ourselves more competitive or less competitive than we are right now.

While many substantial changes have been made to these regulations, I would like to single out a few for comment this evening. A full set of written comments will be provided to the board by the end of the comment period on July 13th.

The first is Anti-Degradation. The proposed changes to the anti-degradation section of the rules refers to inter-governmental coordination that must occur before high quality streams may be degraded. It is not clear to the association's members, many of whom have NPDES permits what this change pretends.

First, is there an inter-governmental committee that reviews proposed degradation of high quality waters and, second, what constitutes degradation such that the committee's review would be required.

The WVMA would strongly oppose creation of another hurdle to NPDES permit issuance and urges the board to agree that completing the NPDES issuance process for discharges to high quality waters will be deemed to satisfy anti-degradation requirements.

Second is on mixing zones. WVMA members are very concerned about the changes made to the mixing zone, Section 5. The current system of calculating instantaneous mix is preferred to the proposed system as it gives permit writers most flexibility for setting permit limits.

If Section 5 is changed though, the board should clarify that mixing zones are available for all Appendix E criteria. At this point the board has adopted acute criteria for some parameters but not others and has specified in Section 5 that acute criteria apply within mixing zones. This is no reason not to continue to follow current practice and

allow mixing zones for all substances.

The rules should specify, should specifically provide that mixing zones are still available even if there is no accurate criteria for a parameter. The board should also be aware that the mixing zone requirements it is proposing requires in-stream measurement of concentrations both within and outside the mixing zone. This may mean double testing for some permittees. Once at the end of the pipe for technology base limits and once in the river. It's easier to measure only the end of the pipe and then calculate the effect of the discharge in-stream as is currently done.

Therefore, once the discharger shows by in-stream measurement that criteria are met inside and outside the mixing zone at certain effluent rates, he should be able to assume that there is no exceedance of the standards under similar river flow and effluent discharges. This would allow relief from unnecessary testing without any loss of environmental protection.

Third is Category A Waters. Several members here this evening and other members have been told by

the Office of Water Resources that mixing zones are not allowed in Category A river segments based on the Office of Water Resources reading of Section 7.2.A. The effect of this rule as it is applied by the OWR is to deny mixing zones when they are within five miles of the drinking water intake. This means dischargers on the Ohio River where many communities get drinking water from the river are forced to meet water quality standards at the end of the pipe. This is unnecessary as the chronic water quality criteria which apply at the water inlet are those designated to protect public health.

Therefore, as long as mixing zones do not overlap a public water supply intake, a condition which is already prohibited by the rules, the quality of the water taken into the intake must meet the board's standards. Therefore, there is no reason to deny mixing zone in Category A Water. Indeed, there is more reason to allow mixing zone in a Category A water where humans are never affected by the mixing zone than there is for Category B waters where fish or other aquatic life may reside in the mixing zone. In both cases mixing zones are safe and effective and

there's no reason to distinguish between the two.

The WVMA has once again joined with others in the state to urge the board to adopt the most scientifically defensible criteria. This is in regard to analytical detection and metals measurement. Two areas that require adjustment to reflect good science are analytical detection metals and metals measurement.

With regard to analytical detection, the board should provide that where the water quality criteria are below the analytical detection level, compliance with the criteria can be demonstrated by test results that are non detected to practical quantitation limit. For metals, the board should specify that the criteria are expressed in terms of dissolved concentration which was the state of the metals used to develop the criteria and represents the bioavailable state of the metals that has the most effect on human and aquatic life.

In conclusion, the water quality standards are important to those concerned about the fate of industry in this state and the WVMA urges the board to continue to let good science, not politics, be the

guide of its triennial reviews. If it does, the WVMA is confident that the board will have met its charge to allow the expansion of employment opportunities and the provision of a permanent foundation for healthy industrial development as required by its governing statute.

Thank you very much.

CHAIRMAN JENKINS: Thank you, Ms. Price.

Anyone wishing to make a comment who didn't get their name on the list?

(No response.)

I want to thank you people for sharing your comments with us this evening and I want to thank those of you who have previously submitted written comments and all of you who intend to do so in the future.

As has been pointed out already, we do need to have those comments sometime prior to July 13th. July 13th is our deadline for receiving those, so we'll look forward to receiving those. Libby will get them digested and re-presented for us.

Do any of the other board members have anything they wish to say at this time?

MS. NEAL: It's good to see so many people.

DR. SNYDER: Excellent turn out.

CHAIRMAN JENKINS: Thank you all for
attending.

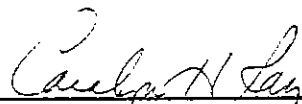
(Whereupon, this hearing was
concluded at 7:40 p.m.)

REPORTER'S CERTIFICATE

STATE OF WEST VIRGINIA,
ENVIRONMENTAL QUALITY BOARD, to wit:

I, the undersigned, Carolyn H. Ray,
Certified Verbatim Reporter, do hereby certify that
the foregoing is, to the best of my skill and
ability, a true and accurate transcript of all the
testimony adduced or proceedings had in the
aforementioned matter, as set forth in the caption
hereof.

Given under my hand this 14th day of July,
1994.



Carolyn H. Ray
Certified Verbatim Reporter

Notice of Public Hearing on Proposed
Amendments and Revisions To Title 46 Legislative Rules
Water Resources Board Series 1
Requirements Governing Water Quality Standards

Public Notice Date: June 1, 1994

In accordance with applicable State and federal requirements, the State Water Resources Board will hold a public hearing on proposed amendments and revisions to Title 46, Series 1 - Requirements Governing Water Quality Standards" on July 7, 1994 at 7:00 p.m. at 1615 Washington Street, East, Charleston, Kanawha County, West Virginia, in the hearing room located on the second floor.

People wishing to make comments on the proposed rule are invited to be present or represented at the hearing. Oral statements will be heard, although written statements are encouraged for the accuracy of the record. Written comments will be accepted prior to the hearing at the Board Office or may be submitted at the hearing. Comments will be received through Wednesday, July 13.

Copies of the proposed rule may be obtained by contacting the Board Office at 1615 Washington Street, East, Suite 301, Charleston, West Virginia 25311-2126 or by calling (304) 558-4002.

Public Notice Date: June 3, 1994

Notice of Public Hearing on Revisions
To Water Quality Standards

Agency: West Virginia State Water Resources Board

Rule Type: Legislative Rule

Rule Title: Title 46, Series 1, Requirements Governing Water
Quality Standards

The West Virginia State Water Resources Board will hold a public hearing on a proposed revision of water quality standards for Opequon Creek and a proposed variance from water quality standards for National Pollutant Discharge Elimination System (NPDES) remaining permit holders. The hearing will be held at 7:00 p.m., July 7, 1994, at 1615 Washington Street, East, Kanawha County, WV. Oral statements will be heard and written comments will be accepted at the Board Office or may be submitted at the hearing. Comments will be received through Wednesday, July 13.

Copies of the proposed revisions and information sheets prepared pursuant to 46 CSR 6 rule may be obtained from the Secretary of State's Office and at the Board Office located at 1615 Washington Street, East, Suite 301, Charleston, WV 25311-2126 (304) 558-4002.

Supporting documentation for these proposals will be available for public review at the Board Office by appointment.

SUMMARY AND STATEMENT OF CIRCUMSTANCES
FOR PROPOSED AMENDMENTS TO 46 CSR 1

A state review of Water Quality Standards is required at least once every three years by Section 303(c)(1) of the Clean Water Act (Public Law 92-500, as amended). The West Virginia State Water Resources Board (Board) is authorized under State law (WV Code Section 20-5A-3) to promulgate the legislative rule governing water quality standards. Pursuant to these laws, the Board conducted a review of the rules and has proposed amendments to the rule based on that review.

In addition, pursuant to its authority under the Clean Water Act, the US Environmental Protection Agency (EPA) conducted a review of the Water Quality Standards and disapproved certain portions of the rule as indicated in a letter from the Acting Regional Administrator of Region III EPA to the Board in January, 1994. The Board has responded to EPA's action by proposing the following changes:

- o Adoption of acute aquatic life criteria (Appendix E)
- o Revised mixing zone provisions (Section 5)
- o Revisions to the antidegradation policy including the adoption of categories of "Waters of Special Concern" and "Outstanding National Resource Waters" (sections 4.1 and 7.3)
- o Updating various numeric criteria to reflect revised values from EPA (Appendix E)
- o Adoption of numeric criteria for 8 organic parameters (Appendix E, section 8.22)
- o Adoption of provisions governing variances to water quality standards (Section 8.3)
- o Changes to the water use categories in which human health standards for carcinogens shall apply. (Section 8.2)

Additional changes resulting from the triennial review conducted by the Board include:

- o Reorganization and reformatting of Appendix E
- o Revisions to the existing provisions for the protection of wetlands (Sections 4.1, 6.1, 6.2, and 7.2.)

The following variances from numeric standards are proposed based on requests and applications made to the Board:

- o A variance from numeric standards for iron, manganese and pH for holders of NPDES remaining permits (Sections 2.20, 2.21 and

Appendix E sections 8.15.2, 8.17.2 and 8.23.1.).

o A variance from the numeric standard for aluminum on Opequon Creek (Section 7.2.d.B.(b) .



DEPARTMENT OF COMMERCE, LABOR & ENVIRONMENTAL RESOURCES
OFFICE OF THE SECRETARY

State Capitol, Room M-146
Charleston, West Virginia 25305-0310
Telephone: (304) 558-0400
Fax No.: (304) 558-4983

GASTON CAPERTON
Governor

THOMAS J. GILLOOLY
Acting Cabinet Secretary

June 1, 1994

Ms. Libby Chatfield
Water Resources Board
1615 Washington Street, East
Charleston, West Virginia 25311

Re: Proposed Exempt Legislative Rule, Title 46, Series 1,
Requirements Governing Water Quality Standards

Dear Libby:

Pursuant to West Virginia Code Section 5F-2-2(a)(12), I hereby
consent to the proposal of the rule specified above.

You may attach a copy of this letter to your filing with the
Secretary of State as evidence of my consent.

Sincerely yours,

Thomas J. Gillooly
General Counsel and
Acting Secretary

TJG/ss

TI46SER1.RUL

OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

JUN 1 12 03 PM '94

FILED

RECEIVED

JUN 01 1994

Legislative Rule Making
Review Committee

WEST VIRGINIA
SECRETARY OF STATE
KEN HECHLER
ADMINISTRATIVE LAW DIVISION

Form #1

Do Not Mark In This Box

FILED

JUN 1 12 04 PM '94

OFFICE OF WEST VIRGINIA
SECRETARY OF STATE

NOTICE OF PUBLIC HEARING ON A PROPOSED RULE

AGENCY: State Water Resources Board TITLE NUMBER: 46

RULE TYPE: Legislative; CITE AUTHORITY: §20-5A-3

AMENDMENT TO AN EXISTING RULE: YES NO

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 1

TITLE OF RULE BEING AMENDED: Requirements Governing Water
Quality Standards

IF NO, SERIES NUMBER OF NEW RULE BEING PROPOSED: _____

TITLE OF RULE BEING PROPOSED: _____

DATE OF PUBLIC HEARING: July 7, 1994 TIME: 7:00 p.m.

LOCATION OF PUBLIC HEARING: 1615 Washington Street, East, Second Floor
Hearing Room, Charleston, Kanawha County, WV

COMMENTS LIMITED TO: ORAL , WRITTEN , BOTH

COMMENTS MAY ALSO BE MAILED TO THE FOLLOWING ADDRESS: State Water Resources Board
1615 Washington Street, East
Suite 301
Charleston, WV 25311-2126

The Department requests that persons wishing to make comments at the hearing make an effort to submit written comments in order to facilitate the review of these comments.

The issues to be heard shall be limited to the proposed rule.

ATTACH A **BRIEF** SUMMARY OF YOUR PROPOSAL

Frances E. Hechler

Authorized Signature

LEGAL ADVERTISEMENT	LEGAL ADVERTISEMENT
<p>be accepted prior to the hearing at the Board Office or may be submitted at the hearing. Comments will be received through Wednesday July 13.</p> <p>Copies of the proposed rule may be obtained by contacting the Board Office at 1615 Washington Street, East, Suite 301, Charleston, West Virginia 25311-2126 or by calling (304) 558-4002. (2277980)</p>	<p>Public Notice Date: June 1, 1994</p> <p>In accordance with applicable State and Federal requirements, the State Water Resources Board will hold a public hearing on proposed amendments and revisions to Title 46, Series 1 - "Requirements Governing Water Quality Standards" on July 7, 1994 at 7:00 p.m. at 1615 Washington Street, East, Charleston, Kanawha County, West Virginia. In the hearing room located on the second floor.</p> <p>People wishing to make comments on the proposed rule are invited to be present or represented at the hearing. Oral statements will be heard, although written statements are encouraged for the accuracy of the record. Written comments will</p>

Notice of Public Hearing on Proposed Amendments and Revisions to Title 46 Legislative Rules Water Resources Board Series 1 - "Requirements Governing Water Quality Standards"

Charleston Daily Mail
WEDNESDAY, JUNE 1, 1994 5C

Notice of Public Hearing on Proposed Amendments and Revisions to Title 46 Legislative Rules Water Resources Board Series 1 - "Requirements Governing Water Quality Standards"

Public Notice Date: June 1, 1994

In accordance with applicable State and Federal requirements, the State Water Resources Board will hold a public hearing on proposed amendments and revisions to Title 46, Series 1 - "Requirements Governing Water Quality Standards" on July 7, 1994 at 7:00 p.m. at 1615 Washington Street, East, Charleston, Kanawha County, West Virginia. In the hearing room located on the second floor.

People wishing to make comments on the proposed rule are invited to be present or represented at the hearing.

LEGAL ADVERTISEMENT

Oral statements will be heard, although written statements are encouraged for the accuracy of the record. Written comments will be accepted prior to the hearing at the Board Office or may be submitted at the hearing. Comments will be received through Wednesday July 13.

Copies of the proposed rule may be obtained by contacting the Board Office at 1615 Washington Street, East, Suite 301, Charleston, West Virginia 25311-2126 or by calling (304) 558-4002. (2277980)

Sign this sheet if you are making an oral statement. Thank you.

Attendee Sheet

ENVIRONMENTAL QUALITY BOARD PUBLIC HEARING

July 7, 1994 - 7:00 p.m.

Proposed Revisions/Amendments to 46 CSR 1 - Requirements Governing Water Quality Standards

<u>Name</u>	<u>Organization/Address</u>
Gene <u>Current</u>	<u>Winston Steel</u> <u>Winston, WV</u>
<u>Richard Head</u>	<u>Allegheny Power Service Corp (Max Power)</u>
<u>Carlin Samples</u>	<u>Whiting-Pfeiffer Steel (Whiting)</u>
<u>David Yausy</u>	<u>Robinson & McElwain (Did not speak)</u>
<u>K.O. Danson</u>	<u>WV Mining & Reclamation Assoc.</u>
<u>Karen Fryce</u>	<u>WV Manufactures Assn.</u>

Attendee Sheet - No Statement

ENVIRONMENTAL QUALITY BOARD PUBLIC HEARING

July 7, 1994 - 7:00 p.m.

Proposed Revisions/Amendments to 46 CSR 1 - Requirements Governing Water Quality Standards

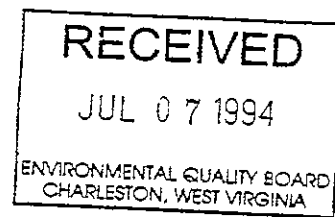
<u>Name</u>	<u>Organization/Address</u>
S.L. FOSTER	CHAS. RYAN ASSOC. CHAR, WV.
DI MOUNT	AScd Duluth Mn
M.D. Pugh	3M Charles Town, WVa.
W. E. Enright	3Kc St. Paul, Mn
Paul Copeland	3M Charles Town, WV
John Metzger	3M St Paul, MN
JORGE McLUNE	DuPont BELLE, WV
Van R. Hulse	USFWS Elkview
Libby Chatfield	EQB
Richard A. Dietz	APCo Roanoke, VA.

Attendee Sheet - No Statement

ENVIRONMENTAL QUALITY BOARD PUBLIC HEARING
July 7, 1994 - 7:00 p.m.

Proposed Revisions/Amendments to 46 CSR 1 - Requirements Governing Water Quality Standards

<u>Name</u>	<u>Organization/Address</u>
Charles R. Jenkins	EQB
Edward M. Ayala	EQB
Michael Lee Neal	E.Q.B.
Patrick Pearbman	Jackson & Kelly / WVEA
DAVE MONTALI	WV DEP
Richard Sharma	Du Pont.
Roger T. Hall	WV DEP
Barbara Taylor	WV DEP - CWR
Frank Pebric	WV DEP - Water Resources
James Smith	CT+E - Charleston



BEFORE THE WEST VIRGINIA ENVIRONMENTAL QUALITY BOARD

COMMENTS ON

WEST VIRGINIA WATER QUALITY STANDARDS
TRIENNIAL REVIEW
46 CSR SERIES I

MONONGAHELA POWER COMPANY

JULY 7, 1994

My name is Richard S. Herd and I am Supervisor of Water Quality and Solid Waste for Allegheny Power Service Corporation. I offer these comments on the Board's proposed water quality standard changes on behalf of Monongahela Power Company (Mon Power), an electric utility serving an area of about 11,900 square miles in northern and central West Virginia and adjacent portions of southeast Ohio. The Company serves approximately 341,000 customers with generation from six coal-fired steam electric generating stations that have associated coal combustion by-product disposal sites.

We are concerned about the Board's proposal, not for what it contains, but for what it does not contain. The Board has chosen to only address the issues that EPA has raised in their review of the State standards. We understand the Clean Water Act mandates that State standards must be at least as stringent as EPA standards and, therefore, the Board must address the provisions that EPA has found to be inconsistent with their rules. However, we are disappointed and concerned that the Board will miss an opportunity to remedy two very important water quality standard implementation problems that would provide some reasonableness to the application of water quality-based effluent limitations. If the Board does not resolve these issues in this rulemaking, it will have to address them in future appeal proceedings.

For the record - in preliminary comments submitted to the Board on seeking proposed revisions to Series I, Mon Power requested the Board make two amendments to the water quality standards, both of which are supported by EPA. The first issue involves how to accurately measure and enforce water quality-based effluent limitations that are established at or below the analytical detection limit. The second is that the State water quality criteria for

metals should be expressed in terms of dissolved metals. I will briefly discuss each of these issues.

A number of the States' water quality criteria such as beryllium, cadmium, hexavalent chromium and mercury are at such an extremely low concentration that accurate measurement with available analytical methods is impossible. The lower the concentration of an analyte, the more difficult it is to measure with an acceptable degree of precision. Therefore, permit limitations set below the level at which reliable measurement is possible can lead to some "false positive" results with harsh and unjustified enforcement consequences.

Although the Office of Water determines compliance with low effluent limitations at the Minimum Detection Level (MDL), there is a fifty-fifty chance that the result will be "false positive" indicating the presence of a pollutant when, in fact, nothing is present in the sample. This subjects a permittee to an unreasonable risk of enforcement action from the Agency as well as a third party. Moreover, recent changes in the Securities and Exchange Commission (SEC) reporting requirements require that any environmental permit noncompliance which may result in the imposition of \$100,000 in penalties must be reported to the SEC. Since the SEC measures this \$100,000 limit based on the potential penalties to be assessed, as few as four excursions of a permit limit may require reporting. Such exposure for what may or may not be real permit violations could have an adverse impact on the financial standing of a publically held Company.

The EPA has offered a remedy for this problem in a March 22, 1994 guidance entitled "National Guidance for the Permitting, Monitoring and Enforcement of Water Quality-Based Effluent Limitations Set Below Analytical Detection/Quantitation Levels". In the guidance, EPA recognizes the problem and recommends the States resolve it by determining compliance at the quantitation level which they define as a concentration 3.18 X the minimum level. Unfortunately, though the EPA approach is conceptually sound, it is technically flawed because it does not take into account analytical bias, analysts' proficiency, matrix effects and other considerations that routinely affect analytical results between laboratories. Instead, Mon Power recommends that the Practical Quantitation Level (PQL) be defined as the compliance threshold. The PQL is the lowest level accurately achievable in most laboratories with appropriate quality control procedures under routine applications and it is used by the EPA in the drinking water and RCRA programs and States such as Ohio in the NPDES program.

To remedy this problem, the following language is recommended:
For purposes of permits issued pursuant to 46 C.S.R. 2, water quality standards are deemed protected where the discharge concentration of a substance is non-detectable at the practical quantitation level. The Practical Quantitation Level (PQL) is five times the Minimum Detection Level (MDL). The permittee has the option to develop permit-specific quantitation levels using a methodology approved by the Chief of the Office of Water Resources.

The second issue concerns the chemical form in which the water quality standards are applied. The State water quality standards do not

specify whether criteria are expressed in terms of total or dissolved metals but are applied in NPDES permits as total concentration. Yet, the EPA criteria are actually derived from dissolved metal concentrations. This makes the criteria overly protective because it is the dissolved portion of the total concentration which is bioavailable and toxic to aquatic life. The portion other than dissolved is absorbed to particulate matter, complexed with organic material or co-precipitated with other chemicals and not toxicologically available.

A number of States including Maryland and Virginia express their water quality criteria as dissolved. To relate the dissolved metal portion to the total metal concentration, they incorporated language into their regulations and/or developed guidance for translating between the dissolved criteria and total concentration required as effluent limitations in the NPDES permits. This approach is in accordance with EPA policy and guidance.¹

Mon Power urges the Board to remedy this conflict by expressing all Appendix E metal water quality criteria as dissolved. The following language is recommended *"All Appendix E Water Quality Criteria for metals are expressed in terms of dissolved concentration"*.

We appreciate the opportunity to offer our comments on these important water quality compliance issues. We urge the Board to adopt our

¹EPA Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Memorandum from Martha Prothro, Acting Assistant Administrator for Water to EPA Regional Water Management Directors, October 1, 1993.

recommendations in this triennial review so that NPDES permittees do not incur unjustified capital and O&M costs for installation of unnecessary waste treatment and are not exposed to unreasonable enforcement action or SEC sanctions for "false positive" permit violations.

Mr. K.O. Damron

Vice President

**West Virginia Mining & Reclamation
Association**

1624 Kanawha Blvd., East
Charleston, WV 25311

submits the following comments
this 7th day of July, 1994
to supplement verbal comments
presented during a formal

Public Hearing
in Charleston, West Virginia
today, in response to

Proposed Legislative Rules
Water Resource Board
Series 1, Requirements
Governing Water Quality Standards

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a formal Public Hearing in Charleston, West Virginia, today, in response to Proposed Legislative Rules, Water Resource Board, Series 1, Requirements Governing Water Quality Standards:

Page 1 of 5

I. ABOUT THE PUBLIC HEARING:

A. OUR REPRESENTATION:

The West Virginia Mining and Reclamation Association represents over 125 coal producing member companies and over 200 associate member companies who provide products and services to the coal industry. Our comments on this proposed rule are on behalf of all of the members and associate members of our Association.

B. OUR APPRECIATION FOR THIS OPPORTUNITY:

Our Association is grateful for this opportunity to offer suggested improvements to this rule. Further, we believe the intent of this rule is a positive one for the coal industry and the State of West Virginia, and, therefore, we applaud the Water Resources Board for proposing this new rule.

II. BACKGROUND:

A. THE INDUSTRY:

The coal mining industry in West Virginia produces hundreds of millions of tons of high quality coal for domestic and foreign use as an energy source for the production of electricity, steel and a host of other applications. Employment directly in West Virginia mines and indirectly in the mining support trades and the hundreds of millions of dollars of taxes generated by coal related sources are the **economic backbone** of the Mountain State.

A recent study found that one out of every ten payroll dollars in West Virginia comes from the coal industry. It was further revealed that one of every three business tax dollars being collected by the State comes directly from the coal industry.

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a formal Public Hearing in Charleston, West Virginia, today, in response to Proposed Legislative Rules, Water Resource Board, Series 1, Requirements Governing Water Quality Standards:

Page 2 of 5

Every influence which alters the production of West Virginia coal changes the fragile **competitive balance** between coal mines here and coal mines in other coal producing states and other nations. Therefore, changes in the governmental regulations affecting this industry must be made with the potential negative impacts of those changes foremost in the minds of those considering such changes.

III. SUGGESTED AMENDMENTS TO THE PROPOSED RULE:

A. ABOUT OUR WRITTEN COMMENTS:

The following suggested amendments are intended to improve the language of the proposed rule. We intend to continue to review the document and receive comments from our member companies, and may submit additional comments on or before July 13, 1994.

B. SPECIFIC AMENDMENTS RECOMMENDED:

AMENDMENTS NUMBER 1 AND 2:

On Page 4, Section 46-1-2, Paragraph 2.20, by **AMENDING** the language to read as follows:

2.20. "Coal mining operation" means a coal mining operation which begins after February 4, 1987, at a site which coal mining was conducted before August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law or a coal mining operation abandoned after August 3 1977, but before January 21, 1981 for which available bond is insufficient to provide for adequate reclamation or coal mining operations where mining was completed between August 4, 1977 and November 5, 1990 which remains unreclaimed due to insolvency of a surety company occurring during the same period.

And on Page 4, Section 46-1-2, Paragraph 2.21, by **AMENDING** the language to read as follows:

2.21. "Remined area" means only that area on any coal remining operation on which coal mining was previously conducted before August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law or a coal mining operation abandoned after August 3, 1977, but before January 21, 1981, for which available bond is insufficient to provide for adequate reclamation or coal mining operations where mining was completed between August 4, 1977, and November 5, 1990, which remains unreclaimed due to insolvency of a surety company occurring during the same period.

JUSTIFICATION FOR AMENDMENTS NUMBER 1 AND 2:

The two definitions in the proposed rule must have been a drafting oversight. These proposed amendments would bring this portion of the definitions in the proposed rule into conformity with the definitions found in the Federal Register for the same terms as provide for in the Federal Energy Act of 1992. Further, this new language will provide more opportunities for coal operators to go back into old mining areas and apply new reclamation standards to the land, therefore providing both new employment opportunities and a better finished reclamation product than existed prior to the "remining". Remining is truly a "win-win" experience: A mining opportunity is created and the land is left in a greatly improved condition.

AMENDMENT NUMBER 3:

On Page 7, Section 46-1-4, Paragraph 4.1, Line d., by **STRIKING** the new language which reads: **In addition to the waters listed in subsection 7.3.e, additional waters may be nominated for inclusion in that category by any interested party or by the Board on its own initiative.**

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a formal Public Hearing in Charleston, West Virginia, today, in response to Proposed Legislative Rules, Water Resource Board, Series 1, Requirements Governing Water Quality Standards:

Page 4 of 5

JUSTIFICATION FOR AMENDMENT NUMBER 3:

Including new streams or watersheds in the "protected" category is a major event. Every effort should be made to maintain a very formal process of adding protected streams, since these protected areas often cause the watershed to be restricted from any industrial or commercial opportunities. A significant portion of the our State is protected today, limiting our chances of adding businesses and NEW JOBS. This new language would enable "any interested party" the opportunity to begin the process of "protecting" a stream, whether there is merit in the proposal or not. There are environmental extremists in West Virginia, today, who would abuse this privilege and cause significant distress in the business community. Therefore, this new proviso is unnecessary and should be deleted.

AMENDMENT NUMBER 4:

On Page 23, Section 46-1-8, Paragraph 8.4, Line a, by **AMENDING** the language to read as follows:

a. In any application for an NPDES remining permit to discharge pollutants from or affected by a coal mining remining operation, the applicant may request, and the Chief may grant, alternate water quality based effluent limits for iron, manganese, and pH. Effluent limits resulting in concentrations of these parameters which are higher than existing numeric standards are allowable upon a demonstration to the Chief that the remining operation will result in improved water quality. Any decision by the Chief is subject to review by the Board and by EPA. Notwithstanding subsection 8.3 above, such demonstration shall be the only one required regarding water quality related effluent limitations.

JUSTIFICATION FOR AMENDMENT NUMBER 4:

This is a more logical system of review and approval than is suggested in the proposed rule. This will provide for the decision of the Chief to be reviewed by either the Board or the EPA.

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association
submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a
formal Public Hearing in Charleston, West Virginia, today, in response to
Proposed Legislative Rules, Water Resource Board, Series 1, Requirements Governing Water Quality Standards:

Page 5 of 5

AMENDMENTS NUMBER 5, 6 AND 7:

On Page 9, Appendix E, Paragraph 8.15.2.,

And on Page 12, Appendix E, Paragraph 8.17.2.,

And on Page 20, Appendix E, Paragraph 8.23.1.,


by **AMENDING** the language to read the same as Amendment Number 4
(above).

JUSTIFICATION FOR AMENDMENTS NUMBER 5, 6 AND 7:

Same justification as above in Amendment Number 4.

IV. SUMMARY:

We hope you will agree the seven amendments suggested herein will improve the language of the proposed rule. Again, we applaud your efforts to improve the water quality of the State while still permitting commerce, specifically coal mining, to continue to provide employment opportunities for our citizens.


**K.O. DAMRON
VICE PRESIDENT
WEST VIRGINIA MINING &
RECLAMATION ASSOCIATION**



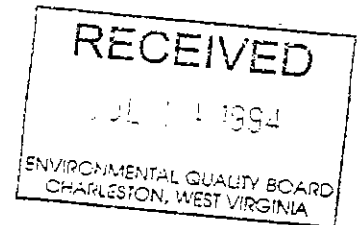
United States Department of the Interior



FISH AND WILDLIFE SERVICE

West Virginia Field Office
Post Office Box 1278
Elkins, West Virginia 26241

July 6, 1994



State Water Resources Board
1615 Washington Street, East
Charleston, West Virginia 25311-2126

Dear Board Members:

The following refers to the proposed amendments and revisions to Title 46, Series 1, West Virginia Water Quality Standards, West Virginia Division of Environmental Protection Public Notice, June 1, 1994. The amendments and proposals were developed as part of the Division's Triennial Water Quality Standards review as required by Section 303(c)(1) of the Clean Water Act. The following comments are submitted by the U.S. Fish and Wildlife Service (Service) as technical assistance in accordance with the provisions of the Clean Water Act Section 404(b)(1) Guidelines of the Clean Water Act (33 U.S.C., Section 1344, as amended), the Fish and Wildlife Coordination Act (48 STAT. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

S 46-1-5 Mixing Zones

The mixing zone standards would not adequately protect endangered species. Present language provides that "mixing zones shall not... harm any endangered species" (subsection 5.2.C). The Environmental Protection Agency has recognized that no mixing zone should occur in "sensitive habitats". Endangered species habitats are sensitive habitats. The present standards also provide for a "zone of initial dilution." In this zone, criteria may be above the acute criteria and lethal conditions can exist. In the case of endangered species, this could constitute a taking in accordance with Section 9 of the Endangered Species Act.

There is limited data concerning endangered species sensitivities to toxic substances. However, there is evidence that present criterion for copper is not protective of some endangered mussel species. Freshwater mollusks are also known to be sensitive to monochloramine and unionized ammonia entered from water treatment plants. In Clinch River, Virginia, stream reaches up to 3.7 km downstream of water treatment plants were devoid of freshwater mussels. The glochidial life stage of freshwater mussel is the

most sensitive invertebrate in their tolerance to monochloramine and unionized ammonia. Even exposure to those toxicants at sub-lethal levels may prevent glochida from infesting fish. Because of sensitivity of endangered species to some contaminants and because the tolerances of most endangered species to most contaminants is unknown, mixing zones should not be permitted in areas harboring those species.

Subsection 5.2.g.B provides that mixing zones may extend downstream for a distance of five times the width of the stream. This would mean that in a large river, such as the Ohio, mixing zones could extend for a distance of up to a mile. In that extensive mixing zone, water quality criteria can be above acute (zone of initial dilution) and chronic levels and, depending on the number of mixing zones, could conceivably include long expanses of large rivers. It is recommended that where mixing zones are permitted, the length of the mixing zone not be more than 200 feet.

Only those substances that are rendered non-toxic by dilution, dissipation, or rapid transformation should be permitted in a mixing zone. Bio-accumulative substances should meet the criteria at end-of-pipe.

West Virginia's Water Quality Standards that became effective on August 25, 1993, provided that mixing zones should not be permitted where the 7Q10 flow is 5cfs or less (subsection 5.4). That language has been omitted in the current proposed standards and a new provision inserted that prohibits mixing zones where instream waste concentration of a discharge is greater than 80% (subsection 5.2.g.D). Mixing zones should not be permitted in streams where the 7Q10 flow is 5 cfs or less. The new language implies that mixing zones would be allowed in small streams during higher flows. A permit condition with that provision would be unenforceable and could lead to water quality degradation in small streams. Additionally, the 80 percent level seems excessive; we would appreciate the opportunity to review the State's justification for that level. Language should be added that prohibits mixing zones in intermittent streams.

Language should be added to the mixing zone standards that prohibit the extension of a mixing zone to the mouths of incoming tributaries. Mixing zones that extend to tributary mouths would restrict passage of aquatic organisms.

Mixing zone standards for thermal discharges (Section 5.2.h) provide avenues for variances or site specific criteria (via Section 316(a) of the Clean Water Act) but provide no limitations on thermal regimes in the mixing zone. Language should be included that will protect natural seasonal temperature cycles, and prevent sudden temperature changes. The presence of other contaminants and temperature related interactions should also be considered when establishing mixing zone temperature criterion.

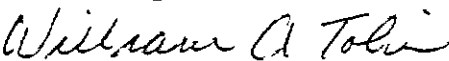
Because of the variety of situations that exist (e.g. different stream and lake sizes, existing conditions, species present, contaminants of concern) the Service believes that comprehensive mixing zone standards are difficult to formulate. Therefore, a case-by-case evaluation may be necessary.

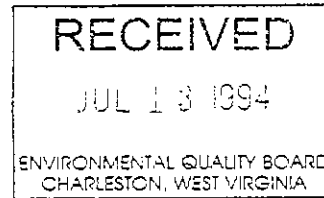
Because each situation may be different and because mixing zones provide a variance from water quality standards it is highly recommended that provisions for public comment and inter-agency review be included in mixing zone standards.

Additional Comments

1. Characteristics that define Tier III waters and specific protection provided for those waters should be provided at subsection 4.1.d. Tier III waters should include wetlands and other waters, or portions thereof, that provide exceptional environmental settings, or exceptional aquatic communities, or exceptional water quality, or exceptional recreational opportunities. There can be no degradation of water quality except for short-term degradation. The short-term degradation must not result in water quality lower than that necessary to protect existing uses. No new or increased discharges to Outstanding National Resource Waters (ONRWs) will be permitted. There can be no new or increased discharges to tributaries of ONRWs that would lower water quality.
2. Waters that contain native brook trout would meet Tier III requirements and should be designated as such.
3. Page 7 - two sections are designated as "d".
4. Page 21 - 7.3.a - the end of that paragraph should read "... defined in Section 2.6."

Sincerely,


William A. Tolin
Acting Supervisor



July 12, 1994

VIA FEDERAL EXPRESS

West Virginia Water Resources Board
1615 Washington Street, East
Suite 301
Charleston, West Virginia 25311-2126

RE: Weirton Steel Corporation Comments Regarding Triennial
Review of West Virginia Water Quality Standards

Dear Sir/Madam:

Weirton Steel Corporation ("Weirton") is pleased to submit the following comments regarding the proposed amendments and revisions to the West Virginia Water Quality Standards, Title 46 Legislative Rules, Series I (the "Proposed Rule"). The Proposed Rule is being promulgated as part of the state's triennial review process which is mandated by Section 303(c)(1) of the Clean Water Act ("CWA"). Weirton's comments focus primarily on Section 7.2.a.B, relating to discharges which occur upstream within five miles from the intake of a water supply public (Water Use Category A). However, Weirton also is proposing a modification to Section 7.2.d.P(b).

I. Introduction and Background

Weirton owns and operates an integrated steelmaking facility located on the banks of the Ohio River in Weirton, West Virginia. Weirton is one of the largest employee-owned companies in the world, employing approximately 6,000 people in the tri-state area. It is also West Virginia's single largest industrial employer and taxpayer.

Since its formation in 1984, Weirton has invested a significant percentage of its capital resources to revise and implement sophisticated wastewater treatment systems in order to improve the quality of its wastewater discharges. As such, Weirton is concerned with the approach taken by the Division of Environmental Protection ("DEP" or the "Division") with respect to the West Virginia Water Quality Standards, and more specifically to Section 7.2.a.B. Consequently, Weirton believes that this Section should be modified to more accurately reflect the intent of the regulation.



II. Section 7.2.a - Water Use Categories

Section 7.2.a.B. provides that "each segment extending upstream from the intake of a water supply public (Water Use Category A), for a distance of five (5) miles or to the headwater, must be protected by prohibiting the discharge of any pollutants in excess of concentrations designated for this Water Use Category in Section 8." 46 CSR Series I, Section 46-1-7.2.a.B (1994). The application of this Section is certainly open to multiple interpretations. Weirton is aware that the DEP has interpreted this section to mean that the water quality criteria must be met at "end-of-pipe" in all circumstances where there is a water supply intake within five miles downstream of the discharge. Weirton believes that such interpretation is unnecessarily stringent, and does not conform with the original purpose of the rule or with similar provisions elsewhere. Furthermore, Weirton believes that such interpretation is in direct conflict with other sections of the water quality standards, specifically Section 46-1-5 related to the use of mixing zones. Therefore, Weirton suggests that the language of Section 7.2.a.B. be modified to clarify its meaning and to bring it into concert with the remainder of the rule.

A. Purpose of the Rule

The West Virginia Water Pollution Control Act as well as the West Virginia Water Quality Standards declare it 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, 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.

W.Va. Code § 20-5A-1, 46 CSR Series I, Section 46-1-1 (emphasis added). Section 7.2.a.B. was promulgated with this policy in mind. As originally proposed, Section 46-1-7.2.a.2 provided that:

those dischargers to stream segments between one half (½) and five (5) miles upstream of an intake must consider the fate and transport of pollutants and demonstrate upon permit application that the concentration of those pollutants will not adversely affect the potability of the water supply.

Legislative Rule, Chapter 20-5 & 20-5A, Section 6 (1985). Numerous comments were submitted with respect to this rule, many of which related to the question of whether or not a discharger should be able to demonstrate that in-stream concentrations of a pollutant would not adversely affect

a potable water supply. Several commenters suggested that this provision was appropriate, but was vague as written. Specifically, Region III of the United States Environmental Protection Agency ("EPA") suggested that the rule should require that a "demonstration" be made to show that the applicable water quality standards in the water supply segment will not be violated." See, EPA Comments on Proposed West Virginia Water Quality Standards, July 9, 1985 (emphasis added). EPA's focus was thus clearly on the instream impact of the discharge.

The DEP's current interpretation of this section results in unnecessarily stringent NPDES permit limits for any discharger within five miles of a drinking water intake. The State's policy can be achieved by an interpretation which balances the interest in protecting the water quality at public drinking water intakes with the interest in the "provision of a permanent foundation for healthy industrial development." The DEP's interpretation of Section 46-1-7.2.a.B. grossly skews this balance and it is up to the Water Resources Board to modify the language in order to provide a greater degree of clarity and to ensure that the policy of the State is being maintained.

B. The Current Interpretation

The DEP's current interpretation of Section 7.2.a.B. effectively prohibits mixing zones within five miles of a public water intake. Such an interpretation is unnecessary to meet the requirements of the CWA, and is even inconsistent with it and relevant caselaw from other jurisdictions. For example, Section 302 of the CWA provides that water quality standards should "not interfere with the attainment or maintenance of that water quality which shall assure protection of public health and public water supplies." 33 U.S.C. § 1312. Reviewing courts have consistently determined that effluent limitations need not equal water quality criteria in order to satisfy this goal. See, e.g., Northwest Environmental Advocates v. City of Portland, 11 F.3d 900 (9th Cir. 1993). Rather, effluent limitations are simply a means of achieving water quality standards. Trustees for Alaska v. EPA, 749 F.2d 549 (9th Cir. 1984).

Indeed, EPA expressly acknowledges that the relevant issue is whether the water quality criteria are met within the receiving stream, not at "end-of-pipe":

It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the water body as a whole. Sometimes it is appropriate to allow for ambient concentrations above the criteria in small areas near outfalls. These are called mixing zones.

Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-001 (March 1991). The DEP's interpretation of Section 7.2.a.B. effectively eliminates any potential use of mixing zones by dischargers within five miles of a water supply intake. While Weirton agrees with a policy which protects the integrity of the drinking water supplies and regulations which further

such protection, it believes that the language of Section 7.2.a.B. must be modified to provide a focus on real-life instream impacts, and not simply a rigid and impractical reading which leaves industrial dischargers in these areas at a severe economic disadvantage with little, if any, ancillary benefit.

C. Mixing Zones

Weirton has reviewed the revised language of Section 46-1-5 relating to mixing zones, and believes that Section 7.2.a.B. should read in conjunction with such provision. Section 46-1-5 provides that the chief may establish on a case-by-case basis an appropriate mixing zone. Further, this Section provides that:

mixing zones shall not interfere with fish spawning or nursery areas of 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 endangered species.

46 CSR Section 5.2.c. (1994). Weirton believes that the DEP's current interpretation of Section 7.2.a.B is in direct conflict with this provision as a discharge which does not overlap a public water quality intake or harm the fish and aquatic life population, but which is within five miles upstream of the intake, is not permitted to utilize the mixing zone concept. This is inconsistent and discriminates against dischargers in the State who fall into this category.

It should be recognized that Weirton commends the Board for including a zone of initial dilution into the mixing zone policy. Such a concept permits the exceedance of acute criteria for protection of aquatic life in small areas for short periods of time until mixing occurs. However, Weirton believes that the DEP's current interpretation of Section 7.2.a.B. effectively eliminates the use of this concept by dischargers within five miles upstream of a drinking water intake. Again, this interpretation is in direct conflict with the regulations themselves and discriminates against a class of industrial dischargers who are unfortunate enough to be located near an intake.

Weirton urges the Board to revise the standards to clarify that the criteria do not have to be met at end-of-pipe unless it is demonstrated that a mixing zone will adversely affect the biological and/or chemical integrity of the stream. This interpretation should be applied regardless of the location of the discharge, as long as the mixing zone meets the requirements and guidelines applicable to mixing zones in Section 5 of the regulations. This is the only reasonable interpretation of Section 7.2.a.B that maintains consistency between the two Sections and furthers the goals and policies of the State of West Virginia.

D. Proposed Language

In order to clarify the intended meaning of Section 7.2.a.B., Weirton proposes that the first sentence of 7.2.a.B. be modified as follows:

Each segment extending upstream from the intake of a water supply public (Water Use Category A), for a distance of five (5) miles or to the headwater, must be protected by prohibiting the discharge of any pollutants such that the instream concentrations at said intake(s) are in excess of the concentrations designated for this Water Use Category in Section 8. Prior to imposing any water quality criteria as "end-of-pipe" effluent limitations, the Chief shall demonstrate that other, less stringent, effluent limitations will adversely impact said intake(s).

Weirton believes that such language provides for both the maintenance of quality of the water of the state and for the provision of a permanent foundation for healthy industrial development. W.Va. Code § 20-5A-1. Weirton also believes that this language guarantees consistency between all sections of Series I of the regulations.

III. Site-Specific Applicability of Water Use Categories

Weirton suggests that Section 7.2.d.P(b) be modified as follows:

Except for that segment of Harmon Creek (0-97) from its confluence with the Ohio River to a point 2.2 miles upstream shall not have the Water Use Categories A and B designations. In addition, criteria 3.2.a. e, f and h shall not apply to this segment of Harmon Creek.

Weirton believes that such change has the support of the Division and is necessary to clarify the existing and modified Harmon Creek variance. It is also justified by the turbidity of the Ohio River, which is used by Weirton for its intake water, which is ultimately discharged to Harmon Creek.

IV. Conclusion

Weirton appreciates the opportunity to submit these comments. Such input is necessary to achieve a balance between the goals of the Clean Water Act and the West Virginia Water Pollution Control Act and the economic health and stability of the State of West Virginia. Weirton sincerely

West Virginia Water Resources Board
July 12, 1994
Page 6

hopes that the Board will strongly consider the proposed changes to the West Virginia water quality standards discussed herein.

If you require any further information or have any questions with respect to the issues raised herein, please feel free to contact me.

Sincerely,

Gene P. Current / dcB
Gene P. Current
Director, Environmental Control

cc: Mark Vignovic
Donald C. Bluedorn II, Esquire



DEPARTMENT OF COMMERCE, LABOR & ENVIRONMENTAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION

10 McJunkin Road
Nitro, WV 25143-2506

Gaston Caperton
Governor

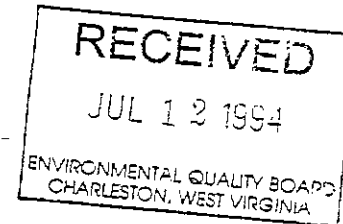
John M. Ranson
Cabinet Secretary

David C. Callaghan
Director

Laidley Eli McCoy
Deputy Director

July 12, 1994

Mr. Robert Jenkins, Chairman
Environmental Quality Board
1615 Washington Street, East
Charleston, West Virginia 25311



Dear Mr. Jenkins:

The Division of Environmental Protection (DEP) wishes to take this opportunity to file written comments to the Board's proposed rule (Title 46, Series 1) entitled "Requirements Governing Water Quality Standards". Comments are as follows:

Page 4. Subsection 2.20

The DEP suggests revisions to two definitions which would make them consistent with the federal Energy Policy Act and proposed regulations being promulgated by the Federal Office of Surface Mining and Reclamation (OSMRE). Suggested revisions are shown as highlighted.

2.20 "Coal Remining Operations" means a coal mining operation which begins after February 4, 1987, at a site on which coal mining was conducted before August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law or a coal mining operation abandoned after August 3, 1977, but before January 21, 1981 for which available bond is insufficient to provide for adequate reclamation, or coal mining operations where mining was completed between August 4, 1977 and November 5, 1990 which remains unreclaimed due to insolvency of a surety company occurring during the same period.

2.21 "Remined Area" means only that area on any coal remining operation on which coal mining was previously conducted before the effective date of the Surface Mining Control and Reclamation Act of August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law, or a coal mining operation abandoned after August 3, 1977, but before January 21, 1981, for which available bond is insufficient to provide for adequate reclamation, or coal mining operations where mining was completed

between August 4, 1977 and November 5, 1990, which remains unreclaimed due to insolvency of a surety company occurring during the same period.

Page 23 Subsection 8.4 paragraph a.

The rule as proposed provides for the approval by the Board of a demonstration by the applicant that alternate water quality effluent limits are justified. The DEP believes that the review and approval of the demonstration of the applicant is more appropriately done by the technical staff of the Office of Water Resources with final approval of the demonstration and the alternate standard granted by the Chief. The decision of the Chief should then be subject to review by the Board and EPA either of which can call the decision of the Chief into question. Similar revisions should be made to Appendix E at 8 . 15. 2. on page 9, at 8. 17. 2 on page 12, and at 8. 23. 1 on page 20.

If it is the decision of the Board to retain the existing draft language, the DEP is requesting that some new language be drafted which gives guidance as to how the review and approval process can be achieved in a timely manner.

The DEP is also suggesting that the last sentence in this paragraph be struck. This sentence is intended to provide assurance that the water quality in the receiving stream is improved as a result of the remining operation as required under the State and Federal remining provisions. However, there are instances where the remining will result in improved water quality, yet the operator cannot meet the more stringent standard.

For example, the remining site is discharging low volume, high concentrations of iron into a high volume, low iron concentration stream. The remining operation could result in a reduction in discharge concentration of 20%, which is an improvement in water quality that would not be measurable in the receiving stream. The operation would not meet the criteria of water quality based effluent limits which are more stringent than the degraded stream quality.

The NPDES remining discharge effluent limitations are the true measure of improved water quality because they measure loadings as opposed to only concentrations. If the pollutant load being discharged into the stream is reduced as a result of remining, water quality has been improved regardless of in-stream concentrations.

It is proposed that the rule be revised as indicated by the following language.

- a. In any application for an NPDES remining permit to discharge pollutants from or affected by a coal remining operation, the applicant may request, and the Chief may grant, alternate water quality based effluent limits for iron, manganese, and pH. Effluent limits resulting in concentrations of these parameters which are

Mr. Robert Jenkins

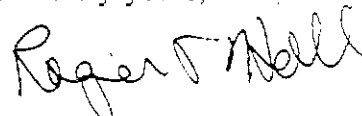
Page 3

July 12, 1994

higher than existing numeric standards are allowable upon a demonstration to the Chief that the remaining operation will result in improved water quality. Such demonstration. Any decision by the Chief is subject to approval review by the Board and review by EPA. Notwithstanding subsection 8-4 8.3 above, such demonstration shall be the only one required regarding water quality related effluent limitations. Where alternate water quality based effluent limits are granted, each permit shall contain specific alternate limits for iron, manganese, and pH which are more stringent than the existing degraded water quality.

Other than some minor technical corrections, the DEP has no further comments or suggestions regarding the rule.

Sincerely yours,



Roger T. Hall

Special Assistant to Director

RTH:cc

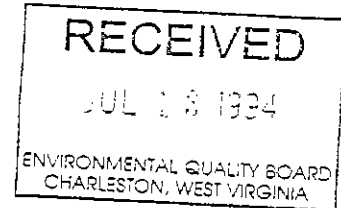
cc: Ms. Libby Chatfield
All Board Members

WILLIAM R. SAMPLES
DIRECTOR
ENVIRONMENTAL CONTROL
(304) 234-2274



July 12, 1994

West Virginia Water Resources Board
1615 Washington Street East
Suite 301
Charleston, WV 25311-2126



**Re: Proposed Amendments and Revisions to
Title 46 Legislative Rules, Series I
Requirements Governing Water Quality Standards**

Members of the Water Resources Board:

Wheeling-Pittsburgh Steel Corporation is a major integrated producer of flat rolled steel products with headquarters in Wheeling and manufacturing facilities along the Ohio River in the northern panhandle of West Virginia and across the river in Ohio.

The Ohio River is a major asset to our region and to our Corporation. The river is used for public water, industrial water, transportation, recreation and fishing. We draw large amounts of water from the Ohio River for our steel making processes and, after extensive treatment, return it to the river with minimal consequence. The Ohio River currently provides the region and Wheeling-Pittsburgh with an ample supply of quality water. We question whether there is a need for the more stringent standards that have been proposed.

ORSANCO Standards

The Ohio River has water quality standards established by both West Virginia and by the Ohio River Valley Sanitation Commission (ORSANCO) of which West Virginia is a member. These two sets of standards are different. The differences, in part, result because the West Virginia standards apply to all streams, large or small, single purpose or multi-purpose and the ORSANCO Standards to only the main stem of the Ohio River. The ORSANCO standards are believed to reflect more nearly the quality needs of the Ohio River. Wheeling-Pittsburgh urges the Water Quality Board to exempt the Ohio River from the present and proposed West Virginia Water Quality Standards and adopt the ORSANCO Standards for the Ohio River.

The following comments are directed toward the proposed amendments and revisions to the Water Quality Standards should the suggestion to adopt the ORSANCO Standards for the Ohio River be rejected.

Comments on Proposed Changes, Water Quality Standards

Section 46-1-1.1, General

Section 46-1-1.1 states that "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." We believe that the proposed standards are unreasonably stringent and that they will be a deterrent to employment opportunities and industrial development. The proposed standards are more stringent than required when compared to their counterparts in other states, and will necessitate costly and unnecessary environmental expenditures. Such expenditures deprive us of the funds needed for modernization and the employment opportunities that come with it.

Section 7.2. Applicability of Water Quality Standards

The Office of Water Resources interprets Paragraph 7.2.a.B as requiring that discharges within a distance of five (5) miles upstream from an intake for a public water supply comply with the water quality criteria designated for this water use (Category A) in the discharge itself. If this should be the intent (a matter which we do not concede), it needs to be changed.

The imposition of such limits on the discharges from Wheeling-Pittsburgh's Coke and Sinter Plants to the Ohio River in Follansbee is unnecessary and would be highly burdensome.

Wheeling-Pittsburgh's discharges at Follansbee are now impacted by this provision by the recent construction of a direct river intake by the Hooverson Heights Public Water Service District less than five (5) miles below our discharges. Certainly the water quality of the Ohio River was a major criterion considered by the District in making this choice. Now, after Hooverson Heights has made this decision and has begun the withdrawal, treatment and use of the water and has apparently found it to be satisfactory, more stringent water quality standards and additional limitations on our discharges seem unnecessary.

In addition, Wheeling-Pittsburgh has just completed and is in the start-up phase of supplemental treatment facilities for our Coke Plant in Follansbee. These facilities were designed to bring us into compliance with reasonably anticipated future discharge limitations. These supplemental improvements cost \$8.5 million. If the requirements of this section are imposed on Wheeling-Pittsburgh, we will not be able to comply.

Wheeling-Pittsburgh obviously neither wants to impose a health nor an economic burden on persons served by the Hooverson Heights system. We, however, believe that the allowance of a properly established mixing zone between our discharges and the Hooverson Heights intake would not jeopardize the public water supply in any way.

Currently, the regulation provides an exception for mixing zones in Paragraph 7.2.c.C. This paragraph provides an exemption "In any mixing zones which are established pursuant to Section 5 of these rules." Section 5 specifies the conditions and safeguards that must be met in the establishment of a mixing zone to assure that the required water quality is maintained while simultaneously not subjecting the discharger to unnecessary requirements. Regulated mixing zones reflect good science and a balance between risk and costs.

However, Paragraph 7.2.c.C. is proposed to be changed to allow exemptions only in "the zones of initial dilution of any mixing zone..." The term "zone of initial dilution" is undefined and could conceivably be very restrictive. If the "zone of initial dilution" should be interpreted as being significantly smaller than the mixing zone of Section 5, unnecessary burdens would be placed on the discharger.

Wheeling-Pittsburgh suggests that the current language of Paragraph 7.2.c.C. be retained as an exemption from Section 7.2.a.B.

Section 8. Specific Water Quality Criteria

(1) 8.10. Cyanide

The current water quality criteria for cyanide are expressed as free cyanide. The proposed criteria specify total cyanide but with no change in the numerical values. As free cyanide is orders of magnitude more toxic than complexed cyanides which are included in total cyanides, the proposed criteria in many cases will be orders of magnitude more stringent than the present criteria. Wheeling-Pittsburgh believes, and we think a majority of the scientific community agrees, that the proposed criteria are overly stringent. The difference between the current and proposed criteria can be like night and day.

Wheeling-Pittsburgh's new \$8.5 million supplemental treatment facility for our Follansbee Coke Plant that was previously discussed will, we are confident, comply with the current free cyanide criteria. However, it was neither designed nor is it capable of being operated to comply with the proposed total cyanide criteria. In addition, we do not know of any available technology that would allow us to comply with the criteria as proposed.

The Ohio River Valley Sanitation Commission (ORSANCO) of which West Virginia is a member has established water quality standards for the Ohio River. The standard for cyanide is identical to West Virginia's current standard for free cyanide. The State of Ohio's standard for cyanide is also in terms of free cyanide as is the standard being proposed under the Great Lakes Initiative by USEPA.

Wheeling-Pittsburgh requests that the present criteria for free cyanide be retained and that the proposed criteria specifying total cyanide be withdrawn. We suggest that until USEPA promulgates an analytical procedure for free cyanides under 40 CFR 136 that method 4500-CNI contained in the 17th edition of Standard Methods (APHA 1989) or equivalent be used.

- (2) 8.4. Arsenic
- 8.6. Beryllium
- 8.22. Organics, Polynuclear Aromatic Hydrocarbons (PAH)

The Public Water Supply criteria proposed for arsenic ($0.14 \mu\text{g}/\ell$) and existing for beryllium ($0.0076 \mu\text{g}/\ell$) and PAH ($0.0028 \mu\text{g}/\ell$) are of concern. It could be most difficult for some segments of industry to meet these conditions. We even question whether analytical procedures exist to permit realistic quantification of these characteristics at these low levels.

Note should be taken that the State of Ohio which also regulates discharges into the Ohio River has set 30-day average limitations for Public Water Supplies at $50 \mu\text{g}/\ell$ for arsenic, $0.068 \mu\text{g}/\ell$ for beryllium and $0.028 \mu\text{g}/\ell$ for PAH. The differences from the West Virginia criteria are significant to say the least.

Wheeling-Pittsburgh requests that the criteria for arsenic, beryllium and PAH be set at levels comparable to those of the State of Ohio.

Other Comments

There are many examples in the current and proposed Water Quality Standards that are more stringent than standards in other states. Some of these have been referenced earlier. However, the Bureau of Water Quality of the Pennsylvania Department of Environmental Resources

(PADER) has recently proposed a number of changes to their water quality standards worthy of note. The following are some of them:

- Changing the form of the water quality criteria for metals from total recoverable to total dissolved with no adjustment to the numerical value of the criteria; (this reflects recommendations in an EPA October, 1993 metals guidance that metals criteria should be in terms reflective of bioavailability.)
- Changing the duration of the acute aquatic life criteria averaging period from one hour to one day and the chronic aquatic life criteria averaging period from four days to thirty days; and
- changing the design stream flow for chronic aquatic life protection from Q_{7-10} to either Q_{30-5} or Q_{30-10} .

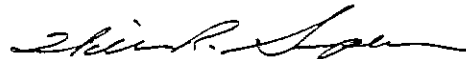
Wheeling-Pittsburgh suggests that the Water Resources Board consider carefully the status of water quality criteria in other states including Pennsylvania.

Conclusion

Wheeling-Pittsburgh recognizes at least in part the difficulty of your task. We can only request that you weigh carefully your decisions in terms of both water quality and the economic needs of West Virginia.

If you should require any additional information, would like further explanations of our comments or if we can be of help in any way, please contact me.

Sincerely,



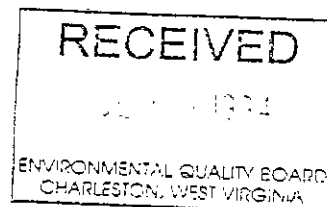
William R. Samples
Director - Environmental Control

KAISER ALUMINUM

CORPORATE ENVIRONMENTAL

July 11, 1994

West Virginia Environmental Quality Board
1615 Washington Street, East
Charleston, WV 25311-2126



Dear Sir or Madame:

Kaiser Aluminum & Chemical Corporation appreciates this opportunity to comment on proposed changes to West Virginia State Water Quality Standards.

The Environmental Quality Board (the Board) proposes to change the basis for the cyanide water quality standard from free cyanide to total cyanide without changing the numerical standard. The proposed change would have the effect of substantially reducing the standard. The state has provided no rationale for doing so.

U.S. EPA documents supporting Federal Ambient Water Quality Criteria indicate that free cyanides represent the bioavailable and toxic species. Many of the complex cyanides included in total cyanide are low-toxicity, inert species that are undissociable and not absorbable.

Federal maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for cyanide are based on free cyanide. In the preamble to Final EPA Drinking Water Rules on 18 Synthetic Organic Chemicals, Five Inorganic Chemicals (FR Vol 57, No. 138/ July 17, 1992/page 31786). EPA states "The Agency agrees with commenters that only free cyanides would be regulated because these are the species of health concern due to their bioavailability and toxicity."

Changing the basis for the cyanide water quality standard from free cyanide to total cyanide tightens the standard dramatically without improving protection of human health or the environment. In some cases total cyanide levels in industrial discharges may exceed free cyanides by a factor of 100 or even by a factor of 1000. The ferro-cyanides and other complex cyanides are low-toxicity, stable compounds that do not represent a threat to human health or the environment.

Water Quality Standards Comment
July 11, 1994
Page 2

Kaiser Aluminum & Chemical Corporation urges the Board to retain free cyanide as the basis for the cyanide water quality standard. Changing the basis to total cyanide would place an unnecessary burden on industry without providing significant benefit for human health or the environment.

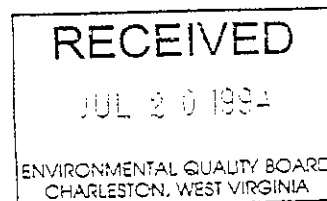
Sincerely,



J. W. Vinzant
Region Corporation Environmental Manager

JWV/shh

g:\kdata\sites\discont\rac\wtrem.ltr

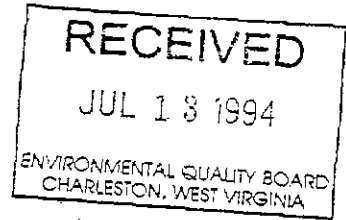




west
virginia
highlands
conservancy

MAILING ADDRESS • P.O. Box 306 • Charleston, West Virginia 25321

Publishers of the Highlands Voice and the Monongahela National Forest Hiking Guide



July 13, 1994

W.V. Environmental Quality Board
1615 Washington Street, East
Charleston, W.V. 25311-2126

RE: Proposed Rules:
Title 46, Series 1
Water Quality Standards

Members of the Board:

Although time constraints, work demands and summer schedules have prevented an indepth review of the proposed amendments to 46 CSR 1, we would be remiss if we didn't at least submit general comments about several aspects of the proposed regulations that deal with issues of ongoing concern to both myself and to the W.V. Highlands Conservancy (WVHC).

The Board is to be commended for its apparent attempt to improve on some of the more insidious amendments that have been made to the regulations since 1980 when I first knew of and commented on Title 46, Series 1. There remain, however, major deficiencies and confusions that continue to distress us.

1) HEADWATERS/HIGH QUALITY WATERS/ANTI-DEGRADATION

Much confusion arises from the interaction of sections that relate to the protection of high quality and headwater streams (i.e. between the definitions sections 2.6 "High quality waters" /2.6 "Outstanding national resource waters" and Sections 4 (the anti-degradation policy) and 7.3 ("Classified waters of the State).

Although pristine headwater streams are included in the definition of "Outstanding National Resource waters" (2.8), the protection afforded these streams is limited or nonexistent when applying the anti-degradation provisions in Section 4.1.c and 4.1.d to the more limited description of special and outstanding resources defined in Sections 7.3.a and 7.3.b.

Pristine headwater streams also are included in the definition of "High quality waters" (2.6) which are meant to be protected at their existing quality rather than in any use regulation that has been imposed. However, protection afforded these streams is limited in instances of non-point source activities to "reasonable" and "feasible" best management practices and point source degradation can be allowed at the discretion of the intergovernmental coordination of the State's

continuing planning process" (which, to the best of my knowledge, is either nonexistent or only fledgling at this point in time) with no public input and with even less interaction with either EPA or the Chief than is provided in existing language.

(Changes made in these regulations in 1983 are partially responsible for some of this convoluted confusion. I have enclosed a copy of WVHC's comments from September of that year (pp. 585, item #9). For further discussion of this, I refer you to other comments as well as the Board's rationale document in your files RE: the 1983 proposal which was approved in 1984.)

2) WATER SUPPLY, PUBLIC - Category A

Fortunately, the five mile buffer zone above the intake for any water supply public has been preserved in these proposed regulations. As can be seen from the attached WVHC comments from 9/27/83, the weakening amendments of that year were made somewhat more palatable by adding the 5 mile buffer provision to the proposed 1/2 mile protection zone.

Unfortunately, the Board has not seen fit to return to the more stringent language of pre-'80 regulations that include protection for waters which in their UNTREATED state are suitable for human consumption. . . . More substantial protection for the high quality and headwater streams referred to in it above would be one way to insure partial protection of the possible future use of such untreated water supplies, but that level of protection is not guaranteed in the existing or proposed anti-degradation language of these regulations.

3) MIXING ZONES

It is encouraging to see further clarification of this rather loosely defined concept, but there continue to be questions about the cumulative effect and the bioaccumulation of pollutants discharged to these zones, particularly the amounts of pollutants that will be allowed in the zone of "initial dilution" or the zone of "immediate destruction" or "instant death" as I have also heard it referred to.

4) VARIANCES

Though I am not someone who runs quickly to the idea of variances, especially when there is already ample amounts of wiggle room in most regulations, the Board's proposed language in 0.3 does add a wee bit of needed restriction (variances apply only to the specific discharger) and review (variances shall be reviewed at least every three years).

Section 8.4 (Variances for Remining Activities) maintains the positive intent of Federal Remining Amendment in that it insists on demonstration and approval that the remining operation will result in improved water quality.

Section 8.4, however, also poses several questions, e.g. Does the Board mean to grant special privilege to remining operations by making this the only demonstration required regarding...effluent limitations? ...And how does this section address the combined responsibilities of EPA under the Clean Water Act and OSM under the Federal Surface Mine Act?

To further clarify the Prohibitions subsection i. so that it specifically prohibits large expanses of mining to receive the variance when only a small portion of the operation is actually affecting or affected by the previously mined area, I might suggest adding another clause such as: "No alternate water quality based limit shall be issued for a coal mining operation which is not located on a remined area, or for those portions of the coal remining operation which are not directly connected to the degraded discharge resulting from the previous mining activity, or for criteria...."


5) APPENDIX E - SPECIFIC WATER QUALITY CRITERIA

The good part of this section is that the Board has not succumbed to pressures to adopt dissolved rather than total values for metals criteria. The questionable part in this section is the addition of acute values across the board and the relaxation of several other specific criteria.

Even the relatively minor relaxation of the Chloride criteria for aquatic life categories (B1-B4) smacks of an attempt to justify the oil and gas industry's efforts to create brine discharge permits, and certainly bleeds the continued pollution from the Department of Highways salt storage piles. Hopefully chemists, biologists and fisheries people have looked at this and other changes to the criteria for toxins even more dangerous to human life:

No doubt many, if not all, of these changes are approvable or even suggested by EPA, but I've got to hope that there are those who would challenge such relaxation, especially in this day and age when reducing pollution at the source is an achievable reality and zero discharge is a desired goal.

Thank you for the opportunity to comment.


Cindy Rank, President
HC 78, Box 227 Rosk Cave, WV 26234

The West Virginia Highlands Conservancy

Route 1, Box 107
Kenna, West Virginia 25248

September 27, 1983

Water Resources Board
1205 Greenbrier Street
Charleston, WV 25311

Re: Comments on proposed amendments
to Administrative Regulations,
Series I, II, and III

Gentlemen:

In response to your Notice of Public Hearing, appearing in the Charleston Gazette on August 12, 1983, and to supplement my oral comments made at the public hearing held on September 19, 1983, I wish to comment on the proposed amendments and revisions.

I.

The cover letter to the proposed regulations indicates that "the Board has reviewed and proposed these changes and some others as indicated in the text. These proposals do not necessarily indicate the Board's consensus . . .". I am informed by Ms. Hunter, the board secretary, that the proposals contained in the document sent to public notice do not result from any formal board action, by way of a vote, but rather are a collection of various proposals and ideas collected from written and oral suggestions made at public meetings since May of 1983. The openness of this process is commendable.

Since you have invited discussion about not only these changes but other areas of the regulations, it is quite likely that you will wish to amend the proposed rules as a result of the comments received. Under § 29A-3-6(a), you would then be required to file a description of any such changes and a statement listing the reasons for the amendments occurring after public comment. I assume that at some point after public comment the board will take formal action, by a vote, to determine exactly what rules it is proposing. Only when this is done will the public know exactly what it is the agency proposes; accordingly, at that point the process required by article three of chapter 29A is triggered, requiring notice and hearing of the rules actually formally proposed by the board.

II.

Generally, the approach to protection of water quality taken by the existing Series I is a good one, and should be

changed only where a pressing need is demonstrated and after an opportunity for necessary technical studies to be completed and reviewed by the public. Many of the proposed revisions are much more than a fine-tuning of existing concepts; the new "protection zone" for the public water supply use category, the "low flow streams" proposal, and the shift to two levels of criteria for many metals are broad, new concepts which are both untried and untested.

III.

My comments on specific proposed changes in Series I are as follows:

1. p. 3, § 2(d), "low flow streams" definition, and p. 11, § 7.01(c), providing that water quality standards shall not apply to such streams:
 - (a) Code § 20-5A-3a provides that "the board shall promulgate . . . regulations setting standards of water quality and effluent limitations . . . to be applicable to the waters of this State . . ." (emphasis added). The definition of "waters" in § 20-5A-2(e) covers ". . . any and all waters on or beneath the surface of the ground . . .". While "wet weather streams" may present difficulties in applying such standards, "low flow streams" are clearly required to be protected by § 3a, and cannot legally be exempted from application of the standards.
 - (b) Where did the "5 mi.²" definition come from? The West Virginia Coal Association proposed an average cfs and 7Q10 based definition; many in the DWR proposed a "1 mi.²" definition. If these proposed regulations didn't result from a board vote, and "don't necessarily represent the consensus of the board", how (and by whom) was "5 mi.²" picked as the judgmental factor for the streams to be stripped of protection?
 - (c) Geologic and topographic differences across the state make the "5 mi.²" definition the grossest type of "broad brush" standard. In limestone aquifer areas, a 5 mi.² watershed may produce a quite substantial flow (of several hundred gpm); in areas which have been substantially deep mined, artificially high (or low) subsurface drainage can exist, making a flow standard based on surface area quite imprecise.

- (d) What percentage of the state's permitted mine discharges go into streams which will be stripped of protection by this proposed change? No study has been done. Under this proposed concept, a mine discharging iron water or acid water which grossly exceeded the standards would be free from citation by an inspector, for stream quality violations. The presence of effluent limitations in a permit does not alleviate this problem. Effluent limits are only judgments (albeit educated ones) as to what given pollutant concentration in a specific discharge will, taken in combination with all other discharges, hopefully allow achievement of in-stream standards. Effluent limitations alone are no more adequate to prevent degradation of low flow streams than they are to alone protect all other waters.
- (e) How many miles of stream courses are potentially affected by this change? What are the costs, in additional downstream treatment or otherwise? (No fiscal note, as required by § 29A-3-4(b) and § 29A-3-9, was included in the materials filed with the secretary of state.) What are the current uses of these streams by private residences or farmers? What relationship exists between the flow contributed by these now-protected streams and the ability of downstream segments to assimilate industrial and POTW discharges? Where in the administrative record are these questions addressed, and the judgments of the board recorded?
- (f) In summary, this change is ill-advised, illegal, not based on any study, and amounts to a write-off of an unknown amount of our water resources.

2. p. 10, § 6, Category B1. Water Supply, Public:

- (a) The magnitude of this change is not properly shown in the proposed revision, because of several typos. Previous Category B1 provided:

This category is used to describe all waters used by the public for drinking purposes

The changes shown in your draft do not show that the phrase underlined above has been eliminated, and replaced by "all stream segments used for drinking purposes." Are we no longer going to protect the use of groundwater for drinking, or protect for this future use streams not

currently used? The one-half mile protection zone is to extend upstream from the "intake". Though not defined, "intake" is commonly used to refer only to municipal or other formal, licensed water supply systems.

- (b) When combined with the new dual criteria in § 8, with differing levels of allowable pollutants "For Protection of Human Health and Trout" and "For Protection of Warmwater Aquatic Life", the one-half mile zone for public water supply use presents another concern: beyond this one-half mile "protection zone", the lesser "warmwater aquatic life" criteria for cadmium, copper, chromium, lead and silver will apply. The problem is that the discharge/s of these metals could be very near upstream from the one-half ^{1/} mile zone; these toxic metals are bioaccumulative and their expected dilution within the one-half mile protected zone cannot be counted on to prevent this accumulative effect in human body tissues.

3. p. 11, & 7.01(f), providing an alphanumeric identification system and providing for use category assignments based on existing water quality: the comprehensive study process implied by this provision is long overdue; however, the assignment of use categories based on existing water quality alone is not a principle that should be fixed in the regulations. It would be most unwise to downgrade or assign uses based on existing quality without first considering improvement of quality in a stream segment as an attainable goal, as contemplated by the Clean Water Act and federal regulations.
4. p. 13, § 7.31: If the Greenbrier is added to the section heading, shouldn't it also be included in the text?
5. p. 13, § 7.32 Bluestone Lake: Why was this lake removed? Was it because of the existing exception, deleting Category D, and therefore prohibiting hydropower developments as proposed by the Corps? This seems as odd way to make a policy judgment that a variance from the regulations is to be granted for this use; no variance proceeding has been conducted on this change. If the lake is to be removed as a separate section, shouldn't it be merged into § 7.31 above (which now stops at the lake's tailwaters)?

^{1/} The common testing method for these metals is to analyze fish body burden.

6. p. 14, § 7.52(b), downgrading uses on the Ohio near Cow Creek, Pleasants County, and p. 15, § 7.61(c), changing values for phenol and phenolic materials on the Monongahela north of Morgantown: These two changes appear to be a grant of the variances requested by American Cyanamid and Borg Warner, respectively, without all the bother of completing the process established in the Board's "Regulations for Revisions of Water Quality Standards" of June 29, 1981. If the document sent to public notice didn't result from formal board action, by a vote, and doesn't "necessarily indicate the Board's consensus"^{2/}, then how did these changes come about?

I hope this process is not an example of how use categories will be assigned in the future, under proposed § 7.01(f).

7. § 8 generally: Problems with the new "dual range" criteria for cadmium, copper, chromium, lead and silver are discussed under ¶ 2(b) above in these comments.
8. p. 29, § 8, Iron criteria: Most surrounding states have a 1.0 mg/l total iron standard. The Coal Association proposed 1.0 mg/l dissolved iron; American Electric Power proposed the BPA-reactive ferrous iron standard proposed here by the Board. The Division is conducting ongoing studies on another proposed standard. Until these studies are complete and their proposals known, it is difficult to evaluate the standard proposed here.
9. The statement of David Flannery, requesting an "interpretation" of the existing anti-degradation policy in § 4 of Series I: This proposal asks the Board to state that the policy intends to protect against degradation only "uses" and not "existing water quality" in terms of background pollutant concentrations. This suggestion misses the mark in several respects:
- (a) § 4, the anti-degradation policy, has a three-tiered approach:
- (1) in all waters other than trout, high quality, and national resource categories, the "existing beneficial uses must be maintained and protected" (§ 4(a)) unless a variance is granted due to unattainability of the use;

^{2/} See discussion in Section I of this letter.

- (2) in trout and high quality waters, "waters must be maintained at their existing high quality" (§ 4(e)) unless a variance is granted for "necessary and justifiable economic or social development";
- (3) in national resource waters, no degradation is allowable, and the board has no power to grant variances (§ 4(g)).
- (b) What Mr. Flannery wants the Board to do is to make the "use protection" apply to all three tiers, rather than just the first one where it is stated. This is not necessary to achieve his goal of moving toward a general permit for the oil and gas industry. Such a general permit could apply the anti-degradation policy as interpreted by the Chief; Mr. Flannery's clients who proposed to discharge pit wastes which would violate the "existing high quality" for the middle tier of waters could then apply for permission to discharge a greater than background concentration of specific pollutants, based on their showing of "necessary and justifiable economic or social development, as provided in the policy.
- (c) Any statement by the Board which sought to guide the chief's interpretation of the antidegradation policy in § 4 would be an "interpretive rule", as defined by § 29A-1-2(c) and would itself require full promulgation in accord with article 3 of chapter 29A.

IV.

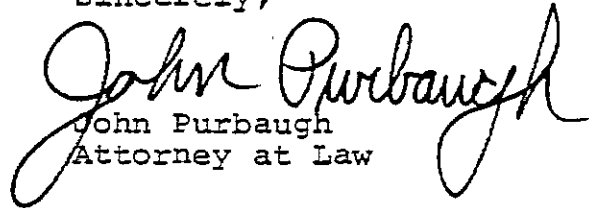
My comments on specific changes in Series II are as follows:

1. p. 10, § 3.02(d): This new provision would allow the Chief to follow NPDES procedures when issuing state act permits. "May" should be changed to "shall" so that there is one procedure applicable to all permits regarding public notice, comment period, etc.
2. p. 27-30, § 4.04(g), Plan for Abandonment and Application to Abandon a Mine: The proposed revisions are a good way to clarify for all involved these two complementary, but separate requirements. Especially commendable is the provision for financial assurances if necessary to assure acceptable water quality from any discharges after abandonment of a mine.

3. p. 61, § 9.02(c):--The proposed new language which would allow the Chief to modify a permit in response to a defined emergency, and then incorporate any changes required after public comment, is a good way to assure speedy action where needed yet avoid the problem of no public input.

Thank you for the opportunity to comment on these proposed changes.

Sincerely,



John Purbaugh
Attorney at Law

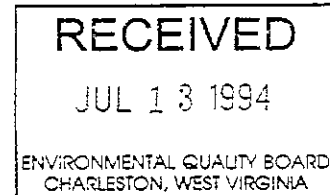
JP:crh

July 12, 1994



VIRGINIA POWER

Dr. David E. Samuel
Chairman
West Virginia State Water Resources Board
615 E. Washington Street
Charleston, WV 25311



Dear Dr. Samuel:

Virginia Power is pleased to submit the attached comments concerning proposed amendments and revisions to West Virginia's Title 46 Legislative Rules, Series 1 - Requirements Governing Water Quality Standards. Virginia Power is an investor owned state-regulated electric utility company engaged in the generation, transmission, distribution and sale of electricity. Our power generation facilities include the West Virginia Energy Center, located in Grant County, West Virginia.

A summary of the issues with which we are concerned is provided below. A detailed discussion of each issue is presented in the attached comments.

1. Separate mixing zone requirements should be included for thermal and chemical pollutants.
2. Other mixing zone issues:

Mixing zones should be allowed to overlap one another.

Mixing zones for the protection of aquatic life should be allowed to overlap public water supplies.

Mixing zones for human health standards should be allowed in Category A waters.

The mixing zone requirement for lakes is overly conservative and no provision is provided to allow for waiving of this size restriction where its inappropriateness can be demonstrated.

A requirement that mixing zones not be allowed where the instream wastewater concentration is greater than 80% is unreasonable.

Mixing zones consistent with those allowed for warm water species are also applicable, and should be allowed, in trout waters.

Dr. Samuel
July 12, 1994
Page 2

3. The State Water Resources Board (SWRB) should seriously reconsider an across-the-board cancer risk factor of 10^{-6} .
4. The standards should specifically allow for calculation of a Water Effects Ratio (WER).
5. The SWRB should seriously reconsider the necessity of adopting enforceable standards based on secondary drinking water standards.
6. Specific recommendations are made concerning the numeric water quality standards proposed for arsenic, beryllium, cadmium, chlorine, cyanide, mercury, selenium, and silver. For a number of these parameters the SWRB has proposed human health standards even though there is significant concern by the scientific and regulated communities, as well as by EPA, that the numbers proposed are inappropriate. Adoption of human health standards for these parameters should be deferred until the outstanding issues have been resolved.
7. The SWRB should adopt water quality standards for dissolved metals.
8. Section 46-1-9. Establishment of Safe Concentration Values should be removed and included in guidance documents.

Virginia Power urges your careful consideration of these comments before final adoption of the proposed standards. We would be happy to meet with the SWRB or members of its staff to discuss any or all of our comments.

Please feel free to contact me at 804/273-2990 or Ken Roller at 804/273-3494 should you have any questions.

Sincerely,



B.M. Marshall, P.E.
Manager
Water Quality

Attachments

RECEIVED

JUL 13 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

VIRGINIA POWER COMMENTS CONCERNING
PROPOSED AMMENDMENTS AND REVISIONS TO WEST VIRGINIA'S
WATER QUALITY STANDARDS REGULATION

July 11, 1994

TEMPERATURE/THERMAL MIXING ZONES

Heat, unlike most chemical pollutants, dissipates rapidly to the environment and is not considered a bioaccumulative pollutant. It is, therefore, appropriate to make a distinction between thermal and non-thermal (chemical) mixing zones, and Virginia Power strongly supports the establishment of separate mixing zone criteria for chemical and thermal discharges.

Establishment of thermal mixing zones is done indirectly in Section 4.1.d. of West Virginia's proposed regulation which states that "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." The proposed regulation also contains the following language concerning thermal mixing zones in Section 5.2.h.:

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

A 316(a) demonstration is, therefore, the only provision which differentiates between chemical and thermal mixing zones in the proposed regulations. Since 316(a) demonstrations are quite expensive (Virginia Power estimated in 1990 that the minimum cost of a Section 316(a) demonstration was \$500,000), and time-consuming, they were clearly intended to be a mechanism for variance when compliance with water quality standards is an issue. While 316(a) variances should certainly continue to be available (upon the proper demonstration), as Congress intended, they are not suitable substitutes for a mixing zone policy to be applied routinely in permits for thermal discharges, and, therefore, specific language must be included in the Water Quality Standards (WQS) regulations to differentiate thermal from chemical mixing zones.

A specific distinction is made by the Virginia Department of Environmental Quality (DEQ) in their Water Quality Standards Regulation, which contains the following mixing zone language for thermal discharges:

"The size of a thermal mixing zone shall be determined on a case by case basis. This determination shall be based upon a sound rationale and be supported by substantial biological, chemical, physical, and engineering evidence and analysis. Any such determination shall show to the [Virginia State Water Control] Board's satisfaction that no adverse changes in the protection and propagation of balanced indigenous populations

of fish, aquatic life, and wildlife may reasonably be expected to occur. A satisfactory showing made in conformance with Section 316(a) of the Clean Water Act shall be deemed as compliance with the requirements of this paragraph."

The above language recognizes that in many cases a thermal mixing zone can be adequately established using scientific studies much less intensive, but every bit as convincing, as a full blown 316(a) demonstration. Virginia Power recommends that this or similar language be included in West Virginia's Water Quality Standards regulation to separate chemical and thermal mixing zone requirements.

MIXING ZONES (Section 5.0)

5.2.a. The proposed West Virginia WQS regulations allow for the determination of mixing zones on a case-by-case basis. The sizing of the mixing zone is based on linear distances from the point of discharge, surface area involvement, and the volume of receiving water available for mixing. Each of these seem to be reasonable requirements for establishment of site-specific mixing zones; however, to limit the length of all mixing zones to 50 times the width (Section 5.2.g.B.), or the width of all mixing zones to 1/3 the width or 1/2 the cross sectional area of a receiving stream (Section 5.2.d.) is arbitrary and lacks a technically sound ecological or human health basis; particularly for thermal discharges. As discussed previously heat dissipates rapidly following discharge to a receiving stream, and cannot be considered a conservative (or bioaccumulative) pollutant. To arbitrarily limit the length or width of a thermal mixing zone is, therefore, inappropriate, and may unnecessarily discourage, or preclude to, the use of certain technologies such as diffuser systems.

With respect to chemical mixing zones, the Virginia DEQ has established guidance¹ for determining mixing zones on a case-by-case basis using mixing zone sizing restrictions specified in Virginia's WQS regulation. The DEQ's guidance is routinely applied in developing effluent monitoring requirements for Virginia NPDES permit holders. Virginia Power recommends that West Virginia take a similar approach in implementing their mixing zone policy.

¹ "OWRM Guidance Memo NO. 93-015: Guidance on Preparing VPDES Permits Based on the Water Quality Standards for Toxics." Virginia DEQ-Water Division, Office of Water Resources Management, June 22, 1993.

Section 5.2.a. also states that the State Water Resources Board (SWRB or Board) will consider the mixing characteristics and the presence of other nearby dischargers in the establishment of a mixing zone. On the surface, this condition seems reasonable; however, according to section 5.2.g.E. mixing zones will not be allowed to overlap one another. This is an unreasonable condition as Total Maximum Daily Loads (TMDLs) may be developed for a stream, and equitably allocated among dischargers with overlapping mixing zones established using the spatial requirements outlined in the proposed regulation. Under this scenario, instream concentrations within the overlapping mixing zones may exceed background stream concentrations, but would not exceed water quality standards.

- 5.2.b. Allows for establishment of a zone of initial dilution (ZID). This section also states that chronic criteria for the protection of aquatic life and criteria for the protection of human health from the consumption of fish tissue may be exceeded within the mixing zone but shall be met at the edge of the assigned mixing zone. Virginia Power supports the establishment of a zone of initial dilution to meet acute water quality standards.
- 5.2.c. According to this section, mixing zones shall not overlap public water intakes or bathing areas. This provision is disturbing for several reasons. First, it fails to make any distinction between aquatic life and human health criteria, the later of which are the only criteria with which the SWRB should be concerned with respect to a public water supply intake or bathing areas. In addition, Section 6.2.e. of the regulation, defines Category A waters (Water Supply, Public) as "the stream segment extending upstream from the intake for a distance as defined in Section 7.2.a.B" (5 miles or to the headwaters if < 5 miles). The presence of a public water supply intake in a thermal mixing zone is not problematic as thermally enriched waters pose no threat to water supplies. In fact, a beneficial effect can be realized during winter months by keeping water intakes ice free. The presence of a bathing area in a thermal mixing zone is not problematic as thermally-enriched waters pose no threat to bathers.

Section 7.2.a.B. goes on to state that each water supply public must be protected "by prohibiting the discharge of any pollutants in excess of the concentrations designated for the Water use Category in Section 8" (i.e., no mixing zone is allowed for Category A pollutants for five miles upstream of a public water supply intake). Further, within 1/2 mile above the intake, effluent limits may be

established for the protection of human health that require additional removal of those pollutants. This condition indicates that the SWRB may actually require removal of effluent pollutant concentrations to below the human health standard.

Mixing zones for compliance with water quality standards for the protection of aquatic life should be allowed to overlap public water supply intakes. In addition, mixing zones should be allowed for human health standards in all cases where a discharger is located far enough upstream that under "critical" flow conditions (receiving stream and effluent), and given the mixing zone sizing restrictions of Section 5., sufficient receiving stream assimilative capacity exists to ensure the standard will be met in the receiving stream above the public water supply intake (physical structure).

Human health standards to protect from drinking water effects are developed assuming human consumption of two liters per day at pollutant concentrations greater than the standard itself. Considering the above "conservative" mixing assumptions under normal receiving stream and effluent discharge conditions pollutant concentrations in the receiving stream should be well below the applicable standard. Only under extreme conditions would instream concentrations ever be expected to approach the standard, and only then for short periods of time.

- 5.2.e. According to this section the volume of a mixing zone in lakes or other surface impoundments, is not to affect in excess of ten (10) percent of the volume of that portion of the receiving waters available for mixing. This condition is overly conservative and no ecological or hydrological rationale is provided to warrant this restriction, especially for situations such as run of the river reservoirs. Moreover, compliance with this requirement is problematic because precise measurements of the volume of a mixing zone in a lotic water body are extremely difficult and costly, especially given the constant dynamics of lakes and impoundments (e.g., due to wind, rainfall, effluent quality and quantity, etc.) and the time lag for analytical results. Virginia Power requests that this volumetric restriction be deleted. Notwithstanding this request, no provision is provided, however, to allow for waiving of this size restriction where its inappropriateness can be demonstrated. Therefore, it is recommended that the language in section 5.2.i. be amended as follows:

The Chief may waive the requirements of subsections (d), (e), and (g)(B) above if a discharger provides an acceptable demonstration of:

- 5.2.g.D. Mixing zones will not be granted where the instream waste concentration of a discharge is greater than 80%. This requirement is unreasonable for the following reasons. First, a definition of instream wastewater concentration is not provided in the regulation. In addition, depending on the size of the receiving stream in question, the volume associated with the remaining 20% may provide substantial assimilative capacity. Also, a mixing zone can be sized such that even though the instream wastewater concentration at a particular flow exceeds 80%, the concentration of a pollutant at the edge of the spatially defined mixing zone would not.
- 5.2.j. Upon implementation of a mixing zone in a permit, the permittee shall provide documentation that demonstrates to the satisfaction of the Chief that the mixing zone is in compliance with the provisions outlined in subsections (b), (d) and (g)(B).

The above language could be interpreted to mean that even if the Chief waives the mixing zone sizing requirements of subsections (d) and (g)(B), once the site-specific mixing zone is implemented in the permit, the permittee would still be required to demonstrate that the mixing zone is in compliance with these sections.

CRITICAL STREAM FLOWS (Section 7)

- 7.2.b. This section specifies that 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 consecutive day drought flow with a ten year return frequency (7Q10). However, the section also states that all exceptions to this condition (Section 7.2.c.A.-D.) do not apply to trout waters.

Exceptions include among other things, flows less than 7Q10, and ZID's. Therefore, as these exceptions would not apply to trout waters, all WQS would apply at all flows in trout waters. This would mandate that the lowest recorded receiving stream flow be used as the basis for establishing a mixing zone in trout waters. Such a condition is extremely unreasonable in light of the conservative nature of the standards and the exposure and averaging periods associated with the standards. In addition, a requirement that all water quality standards are to apply in the ZID during all flows is essentially

a requirement to meet the water quality standard at the end-of-pipe (i.e., no mixing zones allowed).

Section 7.2.b., therefore, ignores the fact that sensitive cold-water species such as trout were considered in the development of most water quality criteria, and that the toxicity of any pollutant to trout is also dependent on the concentration of the pollutant, and the duration and frequency of exposure to the pollutant (i.e., mixing zones, consistent with those allowed for warm water species, are also applicable where trout are concerned). Based on the above, Virginia Power recommends that the SWRB allow for mixing zones in trout waters consistent with those allowed for warm water species in all other waters.

7.2.c.c. As discussed above, this section states that water quality standards will not apply in the zone of initial dilution of any mixing zones which are established pursuant to Section 5. Exceptions to chronic water quality standards are also allowed in the mixing zone from the point of discharge to the edge of the mixing zone proper; therefore, it is recommended that the added language be deleted, as the existing language incorporates any mixing zone, including a ZID, established in accordance with Section 5.

THE SWRB SHOULD SERIOUSLY RECONSIDER AN ACROSS-THE-BOARD CANCER RISK FACTOR OF 10^{-6} .

The draft WQS regulations contain human health criteria based on an across-the-board risk level of 10^{-6} (Sections 8.2.a & b.). In the preamble to National Toxics Rule (NTR [57 FR 60863-4, December 22, 1992]), the EPA recognizes that the adoption of a particular risk level is a policy decision to be made within each state. The national human health criteria were, therefore, based on state-specific risk levels of either 10^{-5} or 10^{-6} , "either of which is consistent with EPA policy and with the requirements of the Clean Water Act". However, the EPA also states in the preamble to the NTR that they have historically considered a 10^{-5} risk level "to be adequately protective". In fact the human health standards for four states (and Puerto Rico), promulgated in the NTR, are based on an across the board risk level of 10^{-5} . Further, the existing human health standards promulgated by both Virginia and Maryland are also set at a risk level of 10^{-5} .

Since the EPA considers both risk levels to be consistent with their policy and the CWA, it is important that the State of West Virginia make an informed decision concerning the risk levels on which their human health standards are to be based. An across-the-board adoption of a 10^{-6} risk level would mandate the reduction of surface water concentrations to levels ten times lower than those

the EPA considers "adequately protective". Such reductions could only result from significant expenditures by both industry and the public, and could place West Virginia at a competitive disadvantage with neighboring states that have less restrictive, yet still "adequately protective", standards. Therefore, Virginia Power recommends that the SWRB seriously consider adoption of a 10^{-5} risk level.

An alternative to adoption of an across-the-board risk level would be the adoption of different risk levels depending on the perceived threat a pollutant poses to human health. For example, in the NTR, the EPA promulgated human health standards for New Jersey with a 10^{-6} risk level for all Group A and B carcinogens, and a 10^{-5} risk level for all Group C carcinogens. The EPA also states in the NTR that "if there is no clear expression of preference by a State, EPA also believes it is reasonable for States to adopt a risk level of 10^{-5} for many of the covered carcinogens and a more stringent risk level of 10^{-6} for those carcinogens with substantially higher bioconcentration factors."

STANDARDS SHOULD SPECIFICALLY ALLOW FOR CALCULATION OF A WATER EFFECTS RATIO.

On Tuesday, December 22, 1992, the EPA published their Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; State's Compliance (57 FR 60848 - 60923). This regulation, commonly known as the National Toxics Rule (NTR) promulgated for 14 States, the chemical-specific, numeric criteria for priority toxic pollutants. The water quality standards for a number of metals promulgated during this rule are expressed as "a function of the water effect ratio, (WER)". The water effect ratio is defined on page 60917 as "a specified pollutant's acute or chronic toxicity values measured in water from the site covered by the standard, divided by the respective acute or chronic toxicity value in laboratory dilution water." The WER, therefore, allows for correction of the national water quality standards to reflect site-specific parameters (e.g., TSS or TOC) which may increase or decrease the toxicity of a particular metal, when compared to the toxicity exhibited by the metal in laboratory water.

By incorporating the WER into the NTR, the EPA has in essence created a floating standard for each metal for which a WER may be calculated. In the absence of a site-specific WER study, the WER is assumed to be 1 (i.e., the toxicity of the metal in site water is equal to that of the metal in laboratory water). Since the WER is part of the NTR no formal public notification process is needed each time a WER is performed, as would be the case if the WER were not included in the regulation.

The State of Maryland has adopted a Water Quality Standards Regulation (effective date June 7, 1993) which expresses the standards for a number of metals as "dissolved or biologically

available equivalence". Procedures to be used to derive the biologically available portion of the metal (to perform a WER study) are described in COMAR 26.08.04; which is specifically referenced in the Standards regulation.

Virginia has also incorporated WER language into their draft Water Quality Standards regulation which the Virginia Water Control Board has approved for public hearings (see attached language).

Based on the above, Virginia Power recommends that the SWRB also incorporate WER language into West Virginia's Water Quality Standards regulation.

SPECIFIC WATER QUALITY CRITERIA (Section 8)

Human Health Standards Based On Organoleptic Effects:

Proposed enforceable human health standards based on secondary drinking water standards (e.g., chloride, fluoride) are inappropriate. Secondary drinking water standards, or secondary maximum contaminant levels, are not federally enforceable but instead are meant to offer guidance to states. These standards are based on odor, aesthetics and appearance. If these guidance values are adopted as water quality standards, they can no longer be used as guidance but are instead enforceable standards.

Virginia Power urges the Board to carefully reconsider the necessity of adopting enforceable standards based on guidance values which rely so heavily on aesthetics as their basis.

ARSENIC:

The SWRB has proposed human health water quality standards for arsenic of 0.14 ug/l (Category A, public water supplies) and 0.018 (Category C - water contact recreation). Both numbers are also found as human health standards in the National toxics rule; however, it appears that the EPA has proposed a human health standard of 0.018 ug/l for protection from drinking water and fish consumption, and a standard of 0.14 ug/l for protection from fish consumption only. West Virginia's human health standards for arsenic, therefore, appear to be the reverse of those promulgated by the EPA in the NTR. It should also be pointed out the NTR arsenic human health standards are for inorganic arsenic; West Virginia's standards do not appear to differentiate between organic and inorganic arsenic.

In the past the scientific and regulated communities have raised serious concerns regarding EPA proposed maximum contaminant levels (MCL) for arsenic in drinking water, and related state and EPA surface water quality standards for arsenic. One major concern has been that in establishing their standards for arsenic, the EPA has

assumed a linear dose-response relationship for cancer (i.e., they have assumed that any incremental increase in the administered dose of a carcinogen results in a linear incremental increase in the risk of cancer).

With respect to arsenic, however, assumption of a linear dose-response relationship may not be scientifically sound. The EPA Science Advisory Board (EPA-SAB-EHC-89-038, Letter from SAB to William Reilly, September 28, 1989) concluded that while "there is clear evidence that arsenic ingested at high doses can cause cancer in humans... [t]he risk of skin cancer at doses encountered in U.S. tap water has not been empirically determined." The SAB also concluded that "[c]onvincing evidence of human metabolism of ingested inorganic arsenic has been presented by the EPA", and that "[t]he findings indicate that daily doses of 250 to 1000 ug As³⁺/person/day or less may be largely detoxified." Based on the above, the SAB recommended that the EPA "develop a revised risk assessment based on estimates of the delivered dose of non-detoxified arsenic to target tissues", and "consider the potential reduction in cancer risk due to detoxification in establishing an MCL for arsenic".

In proposing the NTR human health standards for arsenic, the EPA, however, has apparently ignored the conclusions and recommendations of the SAB. This is apparent by examining the EPA's response to comments related to the proposed arsenic standards (57 FR 60887-60888). For example, in response to a commentator who questioned the effects of arsenic at low doses and who suggested that a threshold for arsenic toxicity may exist, the EPA stated the following:

"At the present time, there is no substantial data base which demonstrates that arsenic has a threshold for adverse effects. Marcus and Tispin theorized that there is a threshold for arsenic. However, there is no adequate proof that such a threshold exists. In addition, it should be noted that there is not an adequate epidemiology study on U.S. populations. Accordingly, at present time, there is no way to establish the presence or absence of a threshold level for arsenic."

In the above response the EPA acknowledges (as had the SAB) that there are serious questions concerning the assumptions used to derive the arsenic human health standards (i.e., possible toxic threshold and inadequate epidemiological studies on U.S. populations); however, it is their opinion that adequate data do not exist to demonstrate that an arsenic threshold exists. The requirement for an "adequate demonstration" of a toxic threshold for arsenic in order not to promulgate a MCL (or water quality standard) is clearly not what was intended by the SAB when they recommended that EPA "consider the potential reduction in cancer risk due to detoxification in establishing a maximum contaminant level for arsenic" (EPA-SAB-EHC-89-038, Letter from SAB to William Reilly, September 28, 1989).

The EPA is under a court-ordered deadline to propose drinking water standards for arsenic by November 1995 and to promulgate the standards by November 1997. Therefore, in light of the fact that significant questions still remain concerning the toxicity of arsenic², Virginia Power recommends that the SWRB postpone inclusion of human health water quality standards for arsenic until such time as a revised MCL for arsenic has been promulgated by the EPA. If the Board finds that it must adopt a human health standard for arsenic, then it is recommended that a concentration of 50 ug/l arsenic (as inorganic arsenic) be established for the protection of public water supplies. This water quality standard for arsenic has been promulgated by both Virginia and Maryland.

BERYLLIUM:

In the NTR, the EPA concluded that "it is necessary to give further consideration to the toxicity and carcinogenicity of beryllium through ingestion before promulgating human health criteria. In the final rulemaking regarding beryllium (see 57 FR 31776, July 17, 1992), Agency analysis of the ingestion route of exposure failed to provide definitive evidence that correlates ingestion with tumor appearance." Based on the lack of this type of demonstration, the agency concluded that the proposed criteria are not scientifically defensible. Therefore, Virginia Power recommends that a human health standard for beryllium not be promulgated until the EPA can resolve the outstanding issues related to this parameter.

CADMIUM:

The proposed rule contains a human health standard for cadmium which is hardness-based. The EPA in their NTR, did not publish human health criteria for cadmium because they were not "scientifically defensible". Therefore, unless the SWRB has data for cadmium, in addition to that used by the EPA in reaching their decision, Virginia Power recommends that no human health standard for cadmium be included at this time.

CHLORINE:

A human health standard for chlorine of 10 ug/l is illogical and cannot be scientifically sound in light of the fact that chlorine is commonly applied to municipal water supplies as a disinfectant, and is routinely discharged from water treatment plants to drinking water systems in concentrations well above the 10 ug/l surface WQS.

² For example see Heather Carlson-Lynch, Barbara D. Beck, and Pamela D. Boardman, "Arsenic Risk Assessment," Environmental Health Perspectives 102, No. 4 (April 1994).

CYANIDE:

Both human health standards for cyanide are the same as the chronic surface water standards. It is inappropriate and scientifically unsound to promulgate aquatic life criteria (standards) as human health standards. The EPA in their NTR, and the State of Virginia have both adopted human health standards for cyanide of 700 ug/l (for protection of drinking water supplies) and >205,000 ug/l (to protect for effects from fish consumption). Therefore, Virginia Power recommends that the SWRB update the existing human health standard with standards protective of human health and not aquatic life.

MERCURY:

A proposed human health standard for mercury, in both Category A and Category C water bodies, is that the total organism body burden of any aquatic species shall not exceed 0.5 ug/g as methylmercury. The EPA in their NTR require that edible fish tissue be measured for mercury following exceedence of the 0.012 ug/l chronic mercury standard more than once every three years. The trigger value for additional action is 1.0 mg/kg, which is considerably higher than the 0.5 ug/g (mg/kg) body burden proposed by the SWRB. Virginia Power recommends that the SWRB not include the proposed mercury standard of 0.5 ug/g body burden, but instead include conditions similar to those of the NTR that require additional studies of fish tissue following exceedence of the chronic standard.

SELENIUM:

The WVA SWRB has proposed a human health standard for selenium of 10 ug/l. In their NTR, the EPA did not promulgate a human health standard for selenium. This action was taken in view of new epidemiological data which were becoming available, as well as "the numerous complex issues concerning essentiality, the consumption of elevated levels by some members of the population, and the need to ensure a protective level." In light of the uncertainty associated with a human health standard for selenium, Virginia Power recommends that a human health standard for selenium not be promulgated at this time.

SILVER:

In their NTR, the EPA promulgated its 1980 criteria for silver, because "the Agency believes the criteria is protective and within the acceptable range based on uncertainties associated with deriving water quality criteria." This approach was taken in light of considerable question concerning the science behind other silver criteria, and EPA's intention to perform additional testing and for preparation of a revised silver criteria document. (57 FR No. 246, December 22, 1992, pg. 60883). Also, it appears that the Board is applying a chronic standard for the protection of aquatic life as

a human health standard for the protection from drinking water consumption (Category A waters). This is clearly inappropriate and has no scientific basis. Therefore, Virginia Power recommends that the SWRB following the EPA (and the state of Virginia) and promulgate the 1980 criteria for silver as an acute standard. It is also recommended that promulgation of human health standards for silver be postponed until scientifically defensible standards are developed.

DISSOLVED vs. TOTAL RECOVERABLE STANDARDS FOR METALS

In an October 1, 1993 memorandum the EPA Office of Water provided their "Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria." According to page 4 of this memorandum it is now the EPA's policy that "the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. This conclusion regarding metals bioavailability is supported by a majority of the scientific community within and outside the Agency." The memorandum goes on to state that "EPA recommends that State water quality standards be based on dissolved metal." This has already been accomplished by two of West Virginia's neighboring States, Virginia and Maryland, both of which have adopted dissolved water quality standards for metals. In light of the above, Virginia Power recommends that the SWRB adopt water quality standards for dissolved metals.

ESTABLISHMENT OF SAFE CONCENTRATION VALUES

Section 46-1-9 Establishment of Safe Concentration Values essentially allows for the development of chronic aquatic life criteria for any pollutant for which criteria do not currently exist. These criteria can be based on the results of as few as one acute toxicity test, and the application of one of two safety factors depending on whether a pollutant is persistent or bioaccumulative. The tests are to be 96-hour acute tests performed in accordance with EPA test methods that are specifically referenced. Once determined, the criteria will then be used to regulate the effluent.

This section is disturbing for several reasons. First, it allows for development of chronic criteria from a single acute test, the technical validity of which is certainly questionable. In addition, it requires the application of one of two safety factors dependent on the persistence or bioaccumulative nature of the pollutant, but provides no guidance concerning the methods which are to be used to establish the extent to which a pollutant would persist or bioaccumulate. Also, it presents specific EPA and ASTM test protocols which are to be used in conducting the acute toxicity test(s). This locks both the State and the discharger

into the use of these procedures, even though better test procedures may be promulgated or subsequently become available. For example, the EPA acute test manual listed in this section (EPA 600/4-85/013) has already been replaced by a more current version (EPA/600/4-90/027).

The requirement to establish water quality criterion for a specific chemical pollutant for which the State has not already established a criteria, but which has the "reasonable" potential to be discharged in concentrations which have the "reasonable" potential to cause an excursion above a narrative water quality criterion, is included in the Federal Permit Regulation (40 CFR Part 122.44(d)(1)(vi)). Specific procedures to implement this requirement should be restricted to guidance documents, and would be better left out of the Water Quality Standards regulation. For the above reasons, Virginia Power recommends that this section be deleted from the regulation.

Table of Parameters ¹

SUBSTANCE ²	AQUATIC LIFE		HUMAN HEALTH			
	ACUTE ³ ug/l	FRESHWATER CHRONIC ³ ug/l	SALTWATER ACUTE ³ ug/l	CHRONIC ³ ug/l	PUBLIC WATER SUPPLIES ⁴ ug/l	ALL OTHER SURFACE WATERS ⁵ ug/l
<u>Acephenanthrene</u>					<u>1,200</u>	<u>2,700</u>
Aldrin c	3.0	0.3	1.3	0.13	0.0013	0.0014
Ammonia	See Table 1	See Table 2	See Tables 3 and 4			
Anthracene					9,600	110,000
<u>Antimony</u>					<u>14</u>	<u>4,300</u>
Arsenic					50	
Arsenic III ¹	360	190	69	36		
Barium					2,000	
Benzene c					12	710
Benzo(a)anthracene c					0.028 0.044	0.311 0.49
Benzo(b)fluoranthene c					0.028 0.044	0.311 0.49
Benzo(k)fluoranthene c					0.028 0.044	0.311 0.49
Benzo(a)pyrene c					0.028 0.044	0.311 0.49
Bromoform c					44	3,600
<u>Butyl benzyl phthalate</u>					<u>3,000</u>	<u>5,200</u>
Cadmium ¹	$\mu(1.128[\ln(\text{hardness}^*)]-3.824)$	$\mu(0.7852[\ln(\text{hardness}^*)]-3.490)$	43	9.3	16	120
Carbon Tetrachloride c					2.5	45
Chlordane c	2.4	0.0043	0.09	0.0040	0.0058	0.0059
Chloride	860,000	230,000			250,000**	
Chlorine	See VR680-21-01.11					
Chlorodibromomethane					690	57,000
Chloroform c					57	4,700
<u>Chloromethane—c</u>					<u>83</u>	<u>4,700</u>
<u>2-Chlorophenol</u>					<u>120</u>	<u>400</u>
Chlorpyrifos	0.083	0.041	0.011	0.0056		
Chromium III ¹	$\mu(0.8190[\ln(\text{hardness}^*)]+3.688)$	$\mu(0.8190[\ln(\text{hardness}^*)]+1.561)$			23,000	670,000
Chromium VI ¹	16	11	1,100	50	120	1,400
Chrysene c					0.028 0.044	0.311 0.49
Copper ¹	$\mu(0.9422[\ln(\text{hardness}^*)]-1.464)$	$\mu(0.8545[\ln(\text{hardness}^*)]-1.465)$	<u>2.9 3.7</u>	<u>2.9 3.7</u>	1,300	

SUBSTANCE	AQUATIC LIFE		HUMAN HEALTH			
	FRESHWATER ACUTE ¹ ug/l	CHRONIC ² ug/l	SALTWATER ACUTE ² ug/l	CHRONIC ³ ug/l	PUBLIC WATER SUPPLIES ⁴ ug/l	ALL OTHER SURFACE WATERS ⁵ ug/l
Pyrene					960	11,000
Radioactivity	See VR680-21-01.12					
Selenium ¹	20	5.0	300	71	423 170	44,200 11,000
Silver ¹	. (1.72[ln(hardness ⁶)]-6.52)					
Sulfate					250,000**	
Temperature	See VR680-21-01.5					
Tetrachloroethylene					248 320	2,540 3,500
Toluene					6,800	200,000
Total dissolved solids					500,000**	
Toxaphene ⁴ c	0.73	0.0002	0.21	0.0002	0.0073	0.0075
<u>1,2,4 Trichlorobenzene</u>					<u>260</u>	<u>950</u>
Trichloroethylene c					27	807 810
2,4,6-Trichlorophenol c					21	65
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)					50	
Tributyltin	See VR680-21-01.13	<u>0.026</u>		<u>0.001</u>		
Vinyl Chloride c					20	5,250 5,300
Zinc ¹	. (0.8473[ln(hardness ⁶)]+0.8604)	. (0.8473[ln(hardness ⁶)]+0.7614)	95	86	5,000**	

¹ = ~~Unless specifically listed above, all~~ All metals shall be measured as dissolved. All aquatic life standards for metals apply to the biologically available form of the metal. Metals measured as dissolved shall be considered to be biologically available, or, because local receiving water characteristics may otherwise affect the biological availability of the metal, the biologically available equivalent measurement of the metal can be further defined by determining a Water Effect Ratio (WER) and multiplying the numerical value shown in VR680-21-01.14.B by the WER. Refer to VR680-21-01.14.F.

² = One hour average concentration not to be exceeded more than once every three years on the average.

³ = Four day average concentration not to be exceeded more than once every three years on the average.

⁴ = Unless otherwise noted, these standards have been calculated to protect human health from toxic effects through drinking water and fish consumption.

⁵ = Unless otherwise noted, these standards have been calculated to protect human health from toxic effects through fish consumption.

⁶ = Chronic aquatic life values have been calculated to protect wildlife from harmful effects through ingestion of contaminated tissue. However, the standard will also protect aquatic life from toxic effects.

⁷ = Chronic aquatic life standard applies to methyl mercury. This standard will protect the marketability of natural resources, e.g. fish and shellfish.

⁸ = See VR680-21-07 for additional standards or effluent limits which are site specific.

** = Hardness as calcium carbonate mg/L CaCO₃. The minimum hardness allowed for use in this equation shall not be less than 25 mg/L, as calcium carbonate, even if the actual ambient hardness is less than 25 mg/L as calcium carbonate. The maximum hardness value for use in this equation shall not exceed 400 mg/L as calcium carbonate, even if the actual ambient hardness is greater than 400 mg/L as calcium carbonate.

** = To maintain acceptable taste, odor or aesthetic quality of drinking water.

c = Known or suspected carcinogen, human health standards are for a risk level of 10⁻⁵.

VR680-21-01.14

F. Water Effect Ratio

1. Description

a. A Water Effects Ratio (WER) shall be determined by measuring the effect of receiving water (as it is or will be affected by any discharges) on the bioavailability or toxicity of a metal by using standard test organisms and a metal salt to conduct toxicity tests simultaneously in receiving water and laboratory water. The ratio of toxicities of the metal(s) in the two waters is the WER (toxicity in receiving water divided by toxicity in laboratory water = WER). Once an acceptable WER for a metal is established, the numerical value for the metal in VR680-21-01.14.B is multiplied by the WER to produce an instream concentration that will protect designated uses. This instream concentration shall be utilized in permitting decisions.

b. The WER shall be assigned a value of 1.0 unless the applicant or permittee demonstrates to the Board's satisfaction in a permit proceeding that another value is appropriate, or unless available data allow the Board to compute a WER for the receiving waters. The applicant or permittee is responsible for proposing and conducting the study to develop a WER. An appropriate study will require multiple testing over several seasons. The applicant or permittee shall obtain the Board's approval of the study protocol prior to beginning any study.

c. The Permit Regulation at VR680-14-01.2.6.C requires that permit limits for metals be expressed as total recoverable measurements. To that end, the study used to establish the WER may be based on total recoverable measurements of the metal(s).

2. WER is a Site Specific Standard

The Environmental Protection Agency views the WER in any particular case as a site specific standard. Nonetheless, the WER is established in a permit proceeding, and applies only to the applicant or permittee in that proceeding. The Board's action to approve or disapprove a WER thus is a case decision, not an amendment to the present regulation. The decision to approve or disapprove a WER shall be subject to the public participation requirements of the Permit Regulation, VR680-14-01.

3. Exclusions

A WER shall not be used for the freshwater and saltwater chronic mercury standard or the freshwater acute and chronic selenium standards.

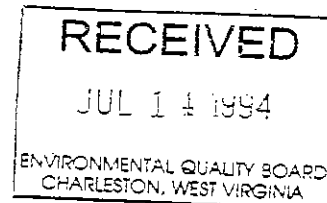
VR680-21-01.15 ~~Surface Water Standards for the Protection of Human Health~~ Dioxin Surface Water Quality Standard

A. Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)

For the protection of human health from the toxic properties of dioxin ingested through water and contaminated aquatic organisms, the ambient concentration of all surface waters shall not exceed 1.2 parts per quadrillion (ppq) based upon a risk level of 10^{-5} and a potency of 1.75×10^4 (mg/kg-day)⁻¹.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431



Dr. Charles Jenkins
Chairman
Environmental Quality Board
1615 E. Washington Street
Charleston, WV 25311-2126

JUL 13 1994

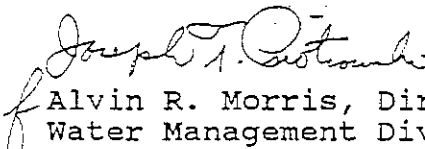
Dear Dr. Jenkins:

Enclosed are the Environmental Protection Agency's (EPA) comments regarding West Virginia's Proposed Legislative Rule on Water Quality Standards published for public comment on June 1, 1994. EPA reminds West Virginia of the January 10, 1994 letter (see enclosure) in which EPA disapproved portions of the State's water quality standards provisions. West Virginia has not yet fully complied with the requirements of that disapproval. The Federal regulations at 40 CFR 131.22(a) mandate that the Administrator must promptly propose and promulgate changes to disapproved standards should the State fail to do so within 90 days after notification by the Regional Administrator that the standards have been disapproved. We fully contend that the standards adopted by West Virginia during the 1995 Legislative Session should fully comply with the concerns we raised in our January 10, 1994 letter in order to avert Federal promulgation.

We would also like to note that, consistent with the Endangered Species Act, EPA must consult with the United States Fish and Wildlife Service (FWS) on the potential impact of States' regulations on threatened and endangered species. As a result, we intend to work with FWS to insure that their concerns are addressed. Enclosed for your consideration is a copy of the FWS' comments on West Virginia's proposed rulemaking.

As it is essential that the Board adopt approvable regulations and resolve the existing disapproval of their regulations, EPA is willing to meet with the State to discuss our comments and how West Virginia might comply with Federal water quality standards requirements. Should you have any questions, please contact Ms. Claudette M. Reed at (215) 597-9927.

Sincerely,


Alvin R. Morris, Director
Water Management Division

Enclosures

EPA's Comments on West Virginia's
Proposed Rule Governing Water Quality Standards
Published on June 1, 1994

RECEIVED

JUL 14 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

Title 46, Series 1 (§46-1)

§ 2 Definitions

'Classified Waters of the State' - West Virginia has changed 'Special Waters of the State' to 'Classified Waters of the State', but has not defined the new term. West Virginia must define this term and identify the water body segments that are included in this classification. In addition, West Virginia must identify how this classification relates to the levels of protection afforded by the antidegradation policy.

'Conventional treatment' - West Virginia uses this term to refer to treatment for drinking water purposes although the more common use of the term relates to waste water treatment. West Virginia should specify what it means by conventional treatment for drinking water purposes.

'High Quality Waters' - West Virginia still has not provided an Attorney General's Certification of the definition of this term, as was required by EPA's January 10, 1994 determination. The proposed definition states that these waters include those that receive annual stockings of trout; however, the logical, but unstated, presumption is that waters that would support naturally-occurring trout populations should also be protected as 'high quality' waters. The definition in its present form could be perceived to limit Tier 2 antidegradation protection to only those waters that receive annual stockings of trout, excluding other warm and cold water fisheries that contain high quality water. As such, it would not be approvable, because it would not provide Tier 2 equivalent protection to all those waters whose quality exceeds that necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water.

As required in the January 10, 1994 determination, the State must provide clarification and Attorney General's Certification of this definition in order for EPA to remove the existing disapproval of this term. Additionally, the State must provide legal clarification of the level of antidegradation protection associated with these waters.

'Intermittent streams' - West Virginia must be reminded that dischargers must meet water quality criteria at the end of the discharge pipe when discharging to intermittent streams. Also,

all discharges to these streams must meet narrative criteria at all times.

'Outstanding National Resource Waters (ONRW)' - Although the State has adopted this new category of waters, it has not fully defined the level of antidegradation protection these waters will receive and has not provided criteria whereby segments are designated as such. According to EPA regulations, where high quality waters constitute an outstanding National resource, such as waters of National and State parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. EPA has interpreted this to mean that new or expanded discharges would be allowed to ONRWs.

As required in the January 10, 1994 determination, the State must provide clarification and Attorney General's Certification of this definition in order for EPA to remove the existing disapproval of this term. In addition, the State must identify the process and criteria whereby Tier III antidegradation protection will be provided.

'Natural or Naturally Occurring' - The State still has not provided EPA with a legal interpretation (through Attorney General Certification) of this term. Thus, it is unclear whether or not background concentrations of pollutants resulting from non-point source discharges are considered 'natural' conditions. EPA disagrees with this definition if non-point sources of pollution are considered to be naturally occurring conditions. Additionally, EPA feels that the phrase "...water use by any person..." should be changed to "...man-induced activity..."

'Non-point Source' - Given that West Virginia has not provided legal interpretation of the term 'natural' or 'naturally occurring', we are concerned that the State has not effectively distinguished between 'non-point source' pollutants and 'natural or naturally occurring' pollutants.

'Waters of Special Concern' - West Virginia must define this term (used in § 4.1.c), identify the level of antidegradation protection these waters will receive, and state what criteria will be used to designate streams of this category. In addition, the State must identify in implementation procedures the methods that will be used to identify and protect these waters.

'Wet weather streams' - West Virginia should be reminded that even though streams may be characterized as 'wet weather', designated and existing uses must be protected.

Undefined Terms - West Virginia must define the following terms: pollutant, lethality, zone of initial dilution, mixing zone, surface impoundment, and toxic.

§ 3 Conditions Not Allowable in State Waters

In Section 3.2.i., the State adopted a provision that prohibits any discharge from adversely impacting the biological components of aquatic ecosystems and EPA approved this discharge-specific "free from" provision. However, one of EPA's National goals for the FY'91-93 Triennium was that States adopt separate biological criteria that are either "numerical values or narrative expressions that describe the reference biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use" (Biological Criteria, EPA-440/5-90-004). EPA expects West Virginia to adopt narrative biological criteria as part of this package.

§ 4 Antidegradation

- As required by the January 10, 1994 disapproval letter, West Virginia has provided neither an Attorney General's Certification of the definition of the term 'High Quality' nor submitted antidegradation implementation procedures that clearly delineate how a three-tiered antidegradation program will be implemented in the State of West Virginia. Until this is accomplished, EPA will not remove the outstanding disapproval of West Virginia's program.
- West Virginia has changed 'Special Waters of the State' to 'Classified Waters of the State', but has not defined the new term. West Virginia should identify in its antidegradation implementation procedures how this classification relates to the levels of protection afforded by the antidegradation policy.

§ 4.1.d

- There needs to be a statement in the first occurrence of §4.1.d. that "no new or expanded discharges" will be allowed on waters that constitute an Outstanding National Resource Water (ONRW) or this requirement needs to be clearly identified in West Virginia's antidegradation implementation procedures for the Tier III provisions to be approvable. The antidegradation implementation procedures must define the level of antidegradation protection ONRWs will receive, identify the process for designating ONRWs.
- There are two (2) sections labeled 4.1.d.; the second one should be labeled 4.1.e.

§ 5 Mixing Zones

- From West Virginia's use of terms, EPA understands that the 'zone of initial dilution' (ZID) is intended to be equivalent to the 'acute mixing zone' and that the term 'mixing zone' is

intended to be equivalent to the 'chronic mixing zone'. If this is incorrect, the State should define the terms otherwise. More importantly, EPA considers the zone of initial dilution to be encompassed by the term 'mixing zone' in West Virginia's regulation and requires that the zone of initial dilution be subject to the requirements of §§ 5.1 and 5.2.

- West Virginia must define how it will size the zone of initial dilution.
- In § 5.2.c., "Mixing zones and zones of initial dilution shall not interfere with fish spawning..." The underlined term must be added as the State makes the distinction described in the above comment.
- Section 5.2.e does not fully specify how West Virginia will size and determine the location of mixing zones within lakes and surface impoundments. Nor does this section define lakes and surface impoundments (i.e., do surface impoundments include run-of-the-river impoundments?) The State must add language to this effect. Additionally, the State must define the basis of the "...10% of volume..." and define the phrase "...portion of the receiving waters available for mixing."
- In Section 5.2.f., "A mixing zone shall...not adversely alter the existing or designated uses...of the water body." The underlined word must be added to the provision.
- Section 5.2.i(A) should also include the statement that any waiver must be subject to "a demonstration that the Zone of Initial Dilution does not cause lethality or toxic conditions to occur."

§ 6 Water Use Categories

§ 6.1 - Water Use Rules

- West Virginia should include in its definition of the term 'Other Aquatic Life', the flora, fauna and all other factors indicative of the biological integrity of the water body.
- The Clean Water Act (CWA), Section 101(a)(2) states that water quality that provides for the protection and propagation of fish, shellfish, and wildlife be achieved. West Virginia must ensure that its water quality standards provide adequate protection for wildlife.
- West Virginia should clarify the statement in the last sentence of this section: "Incidental utilization for whatever purpose may or may not constitute a justification for

assignment of a water use category to a particular stream segment." Also, the State should identify the rationale for distinguishing between existing uses and incidental uses. We must remind West Virginia that their water quality standards must protect existing uses at all times.

§ 6.2 - Category A: Water Supply, Public

Category A describes those "...waters which, after conventional treatment, are used for human consumption." West Virginia uses the underlined term to refer to treatment for drinking water purposes although the more common use of the term relates to waste water treatment. West Virginia should specify what it means by conventional treatment for drinking water purposes.

§ 6.3 - Category B: Propagation/Maintenance of Fish and Other Aquatic Life

- This category should provide broadly for the protection of the biological integrity of the water body including the propagation and maintenance of fish and other aquatic life, encompassing all flora, fauna, and indigenous life.
- § 6.1 of this Proposed Rule "...establish[s] general Water Use Categories and Water Quality Standards for the waters of the State, including wetlands." Furthermore, it states that, "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)..." EPA is concerned that this category neither specifically includes nor refers to criteria for wetlands.
- West Virginia does not specify which waters fall into each of the three (3) subcategories (B1, B2, and B3) described.

§ 6.3.a

- Category B1 waters should not be limited to sport fisheries. All waters that support warm water fish must be included in this category. West Virginia must make this clear in its regulations.
- West Virginia must list those streams that fall into this category.

§ 6.3.b

The reference number for Trout Waters in the Definitions section should be 2.16 instead of 2.14.

§ 6.3.c

- Because of the presence and description of this category, it appears that cold and warm water streams that do not offer sport fishing opportunities will be subject to different criteria and to a different level of antidegradation protection than those that do offer sport fishing opportunities. EPA must stress that, at a minimum, all streams must meet the fishable/swimmable goals of the Clean Water Act and be protected by antidegradation provisions.

§ 6.4 - Category C: Water Contact Recreation

The State should add a statement that readers should refer to Appendix D for a representative list.

§ 6.5.c

For Category D3 - Wildlife, the State must define the in-stream criteria associated with wildlife protection.

§ 7.1 - Major River Basins and their Alphanumeric System

On page 16, the item number after 'D(a)' should be 'E'. (BS - Big Sandy River, not '5.').

§ 7.2.a.A

- West Virginia should list all the water bodies of the State and show the use classification that applies to each. Otherwise, EPA cannot evaluate the merit and nor the State's compliance with this provision.

§ 7.2.a.B

The intent of this section and its impact on human health criteria are unclear.

§ 7.2.c

- With all exceptions from water quality standards, as with this exception, narrative water quality criteria must always apply. Thus, this statement must say, "Numeric water quality criteria shall not apply..."
- The citation for site-specific revisions (in parenthesis) should be 7.2.d.

§ 7.2.c.B

- This rule must clarify the designated use that would be applied to wet weather and intermittent streams.
- West Virginia must protect both existing and designated uses of downstream waters.
- If a discharge provides sufficient volume of water to support uses, then the water body must be protected for those uses and narrative criteria must apply at all times.

§ 7.2.c.D

- This section appears to provide a site-specific exemption from water quality criteria without providing the opportunity for public review and comment and without demonstrating that such criteria are protective of human health and aquatic life. This exemption is inappropriate in its current form.
- Where lesser quality is due to 'natural conditions', the Federal regulations describe several options that provide alternatives to meeting water quality standards—development of Total Maximum Daily Load for the water body; development of a variance to the applicable standard for a discharger; development of a site-specific criterion; or, revision to the use designation of the stream. West Virginia must revise the regulation to reflect one of the above-mentioned options or delete it in its entirety. Also, West Virginia must define what it means by 'natural conditions'.

§ 7.2.d

- Not only does this section describe site-specific applicability, it also discusses variances and use removals. Although the three terms are related, they have discrete applications. The State may want to use a more general and inclusive title or description for this subsection.
- EPA must emphasize that West Virginia must state, for each of the individual occurrences A through KK, whether the exception is a site-specific criterion, a variance, or a use removal and provide appropriate supporting documentation for each of them.
- As discussed in detail in EPA's January 10, 1994 disapproval letter, the exceptions set forth in this section are not based on scientifically defensible criteria that have been demonstrated to be capable of supporting designated uses.
- All of the exceptions described in this subsection were granted more than three years ago, before the State possessed the legal authority to issue variances or develop site-

specific criteria, and were approved based on conditions not discussed in 40 CFR 131.10(g). Subsequently, these exceptions need to be reviewed and revised.

- All the exceptions described in this proposed rule must be revised and reestablished in accordance with the Federal Regulations set forth in 40 CFR 131 and with all Federal guidance.

§ 7.2.d.P(b)

The temperature cited in this paragraph should be 100 degrees Fahrenheit not 1000 degrees.

§ 7.2.d.T(b)

This exception states that, because this stretch of the Kanawha River has only water use category B3 it may contain higher levels of Arsenic, Selenium, and Copper. This is unacceptable. According to the criteria set forth in Appendix E, water use category B3 has the same criteria as water use categories B1 and B4. Subsequently, the uses of all B3 waters must be protected and these waters must have fishable/swimmable criteria, unless site-specific criteria, variances, or Use Attainability Analyses are completed and approved by the State and EPA.

§ 7.2.d.FF(a)

The temperature rise limit of 3 degrees Fahrenheit in this paragraph does not agree with the rise limit of 5 degrees specified in Appendix E (page 25).

§ 7.3 - Classified Waters of the State

West Virginia must define the term 'Classified Waters of the State'.

§ 7.3.a.

The citation, Section 2.4., should be Section 2.6.

§ 7.3.d.

- As mentioned earlier, West Virginia must define the term 'Waters of Special Concern', state what level of antidegradation protection these waters are to receive, and should list the streams that fall into this category.
- As we discussed in our comments on Section 2, West Virginia must state what level of antidegradation ONRWs are to receive

and should identify the criteria used to list those streams that fall into this category.

§ 8 Specific Water Quality Criteria

- West Virginia should add a statement of the biological criteria—either numeric values or a narrative expression of the reference biological integrity of aquatic communities—that would apply to the Waters of the State (See EPA's comment on Section 3.2.i).

§ 8.2.a.

Cancer death must be changed to cancer case for this subsection to be correct.

§ 8.2.b.

- West Virginia must eliminate the word 'organic' at the beginning of the second line as organic carcinogens fail to include Mercury and Selenium as fish contaminants.
- Category B waters—Propagation of Fish, shellfish, wildlife, other aquatic life, and the flora, fauna and other factors indicative of the biological integrity of the water body—must also be subject to criteria that protect humans from consumption of contaminated aquatic organisms.
- This paragraph must state the following: "For Water Use Category B and C, the criteria for carcinogens are for the protection against toxicity to aquatic life and bioaccumulation of those..."

§ 8.2.c.

West Virginia must make a determination for the final rule on what will be the applicable design flow condition. Otherwise, water quality standards set forth in this proposed rule cannot be fully implemented.

§ 8.4 - Variances From Specific Water Quality for Remining Activities

- This regulation, in its current form, does not address the two express, fundamental, purposes of water quality standards (i.e., the designation of appropriate water uses to be achieved and protected, or the specification of water quality criteria (See 40 C.F.R. Section 131.2)). Instead, Section 8.4 addresses the procedures to be used in the calculation of certain specific individual NPDES permit effluent limitations for members of a particular industry. This Section provides a process for adjustments (a "variance") to the final NPDES

permit effluent limitations which would otherwise apply in the development of individual NPDES permits. It does not belong within regulations pertaining to water quality standards, and in any event, raises serious problems even were it to appear within the context of regulations related to NPDES permit effluent limitation.

- Effluent limits should not be prescribed in a water quality standards regulation because this use is inconsistent with the purpose of water quality standards. According to 40 CFR 131.2, a water quality standard defines the goals of a water body by designating the use(s) to be made of the water and by setting criteria necessary to protect the uses. Such standards serve as the regulatory basis for the establishment of water quality-based effluent limits and strategies beyond the technology-based levels required by sections 301(b) and 306 of the Act.

A water quality-based effluent limitation is, by definition, an effluent limitation for a toxicant that, after appropriate dilution, will result in the in-stream attainment of the water quality criterion for that toxicant. The use of the term 'water quality-based effluent limit' for a limit on a toxicant that will not meet the required in-stream criterion for that toxicant is incorrect. According to 40 CFR 122.44(d), water quality-based effluent limitations must be written to achieve water quality criteria in the receiving stream. Thus, there is no legal basis for establishing limits that do not meet either applicable water quality criteria or technology-based requirements. In order to address these remaining discharges properly, the State should use either the variance procedure (Section 8.3) to establish alternate criteria or change the designated use of the stream.

- EPA cannot allow States to give automatic exceptions from meeting water quality standards. However, 40 CFR 131 lays out the conditions by which States can establish alternative water quality standards.
- EPA recommends the following alternatives to the State for dealing with their remaining issue:

West Virginia may adopt general language that enables remaining operators to obtain an exception from meeting water quality standards if they can demonstrate that irretrievable and man-induced conditions exist. To do this, West Virginia must define what set of conditions, applicable only to remaining operations, constitutes irretrievable and man-induced conditions. Once this is done, the State can either:

Option #1 - Downgrade the Stream Segment: Conduct Use Attainability Analyses for those streams impacted by acid mine

drainage, the result of which would change the designated uses to non-fishable/swimmable designations; or

Option #2 - Discharger Request a Variance: Grant to individual dischargers a variance from meeting in-stream criteria; existing uses, however, must be met and the variance must be renewed every three years.

Under either option, the resulting criteria and discharge limits must be adequate to protect the existing uses of the stream.

§ 9 Establishment of Safe Concentration Values

- Category B3 must also be included in the first paragraph.
- The information in Section 46-1-9 represents only a portion of all that is necessary to establish safe concentration values. As a result, these provisions do not relieve the State from the requirement to have a program to require Whole Effluent Toxicity (WET) Testing limits in NPDES permits consistent with 40 CFR 122.44.
- The correct reference for the bioassay testing document is as follows:
 - 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
- West Virginia may want to include a statement that they will refer to the document as referenced in this section or "to the most recent documents".
- These provisions do not include information on how a discharger might use the Water Effect Ratio (WER) to develop site-specific criteria. For the benefit of the dischargers in the State, EPA recommends that West Virginia, at a minimum, refer to our interim guidance, Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals, February 1994, to adopt general procedures.
- Recent guidance issued by EPA (Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1993) indicates that the dissolved form of metals is the preferred form for characterizing toxicity. West Virginia appears to have made the decision to maintain Total Recoverable as the appropriate form. Should West Virginia decide to adopt dissolved criteria in the future, additional changes to the water quality standards will be necessary.

§§ 9.3 & 9.4

These subsections appear to be intended to address the requirements of 40 CFR 122.44 and, as such, should be included in West Virginia's permit regulations and not in the water quality standards regulations.

APPENDIX A: Category B-2 - Trout Waters

- EPA recommends that the State renumber the pages of the Appendices in the following manner: Appendix A = A-1 through A-6; Appendix B = B-1 through B-7; etc.
- There is a typographical error in the first line. It should read: "This list contains known tROUT waters..."
- The reference made to the definition section should be 2.16 instead of 2.14.

APPENDIX E: Criteria Table

- § 8.1 Aluminum - West Virginia should add to the criteria description the exception for the segment of Opequon Creek that has a site-specific criterion for this parameter.
- § 8.7 Cadmium - West Virginia must state the hardness values in terms mg/l as CaCO₃ and the Cadmium values as ug/l total recoverable Cadmium.
- § 8.7.2 - West Virginia must provide a rationale for this criterion.
- § 8.7.3 - This should say: "The four-day average concentration of total recoverable cadmium..."
- The 'X' should be in the 'B2 - Chronic' box instead of the 'Human Health C' box.
- § 8.11 Dissolved Oxygen - There should be an 'X' in all the boxes for this parameter.
- § 8.11.1 - There should be an 'X' in the 'B1, 3, 4 - Acute' box.
- § 8.11.2 - There should be an 'X' in the 'B1, 3, 4 - Acute' box.
- § 8.11.3 - There should be an 'X' in the 'B2 - Acute' box.
- § 8.14 - West Virginia has failed to include criteria (both human health and aquatic life) for trivalent chromium.
- § 8.15 Iron - The Aquatic Life chronic criterion should be 1.0 mg/l and the Human Health - Public Water Supply criterion should be 0.3 mg/l.
- § 8.15.1 - Delete this item per EPA's comments on § 8.4.
- § 8.15.2 - Effluent limits are not an appropriate component of water quality standards. West Virginia should refer to our first comment under Section 8.4 of this enclosure.
- § 8.17 Manganese - The Human Health - Public Water Supply criterion should be 30 ug/l.
- § 8.17.1 - Delete this item per EPA's comments on § 8.4.
- § 8.17.2 - See comment for § 8.15.2.
- § 8.18 Mercury - The Human Health criteria for mercury should be 0.014 ug/l and 0.15 ug/l to protect humans from consumption of mercury in water and organisms (public water supply and

aquatic life use) or organisms only (aquatic life use only). EPA recognizes West Virginia's desire to minimize fish consumption. However, we feel that a body burden standard for mercury in fish may be difficult to enforce.

- § 8.19 Nickel - There appears to be a typographical error for the Aquatic Life - Chronic criterion value. It should be 510 ug/l.
- § 8.19.1 - This should say: "The four-day average concentration of total recoverable nickel..." Also, add an 'X' to the 'Aquatic Life - B2/Chronic' box.
- § 8.22 Organics - The human health criteria for 1,1,2,2-tetrachloroethane should be 0.17 ug/l for consumption of water and organisms and 11 ug/l for organisms only.
- § 8.22.1 - The meaning and implementation of this provision is unclear. In-stream criteria cannot be replaced by laboratory quantification levels. West Virginia must clarify this statement.
- § 8.23.1 pH - Refer to comment on § 8.15.2.
- § 8.26 Selenium - The acute values should be 5 ug/l instead of 20 ug/l.
- § 8.28.2 - The temperature-rise limit should be consistent with the text on page 21.
- § 8.30 Total Residual Chlorine - The acute and chronic criterion values are reversed. The acute value is 11 ug/l and the chronic value is 19 ug/l.
- § 8.33.2 Zinc - The reference for the 'Four-day Average concentration of total recoverable zinc' should be added.
- § 8.33.3 - This criterion appears to be numerically equivalent to the bioconcentration factor for zinc. West Virginia should provide a rationale for this criterion.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

JAN 10 1994

Dr. David E. Samuel
Chairman
West Virginia State Water Resources Board
615 E. Washington Street
Charleston, WV 25311

RECEIVED

JAN 10 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

Dear Dr. Samuel:

On October 12, 1993, we received the final revisions to West Virginia's Legislative Rules, Title 46, governing water quality standards, for review and approval by the Environmental Protection Agency (EPA). The purpose of this letter is to inform you of our determination that some parts of this rule can receive only conditional approval at this time and that some parts must be disapproved in their entirety.

In accordance with Section 303(c)(1) of the Clean Water Act (CWA), a State shall, at least once every three years, review its water quality standards and modify and adopt revisions as appropriate. West Virginia's last triennial review was finalized when its revised water quality standards became effective on April 28, 1989. The next triennial review was to be completed by April 28, 1992. Efforts to fulfill this obligation were initiated by the Water Resources Board when they submitted proposed water quality standards to the EPA on May 17, 1991. On June 27, 1991, and again on June 2, 1992, EPA submitted extensive comments to the Board identifying serious deficiencies in the proposed standards. However, the Board went forward in proposing these standards for consideration during the 1991 and 1992 legislative sessions, with final adoption occurring on August 25, 1993.

Pursuant to 40 CFR 131.21 and Section 303(c)(1) of the CWA, EPA is disapproving those sections of the State's regulations outlined in the attached document under the title "Required Revisions". These elements include:

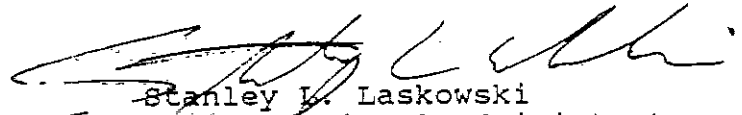
1) 46-1-4 Antidegradation Policy

EPA has determined that the State has failed to adopt an adequate antidegradation policy for high quality waters and that the State's policy, as written, will not protect existing uses.

The attached document also includes a section titled "Recommended Revisions", which the State is strongly encouraged to consider. Without these revisions, the State will be severely handicapped in it's ability to implement the standards in NPDES permits, and will be prevented from implementing such policies as mixing zones and variances in cases where the State may wish to do so. The State will also find that these recommendations will facilitate the revisions that EPA is requiring the State to make.

Our respective staffs have been involved in a cooperative effort to resolve the technical issues surrounding the water quality standards. We will continue to assist the State in these efforts. If your have any questions, please don't hesitate to contact this office or have your staff contact Evelyn MacKnight at (215) 597-4491 or Kathleen Stager at (215) 597-6746.

Sincerely,



Stanley L. Laskowski
Acting Regional Administrator

Enclosure

cc: John M. Ranson

- there are no significant health risks, considering likely pathways of exposure.

EPA has determined that the State's mixing zone provisions do not ensure that the above conditions will be met in any water body where a mixing zone may be allowed to exist. Although the standards allow the State to collect specific information concerning discharge characteristics, the State does not mandate that this information will be used to size a mixing zone that is predicated on ecological concerns. For instance, section 5.2.a.1 requires that mixing zones will be kept **as small as practical**; section 5.2.a.3 requires that they will provide as rapid a mixing **as practical**; section 5.3 states that the boundaries of a mixing zone shall reflect what is essentially a list of hydrologic features, independent of how those features might affect the integrity of the water body as a whole, prevent lethality to passing organisms, or prevent significant health risks. Consequently, EPA disapproves this section in its entirety. To correct this deficiency, criteria must either be applied at end-of-pipe or the State must develop a mixing zone policy that is of sufficient detail to ensure that the biological and chemical integrity of streams will be protected.

46-1-7 West Virginia Waters

Section 7.2.d

This section is described in the regulation as establishing "site-specific applicability of water use categories and water quality criteria". Federal regulations allow States to designate a variety of uses and to establish site-specific water quality criteria to support those uses and to reflect site specific conditions that would affect the applicability of state wide criteria. However, this section of West Virginia's standards establishes designated uses that are less than the "fishable/swimmable" goals of the Clean Water Act (CWA), grants variances from meeting water quality standards to specific dischargers based on economic and other considerations, and sets alternate criteria for the affected stream reaches that are not scientifically defensible.

According to 40 CFR 131.10, a State must conduct a use attainability analysis (UAA) whenever a designated use is less than or different from the uses specified in section 101(a)(2) of the CWA or whenever the State wishes to remove a designated use that is not an existing use. In addition, 40 CFR 131.10(g) establishes the only criteria under which a designated use specified in section 101(a)(2) may be removed. Site-specific criteria to support designated uses and/or to reflect site-specific conditions must be developed according to 40 CFR 131.11(b). EPA has determined that the State has not met these Federal requirements for removing uses, designating uses other

authority to issue such variances. West Virginia's legal authority to modify state-wide standards is confined to site-specific criteria modifications that support specific designated uses. Such modifications must have a scientific basis to indicate that they will adequately protect existing and designated uses. The State may not use this section of the regulations to grant variances to dischargers from meeting water quality standards. Therefore, EPA must disapprove this section of the regulations. The State must remove these exceptions to the standards and adopt state-wide criteria for this stream reach or develop scientifically defensible site-specific criteria. If the State wishes to grant variances to dischargers, the State's regulations must be amended to include the authority to do so.

7.2.d.20.D - This section establishes alternate temperature criteria for a portion of Simmons Creek. EPA believes that the temperature criteria do not support the CWA section 101(a)(2) goals and they do not comply with the 40 CFR 131.11(a) requirement that states adopt criteria to protect designated uses. Therefore, EPA disapproves this section of the regulations. The State must either restore state-wide criteria for this stream reach, remove the designated aquatic or recreational use pursuant to a UAA, or develop scientifically defensible site-specific water quality criteria.

7.2.d.29.A - This section establishes an alternate criterion for iron in a portion of Laurel Creek. EPA believes that this iron criterion will not protect the aquatic or recreational uses of this stream. Therefore, EPA disapproves this section of the regulations. The State must either restore state-wide criteria for this stream reach, remove the designated aquatic or recreational use pursuant to a UAA, or develop scientifically defensible site-specific water quality criteria.

46-1-8 Specific Water Quality Criteria

Section 8.2.a

This section incorrectly restricts the regulation of carcinogens to streams with a drinking water use category. Criteria intended to protect human health from the effects of either systemic and carcinogenic pollutants must also apply to streams designated for recreational use. Section 6.4 of the State's standards includes in the definition of Category C (water contact recreation) the use of such for waters for fishing. EPA interprets this use designation to inherently require human health protection for the consumption of fish. EPA must

- Limit the range of hardness values used to calculate hardness-dependent criteria to no lower than 25 mg/l and no higher than 400 mg/l, measured as CaCO_3 , regardless of actual instream hardness.
- Adopt a fish consumption value of 4300 ug/l for antimony under Use Category C.
- EPA has published a chronic criterion for iron for protection of aquatic life which is more stringent than that listed under Use Categories B1, B3 and B4. The State must adopt EPA's criterion for iron or submit documentation showing that the State's adopted criteria is scientifically defensible and will protect these designated uses.
- EPA has published a criterion for iron for the protection of human health through consumption of water, based on an MCL of 300 mg/l. The criterion adopted by the State for Use Category A is less stringent. The State must either adopt EPA's criterion for Use Category A or provide documentation on the scientific defensibility of the State's criterion.
- EPA has published a human health criterion for manganese based on the consumption of water of 30 ug/l. The State had adopted a less stringent value of 1000 ug/l for Use Category A, public water supplies. The State must either adopt EPA's published criterion for manganese or provide documentation on the scientific defensibility of the State's criterion.
- EPA has published human health criteria for mercury based on both fish and water consumption and water consumption alone. Under Use Category A the criterion should be 0.15 ug/l for the protection of public water supplies, which is more stringent than the 0.2 ug/l criterion proposed by the State. The appropriate criterion for Use Category C, since this is the use designation that would provide protection for fish consumption, should be 0.14 ug/l, which is also more stringent than the 0.2 ug/l adopted by the State.
- Table 2 in Appendix I is a list of organic pollutants for which the State has not adopted all necessary criteria but which have been detected in the ambient water column, in sediment or in fish tissue samples. The State must adopt appropriate criteria for all pollutants which have a reasonable potential to interfere with designated uses. Any pollutant which is present in any point or non-point discharge or in any State water body is considered to have a reasonable potential to interfere with designated uses.
- Table 3 in Appendix I is a comparison between EPA's 304(a) criteria and the criteria adopted by the State. Much of this information is intended to provide the most current

Section 2.7

"Natural" or "naturally occurring" - It is not clear from this definition whether or not background concentrations of pollutants resulting from non-point source discharges are considered to be "natural" conditions. The State must provide a legal interpretation concerning the role of non-point sources in the definition of natural conditions. Section 7.2.c.4 of the State's standards establishes natural conditions as the applicable criteria where lesser quality is due to natural conditions. However, man-induced non-point sources of pollution that cause or contribute to background conditions that violate water quality criteria cannot be considered as "natural" conditions or as a justification for alternate water quality criteria. EPA's conditional approval of section 7.2.c.4 will be predicated on the State's interpretation of this definition.

Section 46-1-4 Anti-degradation Policy

Although the State has had an antidegradation policy section for several years, the State has not yet met the Federal requirement at 40 CFR 131.12(a), to develop implementation procedures for antidegradation and to submit them to EPA for review and approval. In the absence of such procedures, EPA cannot fully evaluate the State's antidegradation policy. We are constrained at this time to issuing a conditional approval of the policy until implementation procedures are developed and submitted to EPA for review. To assist the State in determining the scope and content of the implementation procedures, we have included as Appendix II, Regional guidance concerning the questions that must be answered through the procedures.

Aside from the specific problems outlined for this section in "Required Revisions", there is the general problem that the antidegradation policy combines the concept of antidegradation with the concept of establishing designated uses. (The difference between these two concepts and the way they are used in the State's standards is explained in detail in a letter from Acting EPA Regional Administrator, Stanley Laskowski, to Dr. Samuel of the State Water Resources Board, dated June 21, 1993, which is attached as Appendix I). Since the basic framework for the antidegradation policy is interspersed in the section, on this particular issue EPA can conditionally approve this section, with full approval (pending satisfaction of the conditions required in this document under "Required Revisions") to be granted if one of the following contingencies is met:

- 1) The State reorders the sentences and paragraphs in this section so that the antidegradation policy is clearly and accurately established in a logical order in one part of the regulation. EPA strongly encourages the State to exercise this option because it will clarify the regulations and make

cases, to the tributaries to those waters that are listed in 7.3.d. An Attorney General's statement must be provided which fully describes the State's interpretation and implementation of sections 2.6, 4.1.g and 7.3.d. If EPA determines that the Attorney General's statement does not comply with Federal requirements, then EPA must disapprove the antidegradation policy for lack of an adequate Tier III level of protection.

46-1-6 Water Use Categories

Section 6.3.c

This section establishes a designated use (Category B3) which describes "small non-fishable streams" that do not support sport fishing. The State must be cautioned that Category B is for the propagation and maintenance of fish and other aquatic life. If this category, and specifically this subcategory, is intended to meet the goals of the CWA at section 101(a)(2), then protection of aquatic life cannot be confined to "fishable" aquatic life, or be directed at protecting sport fishing. If the State uses B3 to set alternate water quality criteria on the basis that a stream so designated does not support a "fishable" population, then a UAA must be developed whenever the State uses a B3 designation because this use category does not meet the goals of the CWA at section 101(a)(2). The State must provide a statement outlining how this use designation will be implemented before it can be approved by EPA.

46-1-7 West Virginia Waters

Section 7.2.d.20.B

This section removes Use Categories A and B1 and sets the designated use as B3 for a portion of Little Scary Creek. It also establishes alternate criteria for arsenic, selenium and copper. As noted in our comments for section 6.3.c under "Conditionally Approved", Use Category B3 cannot be used as justification for alternate criteria that does not support aquatic life. EPA will revisit the documentation for the criteria adopted for Scary Creek and will notify the State concerning its approvability.

Section 7.2.c.4

As noted in the conditional approval for the definition of "natural" or "naturally occurring", the State must define the role of background levels of pollutants due solely or in part from non-point sources in the consideration of what constitutes natural conditions. If the State determines that non-point source contributions to background conditions are considered "natural", then this section will be disapproved by EPA. It

document, an example of how the State may want to do this. This Appendix is included for guidance purposes only, and addresses only the most critical portions of the State's standards.

- EPA commends the State for adopting the provision in Section 3.2.i that prohibits any discharge from adversely impacting the biological components of aquatic ecosystems. The placement and phrasing of this provision classifies it as a "free from" provision for discharges impacting State waters and is approvable as such by EPA. However, the State may have intended for this provision to meet the objectives of the Clean Water Act (CWA) and the statutory requirements under Sections 303 and 304 to adopt narrative and/or numeric biological criteria. However, biological criteria cannot be expressed as "free from" statements that are related to the impacts of discharges. Biological criteria are "numerical values or narrative expressions that describe the reference biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use" (Biological Criteria, EPA-440/5-90-004). In the context of a "free from" statement, EPA approves this provision but we expect the State to adopt an adequate narrative or numeric biological criteria statement.

2) 46-1-5 Mixing Zones

EPA has determined that the State has adopted a mixing policy that will not protect the integrity of a water body as a whole, will not prevent lethality to passing organisms, and will not prevent significant health risks from occurring.

3) 46-1-7 West Virginia Waters

EPA has determined that this section fails to establish scientifically defensible site-specific criteria that have been demonstrated to be able to support designated uses. In addition, this section has been used by the State to grant variances to dischargers from meeting State-wide applicable criteria. The State's regulations, in their current form, do not have adequate legal authority for issuing such variances.

4) 46-1-8 Specific Water Quality Criteria

EPA has determined that this section inappropriately restricts the application of criteria intended to protect human health and aquatic life. In addition, the State has adopted criteria that are less stringent than that published by EPA under section 304(a) of the CWA, without providing adequate documentation concerning the scientific defensibility of such criteria.

The Federal regulations at 40 CFR 131.22(a) mandate that the Administrator must promptly propose and promulgate changes to those standards that have been disapproved should the State fail to do so within 90 days after notification by the Regional Administrator that the standards have been disapproved. Therefore, we request that no later than 30 days after the date of this letter, you inform EPA concerning the actions the State proposes to take to adopt the necessary changes to the regulations.

Pursuant to 40 CFR 131.21 and Section 303(c)(1) of the CWA, EPA conditionally approves those sections of the regulations identified in the attached document under the title "Conditional Approval". These sections have not received final approval because EPA does not have sufficient information concerning the State's interpretation and implementation of these sections. Please submit the information outlined in the attached document within 90 days of this letter; upon review of such information, EPA will determine if the regulations are approvable. If the State fails to comply with the provisions of the conditional approval, EPA will notify the State that the subject regulations will be disapproved.

APPENDIX I

by the legislature and that these standards do not fully address the requirements of the 1992 triennial review. Consequently, we will have no choice but to disapprove those parts of the standards that do not meet or conform to Federal requirements when these standards are submitted to EPA for review and approval.

Furthermore, we are concerned that the Water Resources Board will be on a tight schedule to prepare revised Federally-approvable standards which could be adopted during the 1994 legislative session, placing West Virginia in jeopardy of being more than two years late in meeting the current triennial review requirements.

If that unfortunate sequence of events occurs, as we anticipate it will, the State is still responsible for completing the triennial review process in a timely manner by adopting revised standards that reflect the requirements outlined in our June 2, 1992 letter to the Board and correcting the deficiencies identified in this and previous correspondence. Therefore, we request that you send a letter within the next month outlining the steps that will be taken to have a Federally-approvable water quality standards package prepared for the 1994 legislative session. If, for any reason, the Board believes that it is not possible to revise the standards to conform to this and previous correspondence in time for the next legislative session, EPA must consider Federal promulgation of water quality standards for the State.

Enclosed are our specific comments identifying the issues that still need to be addressed. The most critical issues discussed in these comments include:

1. a Federally-approvable antidegradation policy and implementation procedures including clearly defined tiers of protection and a mechanism for protecting outstanding National resource waters;
2. upgraded designated uses for waters which have improved water quality and now meet a more stringent use category;
3. narrative water quality standards for wetlands through the incorporation of wetlands into the definition of "state waters", and extension of the antidegradation policy to wetlands;
4. clarification of the narrative biological criterion;
5. an appropriate mixing zone policy for criteria that are not intended to be applied at end of pipe, to include definition of size, shape, location and in-zone water quality;

THE ENVIRONMENTAL PROTECTION AGENCY'S (EPA'S) COMMENTS ON THE PROPOSED REVISIONS TO WEST VIRGINIA'S WATER QUALITY STANDARDS

Section 46-1-3 Conditions Not Allowable in State Waters

3.2.i - EPA commends the State for proposing a narrative criterion that prohibits adverse impacts to the biological integrity of State waters. However, the State's expression of this narrative criterion is inconsistent with the function of protecting biological integrity as expressed in the goals of the Clean Water Act (CWA). EPA's guidance document, Biological Criteria (EPA-440/5-90-004), describes biological integrity as:

"...the condition of the aquatic community inhabiting the unimpaired water bodies of a specified habitat as measured by community structure and function."

The State's proposed narrative criterion appears to prevent only further impact from occurring and does not link the protection of biological integrity with the designated or potential uses of a water body. Rather, a narrative biological criterion should be an affirmative statement concerning what is attainable in a water body relative to unimpacted reference sites and should include specific language about aquatic community characteristics that must exist in a water body to meet the designated use. In order to be considered to have an acceptable narrative biological criterion, the State must propose a criterion that provides for the attainment and maintenance of biological integrity as defined above and as it relates to supporting the designated use of a water body.

Section 46-1-4 Antidegradation Policy

The Federal regulations at 40 CFR 131.12 (a) outline two basic elements that are necessary to satisfy the antidegradation provisions of the CWA: (1) a statewide antidegradation policy, and (2) methods for implementing that policy. Inherent in the Federal regulations is the requirement that the antidegradation policy must be included in a State's water quality standards regulation in order for those standards regulations to be considered complete. Although there are deficiencies in the policy, West Virginia has satisfied the first element by including the basic framework for an antidegradation policy in the water quality standards. However, the federal regulations also require States to identify the procedures that will be used to implement the antidegradation policy. Although these are not required to be in a regulatory form, the State must develop and submit to EPA implementation procedures for the antidegradation policy.

In general, the antidegradation policy appears to be incorrectly combining the concept of antidegradation with the concept of establishing designated uses. For instance, subsection 4.1.a requires that existing uses be maintained and protected and defines the term "existing use". However, this same section goes on to describe the manner in which designated uses are to be

Therefore, narrative and numeric water quality criteria are required to be written to support the designated use, and by implication, the potential use of a water body.

In contrast to the protection afforded by designated uses, an antidegradation policy is intended to maintain and protect various levels of existing water quality and uses. At a minimum, all existing uses and water quality sufficient to protect those uses must be maintained and protected (Tier I protection). The federal regulations at 40 CFR 131.12 also require protection of existing water quality where the quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (Tier II). For this level of antidegradation protection, there can be some limited water quality degradation to allow for necessary economic/social development but only after extensive public involvement and only if existing uses are fully maintained. Finally, a third level of protection (Tier III) must be provided for Outstanding National Resource waters (ONRWs) which mandates that existing water quality shall be absolutely maintained and protected.

This concept of providing tiered levels of antidegradation protection is based on a relationship between maintaining existing uses and maintaining water quality, which can be separate, albeit sometimes parallel objectives. At the Tier I level, which applies to all waters, existing uses must be maintained and protected. The level of protection escalates for high quality waters in Tier II, which allows limited degradation in water quality but only to accommodate important economic and social development and requires that the level of water quality remain adequate to protect existing uses fully. At the Tier III level, water quality must be maintained absolutely, i.e. there is to be no additional degradation in water quality other than that which is short-term or temporary in nature. This last requirement does not condition degradation in any way through maintaining a designated use, an existing use or the criteria to support a use.

Attached to these comments is the EPA document "Questions and Answers on: Anti-degradation", which should be helpful in explaining the concepts of antidegradation and the relationship between existing and designated uses.

4.1.a - This section appears to be analogous to the Federal Tier I level of protection, but includes a portion, beginning with the sentence "...The classification of the waters..." that describes the federal method for establishing designated uses and includes a phrase that allows criteria to be set according to such classification of uses. As described above, criteria are to be based on the potential uses of a water body whether or not they are existing uses, whereas antidegradation establishes the baseline water quality that is to be maintained apart from criteria

The State must provide a schedule to EPA for the development of antidegradation implementation procedures. These procedures, in addition to the antidegradation policy, are required under 40 CFR 131.12 (a). The State must either include the implementation procedures as part of Section 4.1 of the standards regulation or reference the procedures in Section 4.1.

Section 46-1.5 Mixing Zones

5.2.a - This subsection must identify specific procedures that will be used in establishing mixing zones. For instance, how will zones of passage be established and areas of mixing minimized. If procedures have not been developed, a statement may be added indicating that mixing zones will be established in accordance with EPA's Technical Support Document for Water Quality-based Toxics Control (TSD) EPA/505/2-90-001.

Section 46-1-6 Water Use Categories

6.1 - The State is to be commended for designating all waters of the State according to the goals of the Clean Water Act. However, the goals of the CWA (as defined in sections 101(a)(2) and 303(c)) are for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water. In order to be consistent with the Act, we recommend that this subsection be amended to include at least a narrative statement that all waters are also designated for the protection of wildlife.

6.3.d and 6.5.c - The State needs to clarify what criteria are to be adopted for wetlands at this point in time, and what criteria the State believes may not be applicable to wetlands.

Section 46-1-7 West Virginia Waters

7.2.c - This subsection must be rewritten to indicate that numeric water quality standards (more appropriately expressed as criteria) will not apply when the conditions expressed in the succeeding subsections occur. Narrative criteria must apply in all waters at all times in order to comply with Section 303(c)(2)(A) of the CWA.

7.2.c.2 - This subsection waives the application of water quality standards for wet weather streams when they are dry or have no measurable flow. The standards should identify which streams fall under these categories. In addition, if the discharge of an effluent to a water body provides sufficient volume of water to support uses (e.g., aquatic life, recreation, etc.), then the water body must be protected for those uses.

7.2.d.7.B - This section describes numerous site-specific criteria for an unnamed tributary to the Monongahela River. These criteria were apparently intended to implement the variance which was granted to Sharon Steel Corp. on April 27, 1987. A variance is,

Section 46-1-8 Specific Water Quality Criteria

8.2.b - This subsection states that for Category B, the criteria for organic carcinogens are for the protection against accumulation of carcinogens in fish flesh. However, the use designation for Category B in subsection 6.3 is for the propagation and maintenance of fish and other aquatic life. It must be noted that the tests, the endpoints, and the exposure pathways and frequency that drive the criteria for human health are completely different from those used to protect aquatic life. In fact, it is technically incorrect to assume that there is any correlation between protection against bioconcentration and/or bioaccumulation and protection from toxicity to aquatic life. Human health criteria must be used to support use designations that address exposure to humans through either fish and water consumption combined, or fish consumption alone. It is inappropriate to support a use designation aimed at the propagation and maintenance of fish and other aquatic life with human health criteria.

Appendix B Specific Water Quality Criteria

General Comments

The State must adopt acute aquatic life criteria for all pollutants which are discharged into or are present in State waters and for which CWA Section 304(a) acute aquatic life criteria have been published. Protection from acutely toxic concentrations is generally provided when chronic criteria are applied as never-to-be-exceeded criteria. However, since the State's chronic criteria (as presently applied to point source discharges) are not applied at end-of-pipe, there can be no assurance that acute protection is being provided. Therefore, acute criteria are necessary in order to adequately protect against impacts to aquatic life. The acute criteria that must be adopted for West Virginia waters, based on the existing standards and identification of pollutants known to occur in State waters, are listed in Table 1.

The State also needs to be aware that there are hardness limitations that must be used when calculating the criteria for hardness-dependent metals and that the standards must be revised to reflect the science underlying the metals criteria. The preamble to the National Toxics Rule provides the following justification for the limits that are to be imposed:

"The database used for the Section 304(a) criteria documents for metals do not include data supporting the extrapolation of the hardness effects on metal toxicity beyond a range of 25 mg/l to 400 mg/l (as CaCO₃). Thus, the aquatic life values for the CMC (acute) and CCC (chronic) criteria for these metals in waters with a hardness less than 25 mg/l, must

We would also like to update the State on the status of the human health criterion for beryllium previously published by EPA. This pollutant is no longer considered to be a human carcinogen and was consequently removed by the National Toxics Rule. However, an Rfd value of 0.005 was published in December 1985, from which a criterion can be calculated, based on non-carcinogenic effects.

Cadmium - The State has listed the criteria under Category A, the public water supply use designation, as being hardness dependent, based on the soluble form of the metal (subsection 8.7). It appears that the State has mistakenly applied criteria for aquatic life to a use designation that must consider effects to human health. Any criteria for public water supplies must be based on protection of human health from exposure through ingestion of water. Therefore, the State must provide documentation for the use of the criteria in subsection 8.7 for the protection of human health. The State should be aware that EPA is reevaluating the toxicity of cadmium from exposure to water in terms of bioconcentration potential and has removed the human health criterion for cadmium in the National Toxics Rule.

The basis for subsection 8.7.2 is unclear. The State must clarify the intended form of the metal in the criteria and provide documentation on the relationship of hardness to toxicity and the specific application to trout waters.

For chronic protection to aquatic life, subsection 8.7.3 is correct, however, the State must provide documentation on the use of this criteria for protection under the Category C use designation.

Chloride - EPA has published aquatic life criteria for chloride that is more stringent than the criteria listed in subsection 8.8. The State must provide documentation on the derivation of this alternate criteria and also demonstrate its applicability to Categories C and A.

Dissolved Oxygen - We believe there is a typographical error in subsection 8.11.2. The first sentence of the narrative should read "...The average concentration shall not be less than 5.0 mg/l per calendar day...".

Hexavalent Chromium - The State should be aware that EPA removed the human health criteria for this parameter in the National Toxics Rule after a determination that the proposed criteria were not scientifically defensible. This may affect the State's actions with respect to the criterion at subsection 8.14 for Category A, the public water supply use designation.

Subsections 8.14.1 and 8.14.2 indicate that the State has differentiated the toxicity of this metal according to aquatic

water consumption and water consumption alone at 610 ug/l and 4600 ug/l respectively. The State has proposed a more stringent value than either of EPA's criteria for Category A and may wish to reconsider proposing a criterion that reflects the current science for this parameter. However, the State must include EPA's fish consumption criterion for Category C for reasons explained above.

The State has proposed a criterion for Category B2 that is different from EPA's chronic criterion for the protection of aquatic life. As for other parameters noted above, the State has differentiated the aquatic life criteria according to species, i.e. trout versus non-trout waters. Justification should be provided by the State explaining the scientific basis for this criterion.

Organics

Table 2 is a list of organic pollutants for which the State has not adopted all necessary criteria but which have been detected in the ambient water column, in sediment, or in fish tissue samples. As discussed in the National Toxics Rule, States must adopt appropriate criteria for all pollutants which have a reasonable potential to interfere with designated uses. Furthermore, any pollutant which is present in an effluent discharge or in any State water body is considered to have a reasonable potential to interfere with designated uses.

Table 3 is a comparison between EPA's 304(a) criteria and the criteria proposed by the State. In order to ensure that the proposed standards reflect the most current information available, the criteria have been evaluated according to the criteria promulgated by EPA under the National Toxics Rule. We have also evaluated the standards for technical accuracy so that, where appropriate, the criteria reflect the basis upon which they have been developed. In cases where a criterion is more stringent than necessary, EPA will not require a revision, however, we believe the State should be informed concerning options in developing the water quality standards.

For the highlighted criteria in Table 3, the State must either submit the scientific basis for the criteria indicating that they will be protective for that use designation, or adopt EPA's updated criteria. It is important to note that EPA's human health criteria for fish and water consumption are intended to be used to support Category A. EPA's human health criteria for fish consumption alone are to be used to support the Category C use designation.

Selenium - The State should be aware that the human health criteria for this parameter were removed by the National Toxics Rule. EPA is re-evaluating the human health assessment for selenium based on new epidemiological data.

TABLE 1

EPA ACUTE CRITERIA FOR PROTECTION OF AQUATIC LIFE⁽¹⁾

<u>PARAMETER</u>	<u>CRITERION (ug/l)</u>
Arsenic	360 ug/l
Cadmium	$\exp(1.128 * (\ln H) - 3.828)$
Chromium (III)	$\exp(0.819 * (\ln H) + 3.688)$
Chromium (VI)	16
Copper	$\exp(0.9422 * (\ln H) - 1.464)$
Lead	$\exp(1.273 * (\ln H) - 1.46)$
Mercury	2.4
Nickel	$\exp(0.846 * (\ln H) + 3.3612)$
Selenium	20
Silver	$\exp(1.72 * (\ln H) - 6.52)$
Zinc	$\exp(0.8473 * (\ln H) + 0.8604)$
Cyanide	22
Aldrin ³	3
gamma - BHC ^{2,3}	2
Chlordane ³	2.4
DDT ³	1.1
Dieldrin ³	2.5
Endrin ³	0.18
Heptachlor ³	0.52

NOTES:

¹ EPA's acute criteria, also known as the Criteria Maximum Concentration (CMC), is equal to the highest concentration of a pollutant to which aquatic life can be exposed for a short time (1-hour average) without deleterious effects, unless otherwise noted.

² Other names for this pollutant are lindane and gamma-hexachlorocyclohexane.

³ Aquatic life criteria for these pollutants are final acute values (FAVs) which, by the 1980 Guidelines under which these criteria were published, are instantaneous values as contrasted with a CMC which is a 1-hour average.

TABLE 2 (cont'd)

² The EPA human health criteria presented in this table for carcinogens are based on a 10^{-4} risk level.

³ Carcinogenic pollutants.

⁴ A synonym for this parameter is lindane.

TABLE 3 (cont'd)

	EPA AQUATIC LIFE (ug/l)	WV AQUATIC LIFE (ug/l)	EPA FISH & WATER (ug/l)	WV USE CLASS A (ug/l)	EPA FISH ONLY (ug/l)	WV USE CLASS C (ug/l)
1,4 dichlorobenzene	no criterion	2600 ⁽²⁾	400	400	2600	no WV criterion
2,4 dinitrotoluene	no criterion	9.1 ⁽²⁾	0.11	0.11	2.1	no WV criterion
Hexachlorobenzene	no criterion	0.00074 ⁽⁴⁾	0.00075	0.00072	0.00077	no WV criterion
Carbon Tetrachloride	no criterion	4.4 ⁽²⁾	0.25	0.25	4.4	no WV criterion
Chloroform	no criterion	15.7 ⁽²⁾	5.7	0.19 ⁽²⁾	470	no WV criterion
Halomethanes	no criterion	15.7 ⁽²⁾	0.19	0.19	15.7	no WV criterion
1,2 dichloroethane	no criterion	98.6 ⁽²⁾	0.38	0.035 ⁽⁴⁾	99	no WV criterion
1,1,1 trichloroethane	no criterion	67300	* ⁽²⁾	12000	* ⁽²⁾	no WV criterion
1,1,2,2 tetrachloroethane	no criterion	10.7 ⁽²⁾	0.17	0.17	11	no WV criterion
1,1 di-chloroethylene	no criterion	1.9 ⁽²⁾	0.057	0.03 ⁽²⁾	3.2	no WV criterion

TABLE 3 (cont'd)

- ① These appear to be aquatic life criteria that are used to support Category A and C use designations, which are to be aimed at protecting human health. In most cases these proposed criteria are more stringent than necessary and it would be more appropriate to use EPA's human health criteria.
- ② The basis for these criteria is unclear. The State should provide documentation concerning the scientific bases for these criteria.
- ③ The State should update these human health criteria using the EPA criteria in the Table. In these cases, the State's criteria are more stringent than the criteria recently promulgated in the National Toxics Rule.
- ④ The human health criteria for this parameter was removed by the National Toxics Rule. The previous criteria were calculated using an RfD based on inhalation data, and it is not generally appropriate to use inhalation data to estimate oral risk.
- ⑤ The underlined criteria are EPA criteria that must replace the corresponding proposed State criteria, i.e., where the State criteria is less stringent than that published by EPA under section 304(a) of the CWA. EPA chronic aquatic life criteria are to be implemented under Categories B1, B2, B3 and B4; EPA human health criteria for the consumption of fish and water are to be implemented under Category A; and EPA human health criteria for fish consumption are to be implemented under Category C.

EPA REGION III GUIDELINES FOR REVIEW OF STATE ANTIDegradation POLICY IMPLEMENTATION PROCEDURES

The Federal antidegradation policy is authorized under Section 303(d)(4) of the Clean Water Act and its implementing regulations. The Federal requirements on antidegradation are defined in Section 131.12 of the EPA's water quality standards regulation promulgated on November 8, 1983. These regulations require States to adopt an antidegradation policy and also to identify the procedures that will be used to implement the policy. An antidegradation policy is one of the minimum elements which must be included in each State's water quality standards. The Federal policy consists of a three-tiered approach for protecting water quality. EPA Region III considers minimum requirements of a State's antidegradation policy to be that which would provide for the following:

Tier 1 - To protect and maintain existing instream water uses at all times;

Tier 2 - To protect and maintain waters exceeding the criteria for fishable/swimmable by not allowing lowering of water quality except where certain requirements are met. Those requirements include at least full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process; adequate demonstration that lowering of water quality is necessary to accommodate important economic or social development in the area in which the waters are located; full protection of existing uses; and achievement of controls for new and existing point and nonpoint sources as defined in 40 CFR 131.12(a)(2).

Tier 3 - To have in place a process to protect waters which are of sufficiently high and/or unique quality to constitute an outstanding national resource from any lowering of water quality, except under certain temporary conditions, and which prohibits new or expanded sources which affect waters which are designated as outstanding national resources.

A number of States in the nation have adopted a hybrid tier of protection for waters which may be of special State significance; this tier is commonly referred to as Tier 2.5. Tier 2.5 provisions typically provide for more protection than that required under Tier 2, but may allow new or expanded sources of pollutants so long as no changes in ambient water quality will occur. Although this tier of protection is not entirely equivalent to that required by Tier 3, creation of a Tier 2.5 category can significantly improve the degree of protection afforded to important State water resources.

As a national goal for the FY 91-93 triennium for water quality standards, each State is expected to have in place an EPA-approved antidegradation policy as part of the State's water quality standards regulations and also to have completed approved procedures which outline how that policy will be implemented. EPA Region III expects that all States in Region III will have completed antidegradation implementation procedures by October 1, 1993; several States have largely completed such procedures. EPA Region III intends to review each State's antidegradation policy and procedures to determine whether they meet the

documented?

10. How will intergovernmental coordination be accomplished? How will the procedures handle situations which cross organizational lines at the State and local level?

11. How will the State insure that both point and nonpoint sources of pollution are addressed?

The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

1. How will the State identify "existing instream uses" as they are defined to be those which have occurred on or since November 28, 1975.

2. How will the "level of water quality necessary to protect the existing uses" be defined?

4. How will the State insure that existing instream uses are maintained and protected from degradation by point sources, nonpoint sources, both individually and from cumulative impacts?

5. How will the State insure that existing instream uses are protected from impacts other than those related to water column chemistry?

(2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing such degradation or lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

1. How will the State define "High Quality Waters", or those which exceed that

12. How will the State insure that existing instream uses are maintained where a decision to lower water quality below existing conditions is made?
13. How will the public and other affected parties know that Tier 2 protection applies, that a decision is pending, and that a decision has been made?

(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significant, that water quality shall be maintained and protected.

1. What criteria will be used to designate Outstanding National Resource Waters (ONRWs) in the State?
2. How will potential candidates for ONRW designation be identified?
3. What process will be used to designate ONRWs?
3. How will the public be informed of the criteria for ONRWs, and the process whereby ONRW's can be nominated? What other mechanisms will be used to insure that waterbodies which qualify for ONRW status are so designated?
5. How will the State insure that ONRWs are protected from new or expanded sources?.
6. What types of temporary and limited impacts to ONRW's may occur?

Program Support Branch (3WM10)
Water Management Division
U. S. EPA Region III
October 15, 1992

ANTI-DEGRADATION

4.1.a Existing instream 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 the water body on or after November 28, 1975, whether or not they are included as designated uses within these water quality zones.

4.1.b The existing trout and other high quality waters of the State must be maintained at their existing high quality unless it is determined after consultation with EPA and the Chief 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 recreation in and on the water. The Board and Chief 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 for non-point source control.

4.1.c In all cases, waters which constitute an outstanding national resource as designated in Section 7.3.d shall be maintained and protected and improved where necessary.

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.

AQUATIC LIFE

Acute criteria (CMC)	1Q10 or 1B3
Chronic criteria (CCC)	7Q10 or 4B3

HUMAN HEALTH

Non-carcinogens	3Q05
Carcinogens	Harmonic mean flow

Where:

1Q10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically;

1B3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model);

7Q10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically;

4B3 is biologically based and indicates an allowable exceedence for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model);

3Q05 is the lowest average 30 consecutive day low flow with an average recurrence frequency of once in 5 years determined hydrologically; and

harmonic mean flow is a long term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows.

3 years, this should not be interpreted as implying that a 4Q3 low-flow is appropriate for use as the design flow.

EPA had recommended interim use of the 1Q5 and 1Q10 low-flow as the CMC design flow and the 7Q5 and 7Q10 low-flows as the CCC design flow for unstressed and stressed systems, respectively. Further consideration of stress placed on aquatic ecosystems resulting from exceedences of water quality criteria indicates that there is little justification for different design flows for unstressed and stressed systems. All ecosystems have been changed and, therefore, stressed as a result of human activities. Therefore, the recommended design flow for CMC is 1Q10 and for CCC is 7Q10. States may designate other design or low-flows but such flows, must be scientifically justified. That many streams within a State have no flow at 7Q10 is not adequate justification for designating alternative flows.

5.3 Variances From Water Quality Standards

Exhibit 5-1. EPA recommendations for design flows

EPA has produced guidance on flow considerations (USEPA, 1986d) which calculates design flows based on steady-state modeling. Two design flows are calculated, one for the criterion continuous concentration (CCC) and one for the criterion maximum concentration (CMC). The CCC is the 4-day average concentration of a pollutant in ambient water that should not be exceeded more than once every 3 years on average. The CCC is therefore, a chronic concentration. The CMC is a 1-hour average concentration in ambient waters that should not be exceeded more than once every 3 years on average. The CMC is an acute concentration. Note that when a criterion specifies a 4-day average concentration that should not be exceeded more than once every

EPA first formally indicated allowability of State WQS variance provisions in Decision of the General Counsel No. 44, dated June 22, 1976, which specifically considered an Illinois variance provision, and expanded upon the acceptability of State WQS variance procedures in Decision of the General Counsel No. 53 (OGC No. 58) dated March 29, 1977 (published, in part, at 44 F.R. 39508 (July 6, 1979)). Subsequent guidance has elaborated on or clarified the policy over the years. For example, the Director of EPA's Criteria and Standards Division transmitted EPA's definition of a WQS variance to the Regional WQS Coordinators on July 3, 1979, and on March 15, 1985, the Director of the Office of Water Regulations and Standards, responding to questions raised on WQS variances, issued a reinterpretation of the factors that could be considered when granting variances.

APPENDIX V

PARAMETER	USE DESIGNATION						
	AQUATIC LIFE				HUMAN HEALTH		
	B1, 3, 4		B2		C ³	A ⁴	10
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²			
<p>8.7 Cadmium (ug/L)</p> <p><u>Hardness</u> <u>Soluble Cd</u></p> <p>0 - 35 1.0</p> <p>36 - 75 2.0</p> <p>76 - 150 5.0</p> <p>> 150 10.0</p>							
<p>8.7.1</p> <p>Not to exceed 10 ug/l in the Ohio River (0 Zone 1) main stem (See Section 7.1.d).</p>							
<p>8.7.2</p> <p>The one-hour average concentration of total recoverable cadmium shall not exceed the value determined by the following equation*:</p> $Cd = e^{(0.128[\ln(\text{hardness}) - 3.828])}$	X			X			
<p>8.7.3</p> <p>The four-day average concentration of total recoverable cadmium shall not exceed the value determined by the following equation*:</p> $Cd = e^{(0.7852[\ln(\text{hardness}) - 3.49])}$		X			X		
<p>8.8 Chloride (mg/l)</p>	860	230	860	230	250	250	

PARAMETER	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	B1, 3, 4		B2		C ³	A ⁴
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²		
8.11.2 In the 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				
8.11.3 The concentration shall not be less than 7.0 mg/l in spawning areas and in no case less than 6.0 mg/l at any time.			X			
8.12 Fecal Coliform Maximum allowable level of fecal coliform content for primary 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 exceed 400/100 ml in more than ten percent of all samples taken during the month.					X	X

PARAMETER	USE DESIGNATION				HUMAN HEALTH	
	AQUATIC LIFE				C ³	A ⁴
	B1,3,4		B2			
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²		
1,1-dichloroethylene (ug/l) ^(e)					3.2	0.03
Trichloroethylene (ug/l) ^(e)					81	2.7
Tetrachloroethylene (ug/l) ^(e)					8.85	0.8
Toluene (mg/l) ^(e)					200	6.8
PAHS (ug/l) ^(e)					0.031	.0028
Phthalate esters (ug/l)		3		3		
Vinyl chloride (ug/l) ^(e)					525	2
alpha-BHC (alpha-Hexachlorocyclohexane) (ug/l) ^(e)					0.013	.0039
beta-BHC (beta-Hexachlorocyclohexane) (ug/l) ^(e)					0.046	0.014
gamma-BHC (gamma-Hexachlorocyclohexane) (ug/l) ^(e)	2	0.08	2	0.08	0.063	0.019
Chlorobenzene (mg/l)					21	0.68
Ethylbenzene (mg/l)					29	3.1
Heptachlor (ng/l) ^(e)	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

PARAMETER	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	B1,3,4		B2		C ³	A ⁴
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²		
8.25 Radioactivity Gross Beta activity not to exceed 1000 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
8.25.1 Radioactivity Gross total alpha 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 5 pci/l; provided that the specific determination of radium-226 and radium-228 are not required if dissolved particle activity does not exceed 5 pci/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.						
8.26 Selenium (ug/l)	5	5	5	5		10

PARAMETER	USE DESIGNATION					
	AQUATIC LIFE				HUMAN HEALTH	
	B1, 3, 4		B2		C ³	A ⁴
	ACUTE ¹	CHRON ²	ACUTE ¹	CHRON ²		
8.33.1 The four-day average concentration of total recoverable zinc shall not exceed the value determined by the following equation ⁵ : Zn = $e^{(0.8473)(\ln(\text{hardness})) + 0.76149}$		X			X	

¹ One hour average concentration not to be exceed 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.

⁴ These criteria have been calculated to protect human health from toxic effects through drinking water and fish consumption, unless otherwise noted.

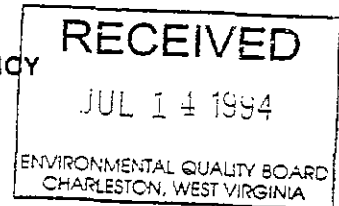
⁵ Hardness as calcium carbonate (mg/l). The minimum hardness allowed for use in this equation shall not be less than 25 mg/l, even if the actual ambient hardness is less than 25 mg/l. The maximum hardness value for use in this equation shall not exceed 400 mg/l even if the actual hardness is greater than 400 mg/l.

⁶ Chronic aquatic life values have been calculated on the basis of fish tissue concentrations.

⁷ Known or suspected carcinogen. Human health standards are for a risk level of 10⁻⁶.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OCT 1 1993

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria

FROM: Martha G. Prothro *Martha G. Prothro*
Acting Assistant Administrator for Water

TO: Water Management Division Directors
Environmental Services Division Directors
Regions I-X

Introduction

The implementation of metals criteria is complex due to the site-specific nature of metals toxicity. We have undertaken a number of activities to develop guidance in this area, notably the Interim Metals Guidance, published May 1992, and a public meeting of experts held in Annapolis, MD, in January 1993. This memorandum transmits Office of Water (OW) policy and guidance on the interpretation and implementation of aquatic life criteria for the management of metals and supplements my April 1, 1993, memorandum on the same subject. The issue covers a number of areas including the expression of aquatic life criteria; total maximum daily loads (TMDLs), permits, effluent monitoring, and compliance; and ambient monitoring. The memorandum covers each in turn. Attached to this policy memorandum are three guidance documents with additional technical details. They are: Guidance Document on Expression of Aquatic Life Criteria as Dissolved Criteria (Attachment #2), Guidance Document on Dynamic Modeling and Translators (Attachment #3), and Guidance Document on Monitoring (Attachment #4). These will be supplemented as additional data become available. (See the schedule in Attachment #1.)

Since metals toxicity is significantly affected by site-specific factors, it presents a number of programmatic challenges. Factors that must be considered in the management of metals in the aquatic environment include: toxicity specific to effluent chemistry; toxicity specific to ambient water chemistry; different patterns of toxicity for different metals; evolution of the state of the science of metals toxicity, fate, and transport; resource limitations for monitoring, analysis, implementation, and research functions; concerns regarding some of the analytical data currently on record due to possible sampling and analytical contamination; and lack of standardized protocols for clean and ultraclean metals analysis. The States have the key role in the risk management process of balancing these factors in the management of water programs. The site-specific nature of this issue could be perceived as requiring a permit-by-permit approach to implementation. However, we believe

that this guidance can be effectively implemented on a broader level, across any waters with roughly the same physical and chemical characteristics, and recommend that we work with the States with that perspective in mind.

Expression of Aquatic Life Criteria

o Dissolved vs. Total Recoverable Metal

A major issue is whether, and how, to use dissolved metal concentrations ("dissolved metal") or total recoverable metal concentrations ("total recoverable metal") in setting State water quality standards. In the past, States have used both approaches when applying the same Environmental Protection Agency (EPA) criteria numbers. Some older criteria documents may have facilitated these different approaches to interpretation of the criteria because the documents were somewhat equivocal with regards to analytical methods. The May 1992 interim guidance continued the policy that either approach was acceptable.

It is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. This conclusion regarding metals bioavailability is supported by a majority of the scientific community within and outside the Agency. One reason is that a primary mechanism for water column toxicity is adsorption at the gill surface which requires metals to be in the dissolved form.

The position that the dissolved metals approach is more accurate has been questioned because it neglects the possible toxicity of particulate metal. It is true that some studies have indicated that particulate metals appear to contribute to the toxicity of metals, perhaps because of factors such as desorption of metals at the gill surface, but these same studies indicate the toxicity of particulate metal is substantially less than that of dissolved metal.

Furthermore, any error incurred from excluding the contribution of particulate metal will generally be compensated by other factors which make criteria conservative. For example, metals in toxicity tests are added as simple salts to relatively clean water. Due to the likely presence of a significant concentration of metals binding agents in many discharges and ambient waters, metals in toxicity tests would generally be expected to be more bioavailable than metals in discharges or in ambient waters.

If total recoverable metal is used for the purpose of water quality standards, compounding of factors due to the lower bioavailability of particulate metal and lower bioavailability of metals as they are discharged may result in a conservative water quality standard. The use of dissolved metal in water quality standards gives a more accurate result. However, the majority of the participants at the Annapolis meeting felt that total recoverable measurements in ambient water had some value, and that exceedences of criteria on a total recoverable basis were an indication that metal loadings could be a stress to the ecosystem, particularly in locations other than the water column.

The reasons for the potential consideration of total recoverable measurements include risk management considerations not covered by evaluation of water column toxicity. The ambient water quality criteria are neither designed nor intended to protect sediments, or to prevent effects due to food webs containing sediment dwelling organisms. A risk manager, however, may consider sediments and food chain effects and may decide to take a conservative approach for metals, considering that metals are very persistent chemicals. This conservative approach could include the use of total recoverable metal in water quality standards. However, since consideration of sediment impacts is not incorporated into the criteria methodology, the degree of conservatism inherent in the total recoverable approach is unknown. The uncertainty of metal impacts in sediments stem from the lack of sediment criteria and an imprecise understanding of the fate and transport of metals. EPA will continue to pursue research and other activities to close these knowledge gaps.

Until the scientific uncertainties are better resolved, a range of different risk management decisions can be justified. EPA recommends that State water quality standards be based on dissolved metal. (See the paragraph below and the attached guidance for technical details on developing dissolved criteria.) EPA will also approve a State risk management decision to adopt standards based on total recoverable metal, if those standards are otherwise approvable as a matter of law.

o Dissolved Criteria

In the toxicity tests used to develop EPA metals criteria for aquatic life, some fraction of the metal is dissolved while some fraction is bound to particulate matter. The present criteria were developed using total recoverable metal measurements or measures expected to give equivalent results in toxicity tests, and are articulated as total recoverable. Therefore, in order to express the EPA criteria as dissolved, a total recoverable to dissolved correction factor must be used. Attachment #2 provides guidance for calculating EPA dissolved criteria from the published total recoverable criteria. The data expressed as percentage metal dissolved are presented as recommended values and ranges. However, the choice within ranges is a State risk management decision. We have recently supplemented the data for copper and are proceeding to further supplement the data for copper and other metals. As testing is completed, we will make this information available and this is expected to reduce the magnitude of the ranges for some of the conversion factors provided. We also strongly encourage the application of dissolved criteria across a watershed or waterbody, as technically sound and the best use of resources.

o Site-Specific Criteria Modifications

While the above methods will correct some site-specific factors affecting metals toxicity, further refinements are possible. EPA has issued guidance (Water Quality Standards Handbook, 1983; Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria, EPA-600/3-H4-099, October 1984) for three site-specific criteria development methodologies: recalculation procedure, indicator species procedure (also known as the water-effect ratio (WER)) and resident species procedure. Only the first two of these have been widely used.

In the National Toxics Rule (57 FR 60848, December 22, 1992), EPA identified the WER as an optional method for site-specific criteria development for certain metals. EPA committed in the NTR preamble to provide guidance on determining the WER. A draft of this guidance has been circulated to the States and Regions for review and comment. As justified by water characteristics and as recommended by the WER guidance, we strongly encourage the application of the WER across a watershed or waterbody as opposed to application on a discharger by discharger basis, as technically sound and an efficient use of resources.

In order to meet current needs, but allow for changes suggested by protocol users, EPA will issue the guidance as "interim." EPA will accept WERs developed using this guidance, as well as by using other scientifically defensible protocols. OW expects the interim WER guidance will be issued in the next two months.

Total Maximum Daily Loads (TMDLs) and National Pollutant Discharge Elimination System (NPDES) Permits

o Dynamic Water Quality Modeling

Although not specifically part of the reassessment of water quality criteria for metals, dynamic or probabilistic models are another useful tool for implementing water quality criteria, especially for those criteria protecting aquatic life. These models provide another way to incorporate site-specific data. The 1991 Technical Support Document for Water Quality-based Toxics Control (TSD) (EPA/505/2-90-001) describes dynamic, as well as static (steady-state) models. Dynamic models make the best use of the specified magnitude, duration, and frequency of water quality criteria and, therefore, provide a more accurate representation of the probability that a water quality standard exceedence will occur. In contrast, steady-state models make a number of simplifying, worst case assumptions which makes them less complex and less accurate than dynamic models.

Dynamic models have received increased attention over the last few years as a result of the widespread belief that steady-state modeling is over-conservative due to environmentally conservative dilution assumptions. This belief has led to the misconception that dynamic models will always lead to less stringent regulatory controls (e.g., NPDES effluent limits) than steady-state models, which is not true in every application of dynamic models. EPA considers dynamic models to be a more accurate approach to implementing water quality criteria and continues to recommend their use. Dynamic modeling does require commitment of resources to develop appropriate data. (See Attachment #3 and the TSD for details on the use of dynamic models.)

o Dissolved-Total Metal Translators

Expressing water quality criteria as the dissolved form of a metal poses a need to be able to translate from dissolved metal to total recoverable metal for TMDLs and NPDES permits. TMDLs for metals must be able to calculate: (1) dissolved metal in order to ascertain attainment of water quality standards, and (2) total recoverable metal in order to achieve mass balance necessary for permitting purposes.

EPA's NPDES regulations require that limits of metals in permits be stated as total recoverable in most cases (see 40 CFR §122.45(c)) except when an effluent guideline specifies the limitation in another form of the metal, the approved analytical methods measure only dissolved metal, or the permit writer expresses a metals limit in another form (e.g., dissolved, valent, or total) when required to carry out provisions of the Clean Water Act. This is because the chemical conditions in ambient waters frequently differ substantially from those in the effluent, and there is no assurance that effluent particulate metal would not dissolve after discharge. The NPDES rule does not require that State water quality standards be expressed as total recoverable; rather, the rule requires permit writers to translate between different metal forms in the calculation of the permit limit so that a total recoverable limit can be established. Both the TMDL and NPDES uses of water quality criteria require the ability to translate between dissolved metal and total recoverable metal. Attachment #3 provides methods for this translation.

Guidance on Monitoring

o Use of Clean Sampling and Analytical Techniques

In assessing waterbodies to determine the potential for toxicity problems due to metals, the quality of the data used is an important issue. Metals data are used to determine attainment status for water quality standards, discern trends in water quality, estimate background loads for TMDLs, calibrate fate and transport models, estimate effluent concentrations (including effluent variability), assess permit compliance, and conduct research. The quality of trace level metal data, especially below 1 ppb, may be compromised due to contamination of samples during collection, preparation, storage, and analysis. Depending on the level of metal present, the use of "clean" and "ultraclean" techniques for sampling and analysis may be critical to accurate data for implementation of aquatic life criteria for metals.

The magnitude of the contamination problem increases as the ambient and effluent metal concentration decreases and, therefore, problems are more likely in ambient measurements. "Clean" techniques refer to those requirements (or practices for sample collection and handling) necessary to produce reliable analytical data in the part per billion (ppb) range. "Ultraclean" techniques refer to those requirements or practices necessary to produce reliable analytical data in the part per trillion (ppt) range. Because typical concentrations of metals in surface waters and effluents vary from one metal to another, the effect of contamination on the quality of metals monitoring data varies appreciably.

We plan to develop protocols on the use of clean and ultra-clean techniques and are coordinating with the United States Geological Survey (USGS) on this project, because USGS has been doing work on these techniques for some time, especially the sampling procedures. We anticipate that our draft protocols for clean techniques will be available in late calendar year 1993. The development of comparable protocols for ultra-clean techniques is underway and will be available in 1995. In developing these protocols, we will consider the costs of these techniques and will give guidance as to the situations where their use is necessary. Appendix B to the WER guidance document provides some general guidance on the use of

clean analytical techniques. (See Attachment #4.) We recommend that this guidance be used by States and Regions as an interim step, while the clean and ultra-clean protocols are being developed.

o Use of Historical Data

The concerns about metals sampling and analysis discussed above raise corresponding concerns about the validity of historical data. Data on effluent and ambient metal concentrations are collected by a variety of organizations including Federal agencies (e.g., EPA, USGS), State pollution control agencies and health departments, local government agencies, municipalities, industrial dischargers, researchers, and others. The data are collected for a variety of purposes as discussed above.

Concern about the reliability of the sample collection and analysis procedures is greatest where they have been used to monitor very low level metal concentrations. Specifically, studies have shown data sets with contamination problems during sample collection and laboratory analysis, that have resulted in inaccurate measurements. For example, in developing a TMDL for New York Harbor, some historical ambient data showed extensive metals problems in the harbor, while other historical ambient data showed only limited metals problems. Careful resampling and analysis in 1992/1993 showed the latter view was correct. The key to producing accurate data is appropriate quality assurance (QA) and quality control (QC) procedures. We believe that most historical data for metals, collected and analyzed with appropriate QA and QC at levels of 1 ppb or higher, are reliable. The data used in development of EPA criteria are also considered reliable, both because they meet the above test and because the toxicity test solutions are created by adding known amounts of metals.

With respect to effluent monitoring reported by an NPDES permittee, the permittee is responsible for collecting and reporting quality data on a Discharge Monitoring Report (DMR). Permitting authorities should continue to consider the information reported to be true, accurate, and complete as certified by the permittee. Where the permittee becomes aware of new information specific to the effluent discharge that questions the quality of previously submitted DMR data, the permittee must promptly submit that information to the permitting authority. The permitting authority will consider all information submitted by the permittee in determining appropriate enforcement responses to monitoring/reporting and effluent violations. (See Attachment #4 for additional details.)

Summary

The management of metals in the aquatic environment is complex. The science supporting our technical and regulatory programs is continuing to evolve, here as in all areas. The policy and guidance outlined above represent the position of OW and should be incorporated into ongoing program operations. We do not expect that ongoing operations would be delayed or deferred because of this guidance.

If you have questions concerning this guidance, please contact Jim Hanlon, Acting Director, Office of Science and Technology, at 202-260-5400. If you have questions on specific details of the guidance, please contact the appropriate OW Branch Chief. The Branch Chiefs responsible for the various areas of the water quality program are: Bob April (202-260-6322, water quality criteria), Elizabeth Fellows (202-260-7046, monitoring and data issues), Russ Kinerson (202-260-1330, modeling and translators), Don Brady (202-260-7074, Total Maximum Daily Loads), Sheila Frace (202-260-9537, permits), Dave Sabock (202-260-1315, water quality standards), Bill Telliard (202-260-7134, analytical methods) and Dave Lyons (202-260-8310, enforcement).

Attachments

TECHNICAL GUIDANCE FOR METALS

Schedule of Upcoming Guidance

Water-effect Ratio Guidance - September 1993

Draft "Clean" Analytical Methods - Spring 1994

Dissolved Criteria - currently being done; as testing is completed, we will release the updated percent dissolved data

Draft Sediment Criteria for Metals - 1994

Final Sediment Criteria for Metals - 1995

ATTACHMENT #2

**GUIDANCE DOCUMENT
ON DISSOLVED CRITERIA**
Expression of Aquatic Life Criteria
October 1993

Percent Dissolved in Aquatic Toxicity Tests on Metals

The attached table contains all the data that were found concerning the percent of the total recoverable metal that was dissolved in aquatic toxicity tests. This table is intended to contain the available data that are relevant to the conversion of EPA's aquatic life criteria for metals from a total recoverable basis to a dissolved basis. (A factor of 1.0 is used to convert aquatic life criteria for metals that are expressed on the basis of the acid-soluble measurement to criteria expressed on the basis of the total recoverable measurement.) Reports by Grunwald (1992) and Brungs et al. (1992) provided references to many of the documents in which pertinent data were found. Each document was obtained and examined to determine whether it contained useful data.

"Dissolved" is defined as metal that passes through a 0.45- μ m membrane filter. If otherwise acceptable, data that were obtained using 0.3- μ m glass fiber filters and 0.1- μ m membrane filters were used, and are identified in the table; these data did not seem to be outliers.

Data were used only if the metal was in a dissolved inorganic form when it was added to the dilution water. In addition, data were used only if they were generated in water that would have been acceptable for use as a dilution water in tests used in the derivation of water quality criteria for aquatic life; in particular, the pH had to be between 6.5 and 9.0, and the concentrations of total organic carbon (TOC) and total suspended solids (TSS) had to be below 5 mg/L. Thus most data generated using river water would not be used.

Some data were not used for other reasons. Data presented by Carroll et al. (1979) for cadmium were not used because 9 of the 36 values were above 150%. Data presented by Davies et al. (1976) for lead and Holcombe and Andrew (1978) for zinc were not used because "dissolved" was defined on the basis of polarography, rather than filtration.

Beyond this, the data were not reviewed for quality. Horowitz et al. (1992) reported that a number of aspects of the filtration procedure might affect the results. In addition, there might be concern about use of "clean techniques" and adequate QA/QC.

Each line in the table is intended to represent a separate piece of information. All of the data in the table were determined in fresh water, because no saltwater data were found. Data are becoming available for copper in salt water from the New York

Harbor study; based on the first set of tests, Hansen (1993) suggested that the average percent of the copper that is dissolved in sensitive saltwater tests is in the range of 76 to 82 percent.

A thorough investigation of the percent of total recoverable metal that is dissolved in toxicity tests might attempt to determine if the percentage is affected by test technique (static, renewal, flow-through), feeding (were the test animals fed and, if so, what food and how much), water quality characteristics (hardness, alkalinity, pH, salinity), test organisms (species, loading), etc.

The attached table also gives the freshwater criteria concentrations (CMC and CCC) because percentages for total recoverable concentrations much (e.g., more than a factor of 3) above or below the CMC and CCC are likely to be less relevant. When a criterion is expressed as a hardness equation, the range given extends from a hardness of 50 mg/L to a hardness of 200 mg/L.

The following is a summary of the available information for each metal:

Arsenic(III)

The data available indicate that the percent dissolved is about 100, but all the available data are for concentrations that are much higher than the CMC and CCC.

Cadmium

Schuyttema et al. (1984) reported that "there were no real differences" between measurements of total and dissolved cadmium at concentrations of 10 to 80 ug/L (pH = 6.7 to 7.8, hardness = 25 mg/L, and alkalinity = 33 mg/L); total and dissolved concentrations were said to be "virtually equivalent".

The CMC and CCC are close together and only range from 0.66 to 8.6 ug/L. The only available data that are known to be in the range of the CMC and CCC were determined with a glass fiber filter. The percentages that are probably most relevant are 75, 92, 89, 78, and 80.

Chromium(III)

The percent dissolved decreased as the total recoverable concentration increased, even though the highest concentrations reduced the pH substantially. The percentages that are probably

most relevant to the CMC are 50-75, whereas the percentages that are probably most relevant to the CCC are 86 and 61.

Chromium(VI)

The data available indicate that the percent dissolved is about 100, but all the available data are for concentrations that are much higher than the CMC and CCC.

Copper

Howarth and Sprague (1978) reported that the total and dissolved concentrations of copper were "little different" except when the total copper concentration was above 500 ug/L at hardness = 360 mg/L and pH = 8 or 9. Chakoumakos et al. (1979) found that the percent dissolved depended more on alkalinity than on hardness, pH, or the total recoverable concentration of copper.

Chapman (1993) and Lazorchak (1987) both found that the addition of daphnid food affected the percent dissolved very little, even though Chapman used yeast-trout chow-alfalfa whereas Lazorchak used algae in most tests, but yeast-trout chow-alfalfa in some tests. Chapman (1993) found a low percent dissolved with and without food, whereas Lazorchak (1987) found a high percent dissolved with and without food. All of Lazorchak's values were in high hardness water; Chapman's one value in high hardness water was much higher than his other values.

Chapman (1993) and Lazorchak (1987) both compared the effect of food on the total recoverable LC50 with the effect of food on the dissolved LC50. Both authors found that food raised both the dissolved LC50 and the total recoverable LC50 in about the same proportion, indicating that food did not raise the total recoverable LC50 by sorbing metal onto food particles; possibly the food raised both LC50s by (a) decreasing the toxicity of dissolved metal, (b) forming nontoxic dissolved complexes with the metal, or (c) reducing uptake.

The CMC and CCC are close together and only range from 6.5 to 34 ug/L. The percentages that are probably most relevant are 74, 95, 95, 73, 57, 53, 52, 64, and 91.

Lead

The data presented in Spehar et al. (1978) were from Holcombe et al. (1976). Both Chapman (1993) and Holcombe et al. (1976) found that the percent dissolved increased as the total recoverable concentration increased. It would seem reasonable to expect more precipitate at higher total recoverable concentrations and

therefore a lower percent dissolved at higher concentrations. The increase in percent dissolved with increasing concentration might be due to a lowering of the pH as more metal is added if the stock solution was acidic.

The percentages that are probably most relevant to the CMC are 9, 18, 25, 10, 62, 68, 71, 75, 81, and 95, whereas the percentages that are probably most relevant to the CCC are 9 and 10.

Mercury

The only percentage that is available is 73, but it is for a concentration that is much higher than the CMC.

Nickel

The percentages that are probably most relevant to the CMC are 88, 93, 92, and 100, whereas the only percentage that is probably relevant to the CCC is 76.

Selenium

No data are available.

Silver

There is a CMC, but not a CCC. The percentage dissolved seems to be greatly reduced by the food used to feed daphnids, but not by the food used to feed fathead minnows. The percentages that are probably most relevant to the CMC are 41, 79, 79, 73, 91, 90, and 93.

Zinc

The CMC and CCC are close together and only range from 59 to 210 ug/L. The percentages that are probably most relevant are 31, 77, 77, 99, 94, 100, 103, and 96.

Recommended Values (%)^A and Ranges of Measured Percent Dissolved
 Considered Most Relevant in Fresh Water

<u>Metal</u>	<u>CMC</u>		<u>CCC</u>	
	<u>Recommended Value (%)</u>	<u>(Range %)</u>	<u>Recommended Value (%)</u>	<u>(Range %)</u>
Arsenic(III)	95	100-104 ^B	95	100-104 ^B
Cadmium	85	75-92	85	75-92
Chromium(III)	85	50-75	85	61-86
Chromium(VI)	95	100 ^B	95	100 ^B
Copper	85	52-95	85	52-95
Lead	50	9-95	25	9-10
Mercury	85	73 ^B	NA ^E	NA ^E
Nickel	85	88-100	85	76
Selenium	NA ^E	NA ^C	NA ^E	NA ^C
Silver	85	41-93	YY ^D	YY ^D
Zinc	85	31-103	85	31-103

^A The recommended values are based on current knowledge and are subject to change as more data becomes available.

^B All available data are for concentrations that are much higher than the CMC.

^C NA = No data are available.

^D YY = A CCC is not available, and therefore cannot be adjusted.

^E NA = Bioaccumulative chemical and not appropriate to adjust to percent dissolved.

Concn. ^A (ug/L)	Percent Diss. ^B	n ^C Species ^D	SRF ^E	Food	Hard.	Alk.	pH	Ref.
<u>ARSENIC(III)</u> (Freshwater: CCC = 190 ug/L; CMC = 360 ug/L)								
600-15000	104	5	?	?	48	41	7.6	Lima et al. 1984
12600	100	3	FM	No	44	43	7.4	Spehar and Fiandt 1986
<u>CADMIUM</u> (Freshwater: CCC = 0.66 to 2.0 ug/L; CMC = 1.8 to 8.6 ug/L) ^F								
0.16	41	?	DM	R	53	46	7.6	Chapman 1993
0.28	75	?	DM	R	103	83	7.9	Chapman 1993
0.4-4.0	92 ^G	?	CS	F	21	19	7.1	Finlayson and Verrue 1982
13	89	3	FM	F	44	43	7.4	Spehar and Fiandt 1986
15-21	96	8	FM	S	42	31	7.5	Spehar and Carlson 1984
42	84	4	FM	S	45	41	7.4	Spehar and Carlson 1984
10	78	?	DM	S	51	38	7.5	Chapman 1993
35	77	?	DM	S	105	88	8.0	Chapman 1993
51	59	?	DM	S	209	167	8.4	Chapman 1993
6-80	80	8	?	S	47	44	7.5	Call et al. 1982
3-232	90 ^H	5	?	F	46	42	7.4	Spehar et al. 1978
450-6400	70	5	FM	F	202	157	7.7	Pickering and Gast 1972

CHROMIUM(III) (Freshwater: CCC = 120 to 370 ug/L; CMC = 980 to 3100 ug/L)^F

5-13	94	?	SG	F	?	25	24	7.3	Stevens and Chapman 1984
19-495	86	?	SG	F	?	25	24	7.2	Stevens and Chapman 1984
>1100	50-75	?	SG	F	No	25	24	7.0	Stevens and Chapman 1984
42	54	?	DM	R	Yes	206	166	8.2	Chapman 1993
114	61	?	DM	R	Yes	52	45	7.4	Chapman 1993
16840	26	?	DM	S	No	<51	9	6.3 ¹	Chapman 1993
26267	32	?	DM	S	No	110	9	6.7	Chapman 1993
27416	27	?	DM	S	No	96	10	6.0 ¹	Chapman 1993
58665	23	?	DM	S	No	190	25	6.2 ¹	Chapman 1993

CHROMIUM(VI) (Freshwater: CCC = 11 ug/L; CMC = 16 ug/L)

>25,000	100	1	FM,GF	F	Yes	220	214	7.6	Adelman and Smith 1976
43,300	99.5	4	FM	F	No	44	43	7.4	Spehar and Fiandt 1986

COPPER (Freshwater: CCC = 6.5 to 21 ug/L; CMC = 9.2 to 34 ug/L)^F

10-30	74	?	CT	F	No	27	20	7.0	Chakoumakos et al. 1979
40-200	78	?	CT	F	No	154	20	6.8	Chakoumakos et al. 1979
30-100	79	?	CT	F	No	74	23	7.6	Chakoumakos et al. 1979
100-200	82	?	CT	F	No	192	72	7.0	Chakoumakos et al. 1979
20-200	86	?	CT	F	No	31	78	8.3	Chakoumakos et al. 1979
40-300	87	?	CT	F	No	83	70	7.4	Chakoumakos et al. 1979
10-80	89	?	CT	F	No	25	169	8.5	Chakoumakos et al. 1979

300-1300	92	?	CT	F	No	195	160	7.0	Chakoumakos et al. 1979
100-400	94	?	CT	F	No	70	174	8.5	Chakoumakos et al. 1979
3-4 ^J	125-167	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986a,b
12-91 ^J	79-84	3	CD	R	Yes	31	38	7.2	Carlson et al. 1986a,b
18-19	95	2	DA	S	No	52	55	7.7	Carlson et al. 1986b
20 ^J	95	1	DA	R	No	31	38	7.2	Carlson et al. 1986b
50	96	2	FM	S	No	52	55	7.7	Carlson et al. 1986b
175 ^J	91	2	FM	R	No	31	38	7.2	Carlson et al. 1986b
5-52	>82 ^K	?	FM	F	Yes ^L	47	43	8.0	Lind et al. 1978
6-80	83 ^O	?	CS	F	No	21	19	7.1	Finlayson and Verrue 1982
6.7	57	?	DM	S	No	49	37	7.7	Chapman 1993
35	43	?	DM	S	Yes	48	39	7.4	Chapman 1993
13	73	?	DM	R	Yes	211	169	8.1	Chapman 1993
16	57	?	DM	R	Yes	51	44	7.6	Chapman 1993
51	39	?	DM	R	Yes	104	83	7.8	Chapman 1993
32	53	?	DM	S	No	52	45	7.8	Chapman 1993
33	52	?	DM	S	No	105	79	7.9	Chapman 1993
39	64	?	DM	S	No	106	82	8.1	Chapman 1993
25-84	96	14	FM,GM	S	No	50	40	7.0	Hammermeister et al. 1983
17	91	6	DM	S	No	52	43	7.3	Hammermeister et al. 1983
120	88	14	SG	S	No	48	47	7.3	Hammermeister et al. 1983
15-90	74	19	?	S	No	48	47	7.7	Call et al. 1982
12-162	80 ^H	?	BG	F	Yes ^L	45	43	7-8	Benoit 1975
28-58	85	6	DM	R	No	168	117	8.0	Lazorchak 1987
26-59	79	7	DM	R	Yes ^M	168	117	8.0	Lazorchak 1987
56,101	86	2	DM	R	Yes ^N	168	117	8.0	Lazorchak 1987

96	86	4	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
160	94	1	FM	S	No	203	171	8.2	Geckler et al. 1976
230-3000	>69->79	?	CR	F	No	17	13	7.6	Rice and Harrison 1983
<u>LEAD</u> (Freshwater: CCC = 1.3 to 7.7 ug/L; CMC = 34 to 200 ug/L) ^F									
17	9	?	DM	R	Yes	52	47	7.6	Chapman 1993
181	18	?	DM	R	Yes	102	86	7.8	Chapman 1993
193	25	?	DM	R	Yes	151	126	8.1	Chapman 1993
612	29	?	DM	S	No	50	--	---	Chapman 1993
952	33	?	DM	S	No	100	--	---	Chapman 1993
1907	~38	?	DM	S	No	150	--	---	Chapman 1993
7-29	10	?	EZ	R	No	22	--	---	JRB Associates 1983
34	62 ^H	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
58	68 ^H	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
119	71 ^H	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
235	75 ^H	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
474	81 ^H	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
4100	82 ^H	?	BT	F	No	44	43	7.2	Holcombe et al. 1976
2100	79	7	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
220-2700	96	14	FM,GM,DM	S	No	49	44	7.2	Hammermeister et al. 1983
580	95	14	SG	S	No	51	48	7.2	Hammermeister et al. 1983
<u>MERCURY (II)</u> (Freshwater: CMC = 2.4 ug/L)									
172	73	1	FM	F	No	44	43	7.4	Spehar and Fiandt 1986

NICKEL (Freshwater: CCC = 88 to 280 ug/L; CMC = 790 to 2500 ug/L)^F

21	81	?	DM	R	Yes	51	49	7.4	Chapman 1993
150	76	?	DM	R	Yes	107	87	7.8	Chapman 1993
578	87	?	DM	R	Yes	205	161	8.1	Chapman 1993
645	88	?	DM	S	No	54	43	7.7	Chapman 1993
1809	93	?	DM	S	No	51	44	7.7	Chapman 1993
1940	92	?	DM	S	No	104	84	8.2	Chapman 1993
2344	100	?	DM	S	No	100	84	7.9	Chapman 1993
4000	90	?	PK	R	No	21	--	---	JRB Associates 1983

SELENIUM (FRESHWATER: CCC = 5 ug/L; CMC = 20 ug/L)

No data are available.

SILVER (Freshwater: CMC = 1.2 to 13 ug/L; a CCC is not available)

0.19	74	?	DM	S	No	47	37	7.6	Chapman 1993
9.98	13	?	DM	S	Yes	47	37	7.5	Chapman 1993
4.0	41	?	DM	S	No	36	25	7.0	Nebeker et al. 1983
4.0	11	?	DM	S	Yes	36	25	7.0	Nebeker et al. 1983
3	79	?	FM	S	No	51	49	8.1	UWS 1993
2-54	79	?	FM	S	Yes ⁰	49	49	7.9	UWS 1993
2-32	73	?	FM	S	No	50	49	8.1	UWS 1993
4-32	91	?	FM	S	No	48	49	8.1	UWS 1993
5-89	90	?	FM	S	No	120	49	8.2	UWS 1993
6-401	93	?	FM	S	No	249	49	8.1	UWS 1993

ZINC (Freshwater: CCC = 59 to 190 ug/L; CMC 65 to 210 ug/L)^F

52	31	?	DM	R	Yes	211	169	8.2	Chapman 1993
62	77	?	DM	R	Yes	104	83	7.8	Chapman 1993
191	77	?	DM	R	Yes	52	47	7.5	Chapman 1993
356	74	?	DM	S	No	54	47	7.6	Chapman 1993
551	78	?	DM	S	No	105	85	8.1	Chapman 1993
741	76	?	DM	S	No	196	153	8.2	Chapman 1993
7 ^J	71-129	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986b
18-273 ^J	81-107	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986b
167 ^J	99	2	CD	R	No	31	38	7.2	Carlson et al. 1986b
180	94	1	CD	S	No	52	55	7.7	Carlson et al. 1986b
188-393 ^J	100	2	FM	R	No	31	38	7.2	Carlson et al. 1986b
551	100	1	FM	S	No	52	55	7.7	Carlson et al. 1986b
40-500	95 ^G	?	CS	F	No	21	19	7.1	Finlayson and Verrue 1982
1940	100	?	AS	F	No	20	12	7.1	Sprague 1964
5520	83	?	AS	F	No	20	12	7.9	Sprague 1964
<4000	90	?	FM	F	No	204	162	7.7	Mount 1966
>4000	70	?	FM	F	No	204	162	7.7	Mount 1966
160-400	103	13	FM, GM, DM	S	No	52	43	7.5	Hammermeister et al. 1983
240	96	13	SG	S	No	49	46	7.2	Hammermeister et al. 1983

^A Total recoverable concentration.

^B Except as noted, a 0.45- μ m membrane filter was used.

^c Number of paired comparisons.

^d The abbreviations used are:

AS = Atlantic salmon
BT = Brook trout
CD = Ceriodaphnia dubia
CR = Crayfish
CS = Chinook salmon
CT = Cutthroat trout
DA = Daphnids

DM = Daphnia magna
EZ = Elassoma zonatum
FM = Fathead minnow
GF = Goldfish
GM = Gammarid
PK = Palaemonetes kadiakensis
SG = Salmo gairdneri

^e The abbreviations used are:

S = static
R = renewal
F = flow-through

^f The two numbers are for hardnesses of 50 and 200 mg/L, respectively.

^g A 0.3- μ m glass fiber filter was used.

^h A 0.10- μ m membrane filter was used.

ⁱ The pH was below 6.5.

^j The dilution water was a clean river water with TSS and TOC below 5 mg/L.

^k Only limited information is available concerning this value.

^l It is assumed that the solution that was filtered was from the test chambers that contained fish and food.

^m The food was algae.

ⁿ The food was yeast-trout chow-alfalfa.

^o The food was frozen adult brine shrimp.

References

- Adelman, I.R., and L.L. Smith, Jr. 1976. Standard Test Fish Development. Part I. Fathead Minnows (Pimephales promelas) and Goldfish (Carassius auratus) as Standard Fish in Bioassays and Their Reaction to Potential Reference Toxicants. EPA-600/3-76-061a. National Technical Information Service, Springfield, VA. Page 24.
- Benoit, D.A. 1975. Chronic Effects of Copper on Survival, Growth, and Reproduction of the Bluegill (Lepomis macrochirus). Trans. Am. Fish. Soc. 104:353-358.
- Brungs, W.A., T.S. Holderman, and M.T. Southerland. 1992. Synopsis of Water-Effect Ratios for Heavy Metals as Derived for Site-Specific Water Quality Criteria.
- Call, D.J., L.T. Brooke, and D.D. Vaishnav. 1982. Aquatic Pollutant Hazard Assessments and Development of a Hazard Prediction Technology by Quantitative Structure-Activity Relationships. Fourth Quarterly Report. University of Wisconsin-Superior, Superior, WI.
- Carlson, A.R., H. Nelson, and D. Hammermeister. 1986a. Development and Validation of Site-Specific Water Quality Criteria for Copper. Environ. Toxicol. Chem. 5:997-1012.
- Carlson, A.R., H. Nelson, and D. Hammermeister. 1986b. Evaluation of Site-Specific Criteria for Copper and Zinc: An Integration of Metal Addition Toxicity, Effluent and Receiving Water Toxicity, and Ecological Survey Data. EPA/600/S3-86-026. National Technical Information Service, Springfield, VA.
- Carroll, J.J., S.J. Ellis, and W.S. Oliver. 1979. Influences of Hardness Constituents on the Acute Toxicity of Cadmium to Brook Trout (Salvelinus fontinalis).
- Chakoumakos, C., R.C. Russo, and R.V. Thurston. 1979. Toxicity of Copper to Cutthroat Trout (Salmo clarki) under Different Conditions of Alkalinity, pH, and Hardness. Environ. Sci. Technol. 13:213-219.
- Chapman, G.A. 1993. Memorandum to C. Stephan. June 4.
- Davies, P.H., J.P. Goettl, Jr., J.R. Sinley, and N.F. Smith. 1976. Acute and Chronic Toxicity of Lead to Rainbow Trout Salmo gairdneri, in Hard and Soft Water. Water Res. 10:199-206.
- Finlayson, B.J., and K.M. Verrue. 1982. Toxicities of Copper, Zinc, and Cadmium Mixtures to Juvenile Chinook Salmon. Trans. Am. Fish. Soc. 111:645-650.

Geckler, J.R., W.B. Horning, T.M. Neiheisel, Q.H. Pickering, E.L. Robinson, and C.E. Stephan. 1976. Validity of Laboratory Tests for Predicting Copper Toxicity in Streams. EPA-600/3-76-116. National Technical Information Service, Springfield, VA. Page 118.

Grunwald, D. 1992. Metal Toxicity Evaluation: Review, Results, and Data Base Documentation.

Hammermeister, D., C. Northcott, L. Brooke, and D. Call. 1983. Comparison of Copper, Lead and Zinc Toxicity to Four Animal Species in Laboratory and ST. Louis River Water. University of Wisconsin-Superior, Superior, WI.

Hansen, D.J. 1993. Memorandum to C.E. Stephan. April 15.

Holcombe, G.W., D.A. Benoit, E.N. Leonard, and J.M. McKim. 1976. Long-Term Effects of Lead Exposure on Three Generations of Brook Trout (*Salvelinus fontinalis*). J. Fish. Res. Bd. Canada 33:1731-1741.

Holcombe, G.W., and R.W. Andrew. 1978. The Acute Toxicity of Zinc to Rainbow and Brook Trout. EPA-600/3-78-094. National Technical Information Service, Springfield, VA.

Horowitz, A.J., K.A. Elrick, and M.R. Colberg. 1992. The Effect of Membrane Filtration Artifacts on Dissolved Trace Element Concentrations. Water Res. 26:753-763.

Howarth, R.S., and J.B. Sprague. 1978. Copper Lethality to Rainbow Trout in Waters on Various Hardness and pH. Water Res. 12:455-462.

JRB Associates. 1983. Demonstration of the Site-specific Criteria Modification Process: Selser's Creek, Ponchatoula, Louisiana.

Lazorchak, J.M. 1987. The Significance of Weight Loss of Daphnia magna Straus During Acute Toxicity Tests with Copper. Ph.D. Thesis.

Lima, A.R., C. Curtis, D.E. Hammermeister, T.P. Markee, C.E. Northcott, L.T. Brooke. 1984. Acute and Chronic Toxicities of Arsenic(III) to Fathead Minnows, Flagfish, Daphnids, and an Amphipod. Arch. Environ. Contam. Toxicol. 13:595-601.

Lind, D., K. Alto, and S. Chatterton. 1978. Regional Copper-Nickel Study. Draft.

Mount, D.I. 1966. The Effect of Total Hardness and pH on Acute Toxicity of Zinc to Fish. Air Water Pollut. Int. J. 10:49-56.

Nebeker, A.V., C.K. McAuliffe, R. Mshar, and D.G. Stevens. 1983. Toxicity of Silver to Steelhead and Rainbow Trout, Fathead Minnows, and *Daphnia magna*. Environ. Toxicol. Chem. 2:95-104.

Pickering, Q.P., and M.H. Gast. 1972. Acute and Chronic Toxicity of Cadmium to the Fathead Minnow (*Pimephales promelas*). J. Fish. Res. Bd. Canada 29:1099-1106.

Rice, D.W., Jr., and F.L. Harrison. 1983. The Sensitivity of Adult, Embryonic, and Larval Crayfish *Procambarus clarkii* to Copper. NUREG/CR-3133 or UCRL-53048. National Technical Information Service, Springfield, VA.

Schuytema, G.S., P.O. Nelson, K.W. Malueg, A.V. Nebeker, D.F. Krawczyk, A.K. Ratcliff, and J.H. Gakstatter. 1984. Toxicity of Cadmium in Water and Sediment Slurries to *Daphnia magna*. Environ. Toxicol. Chem. 3:293-308.

Spehar, R.L., R.L. Anderson, and J.T. Fiandt. 1978. Toxicity and Bioaccumulation of Cadmium and Lead in Aquatic Invertebrates. Environ. Pollut. 15:195-208.

Spehar, R.L., and A.R. Carlson. 1984. Derivation of Site-Specific Water Quality Criteria for Cadmium and the St. Louis River Basin, Duluth, Minnesota. Environ. Toxicol. Chem. 3:651-665.

Spehar, R.L., and J.T. Fiandt. 1986. Acute and Chronic Effects of Water Quality Criteria-Based Metal Mixtures on Three Aquatic Species. Environ. Toxicol. Chem. 5:917-931.

Sprague, J.B. 1964. Lethal Concentration of Copper and Zinc for Young Atlantic Salmon. J. Fish. Res. Bd. Canada 21:17-9926.

Stevens, D.G., and G.A. Chapman. 1984. Toxicity of Trivalent Chromium to Early Life Stages of Steelhead Trout. Environ. Toxicol. Chem. 3:125-133.

University of Wisconsin-Superior. 1993. Preliminary data from work assignment 1-10 for Contract No. 68-C1-0034.

**GUIDANCE DOCUMENT
ON DYNAMIC MODELING AND TRANSLATORS**

August 1993

Total Maximum Daily Loads (TMDLs) and Permits

o Dynamic Water Quality Modeling

Although not specifically part of the reassessment of water quality criteria for metals, dynamic or probabilistic models are another useful tool for implementing water quality criteria, especially those for protecting aquatic life. Dynamic models make best use of the specified magnitude, duration, and frequency of water quality criteria and thereby provide a more accurate calculation of discharge impacts on ambient water quality. In contrast, steady-state modeling is based on various simplifying assumptions which makes it less complex and less accurate than dynamic modeling. Building on accepted practices in water resource engineering, ten years ago OW devised methods allowing the use of probability distributions in place of worst-case conditions. The description of these models and their advantages and disadvantages is found in the 1991 Technical Support Document for Water Quality-based Toxic Control (TSD).

Dynamic models have received increased attention in the last few years as a result of the perception that static modeling is over-conservative due to environmentally conservative dilution assumptions. This has led to the misconception that dynamic models will always justify less stringent regulatory controls (e.g. NPDES effluent limits) than static models. In effluent dominated waters where the upstream concentrations are relatively constant, however, a dynamic model will calculate a more stringent wasteload allocation than will a steady state model. The reason is that the critical low flow required by many State water quality standards in effluent dominated streams occurs more frequently than once every three years. When other environmental factors (e.g. upstream pollutant concentrations) do not vary appreciably, then the overall return frequency of the steady state model may be greater than once in three years. A dynamic modeling approach, on the other hand, would be more stringent, allowing only a once in three year return frequency. As a result, EPA considers dynamic models to be a more accurate rather than a less stringent approach to implementing water quality criteria.

The 1991 TSD provides recommendations on the use of steady state and dynamic water quality models. The reliability of any modeling technique greatly depends on the accuracy of the data used in the analysis. Therefore, the selection of a model also depends upon the data. EPA recommends that steady state wasteload allocation analyses generally be used where few or no whole effluent toxicity or specific chemical measurements are available, or where daily receiving water flow records are not available. Also, if staff resources are insufficient to use and defend the use of dynamic models, then steady state

models may be necessary. If adequate receiving water flow and effluent concentration data are available to estimate frequency distributions, EPA recommends that one of the dynamic wasteload allocation modeling techniques be used to derive wasteload allocations which will more exactly maintain water quality standards. The minimum data required for input into dynamic models include at least 30 years of river flow data and one year of effluent and ambient pollutant concentrations.

o Dissolved-Total Metal Translators

When water quality criteria are expressed as the dissolved form of a metal, there is a need to translate TMDLs and NPDES permits to and from the dissolved form of a metal to the total recoverable form. TMDLs for toxic metals must be able to calculate 1) the dissolved metal concentration in order to ascertain attainment of water quality standards and 2) the total recoverable metal concentration in order to achieve mass balance. In meeting these requirements, TMDLs consider metals to be conservative pollutants and quantified as total recoverable to preserve conservation of mass. The TMDL calculates the dissolved or ionic species of the metals based on factors such as total suspended solids (TSS) and ambient pH. (These assumptions ignore the complicating factors of metals interactions with other metals.) In addition, this approach assumes that ambient factors influencing metal partitioning remain constant with distance down the river. This assumption probably is valid under the low flow conditions typically used as design flows for permitting of metals (e.g., 7Q10, 4B3, etc) because erosion, resuspension, and wet weather loadings are unlikely to be significant and river chemistry is generally stable. In steady-state dilution modeling, metals releases may be assumed to remain fairly constant (concentrations exhibit low variability) with time.

EPA's NPDES regulations require that metals limits in permits be stated as total recoverable in most cases (see 40 CFR §122.45(c)). Exceptions occur when an effluent guideline specifies the limitation in another form of the metal or the approved analytical methods measure only the dissolved form. Also, the permit writer may express a metals limit in another form (e.g., dissolved, valent, or total) when required, in highly unusual cases, to carry out the provisions of the CWA.

The preamble to the September 1984 National Pollutant Discharge Elimination System Permit Regulations states that the total recoverable method measures dissolved metals plus that portion of solid metals that can easily dissolve under ambient conditions (see 49 Federal Register 38028, September 26, 1984). This method is intended to measure metals in the effluent that are or may easily become environmentally active, while not measuring metals that are expected to settle out and remain inert.

The preamble cites, as an example, effluent from an electroplating facility that adds lime and uses clarifiers. This effluent will be a combination of solids not removed by the clarifiers and residual dissolved metals. When the effluent from the clarifiers, usually with a

high pH level, mixes with receiving water having significantly lower pH level, these solids instantly dissolve. Measuring dissolved metals in the effluent, in this case, would underestimate the impact on the receiving water. Measuring with the total metals method, on the other hand, would measure metals that would be expected to disperse or settle out and remain inert or be covered over. Thus, measuring total recoverable metals in the effluent best approximates the amount of metal likely to produce water quality impacts.

However, the NPDES rule does not require in any way that State water quality standards be in the total recoverable form; rather, the rule requires permit writers to consider the translation between differing metal forms in the calculation of the permit limit so that a total recoverable limit can be established. Therefore, both the TMDL and NPDES uses of water quality criteria require the ability to translate from the dissolved form and the total recoverable form.

Many toxic substances, including metals, have a tendency to leave the dissolved phase and attach to suspended solids. The partitioning of toxics between solid and dissolved phases can be determined as a function of a pollutant-specific partition coefficient and the concentration of solids. This function is expressed by a linear partitioning equation:

$$C = \frac{C_{Tf}}{1 + K_d \cdot TSS \cdot 10^{-6}}$$

where,

- C = dissolved phase metal concentration,
- C_{Tf} = total metal concentration,
- TSS = total suspended solids concentration, and
- K_d = partition coefficient.

A key assumption of the linear partitioning equation is that the sorption reaction reaches dynamic equilibrium at the point of application of the criteria; that is, after allowing for initial mixing the partitioning of the pollutant between the adsorbed and dissolved forms can be used at any location to predict the fraction of pollutant in each respective phase.

Successful application of the linear partitioning equation relies on the selection of the partition coefficient. The use of a partition coefficient to represent the degree to which toxics adsorb to solids is most readily applied to organic pollutants; partition coefficients for metals are more difficult to define. Metals typically exhibit more complex speciation and complexation reactions than organics and the degree of partitioning can vary greatly depending upon site-specific water chemistry. Estimated partition coefficients can be determined for a number of metals, but waterbody or site-specific observations of dissolved and adsorbed concentrations are preferred.

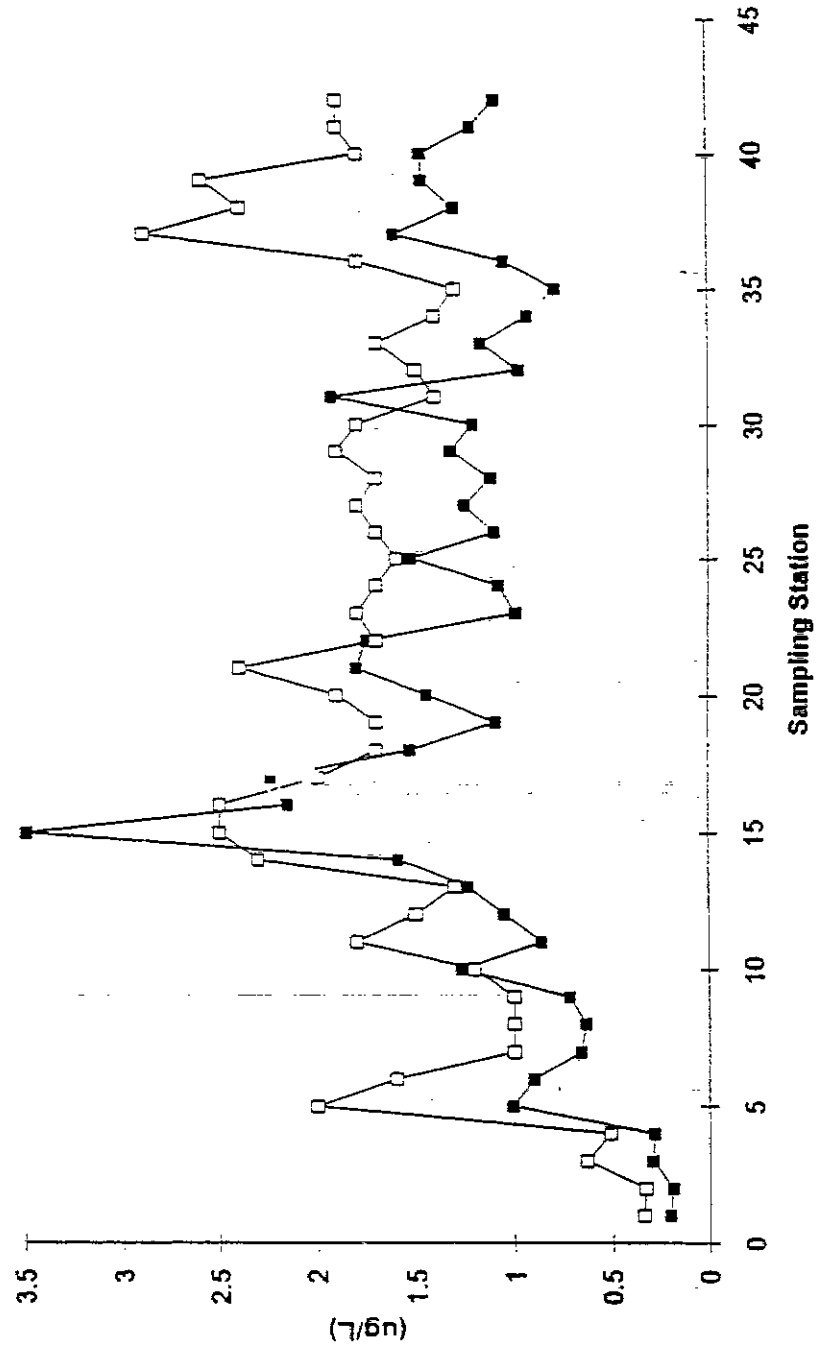
EPA suggests three approaches for instances where a water quality criterion for a metal is expressed in the dissolved form in a State's water quality standards:

1. Using clean analytical techniques and field sampling procedures with appropriate QA/QC, collect receiving water samples and determine site specific values of K_d for each metal. Use these K_d values to "translate" between total recoverable and dissolved metals in receiving water. This approach is more difficult to apply because it relies upon the availability of good quality measurements of ambient metal concentrations. This approach provides an accurate assessment of the dissolved metal fraction providing sufficient samples are collected. EPA's initial recommendation is that at least four pairs of total recoverable and dissolved ambient metal measurements be made during low flow conditions or 20 pairs over all flow conditions. EPA suggests that the average of data collected during low flow or the 95th percentile highest dissolved fraction for all flows be used. The low flow average provides a representative picture of conditions during the rare low flow events. The 95th percentile highest dissolved fraction for all flows provides a critical condition approach analogous to the approach used to identify low flows and other critical environmental conditions.
2. Calculate the total recoverable concentration for the purpose of setting the permit limit. Use a value of 1 unless the permittee has collected data (see #1 above) to show that a different ratio should be used. The value of 1 is conservative and will not err on the side of violating standards. This approach is very simple to apply because it places the entire burden of data collection and analysis solely upon permitted facilities. In terms of technical merit, it has the same characteristics of the previous approach. However, permitting authorities may be faced with difficulties in negotiating with facilities on the amount of data necessary to determine the ratio and the necessary quality control methods to assure that the ambient data are reliable.
3. Use the historical data on total suspended solids (TSS) in receiving waterbodies at appropriate design flows and K_d values presented in the Technical Guidance Manual for Performing Waste Load Allocations. Book II. Streams and Rivers. EPA-440/4-84-020 (1984) to "translate" between (total recoverable) permits limits and dissolved metals in receiving water. This approach is fairly simple to apply. However, these K_d values are suspect due to possible quality assurance problems with the data used to develop the values. EPA's initial analysis of this approach and these values in one site indicates that these K_d values generally over-estimate the dissolved fraction of metals in ambient waters (see Figures following). Therefore, although this approach may not provide an accurate estimate of the dissolved fraction, the bias in the estimate is likely to be a conservative one.

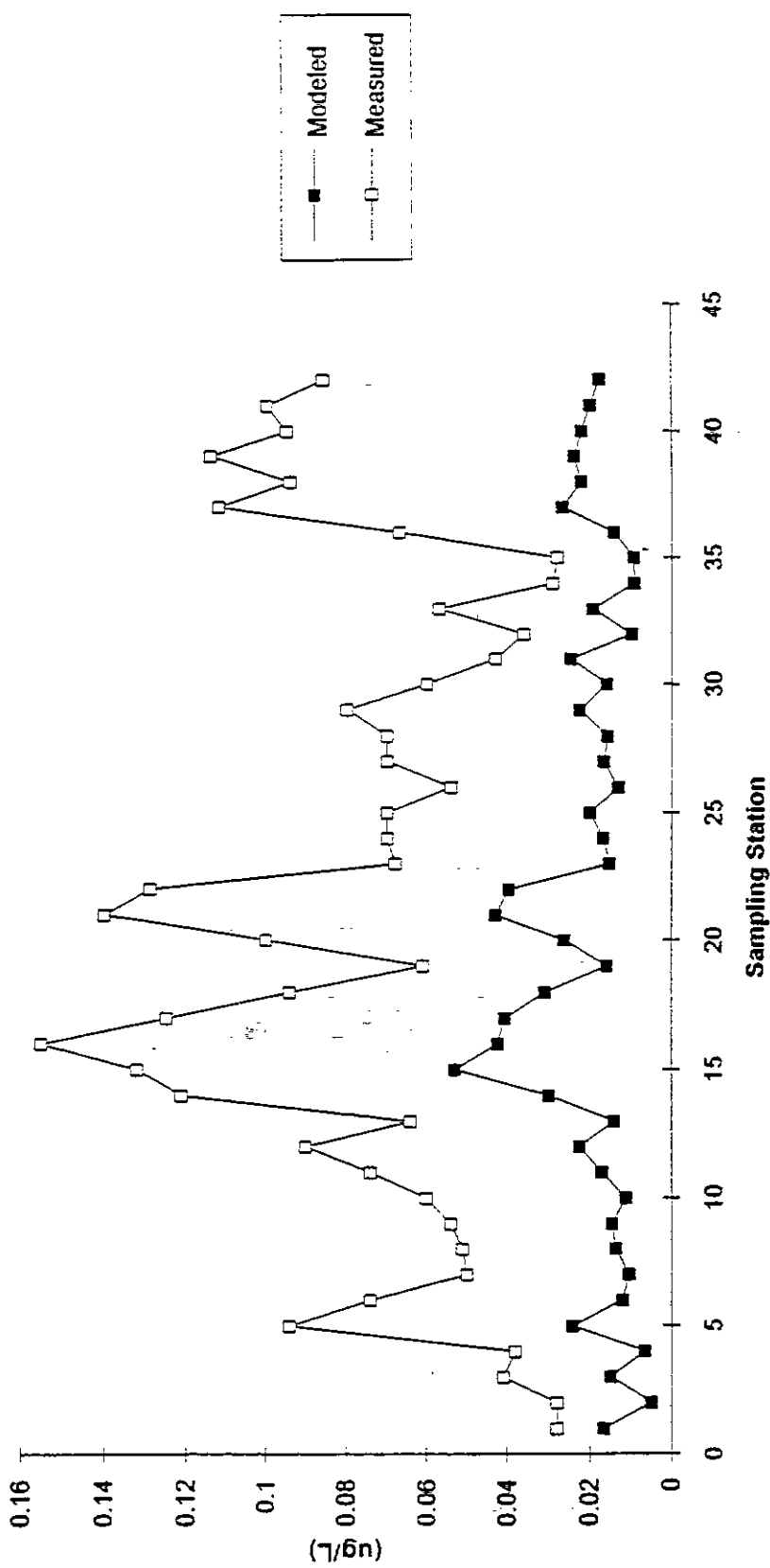
EPA suggests that regulatory authorities use approaches #1 and #2 where States express their water quality standards in the dissolved form. In those States where the standards are in the total recoverable or acid soluble form, EPA recommends that no

translation be used until the time that the State changes the standards to the dissolved form. Approach #3 may be used as an interim measure until the data are collected to implement approach #1.

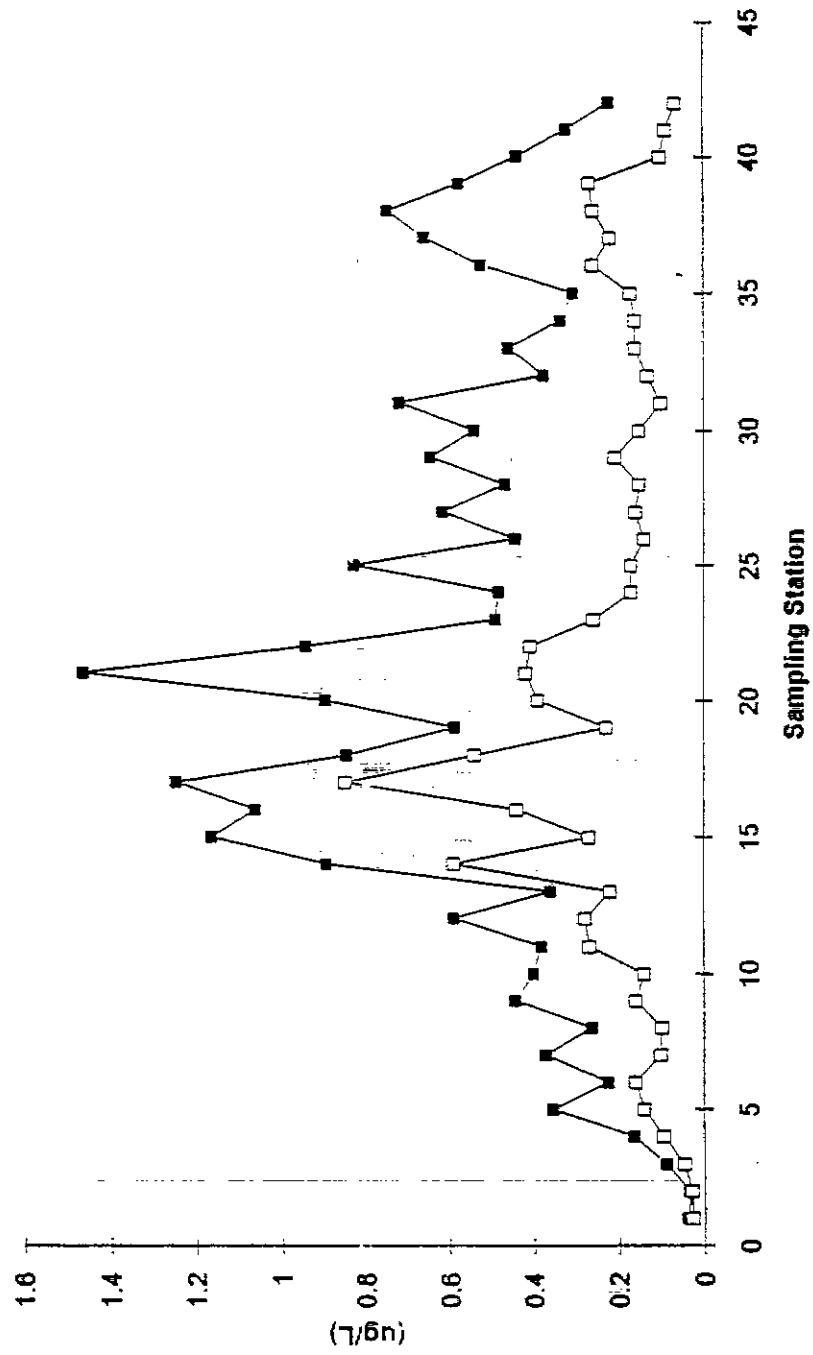
Measured vs. Modeled Dissolved Copper Concentrations



Measured vs. Modeled Dissolved Cadmium Concentrations

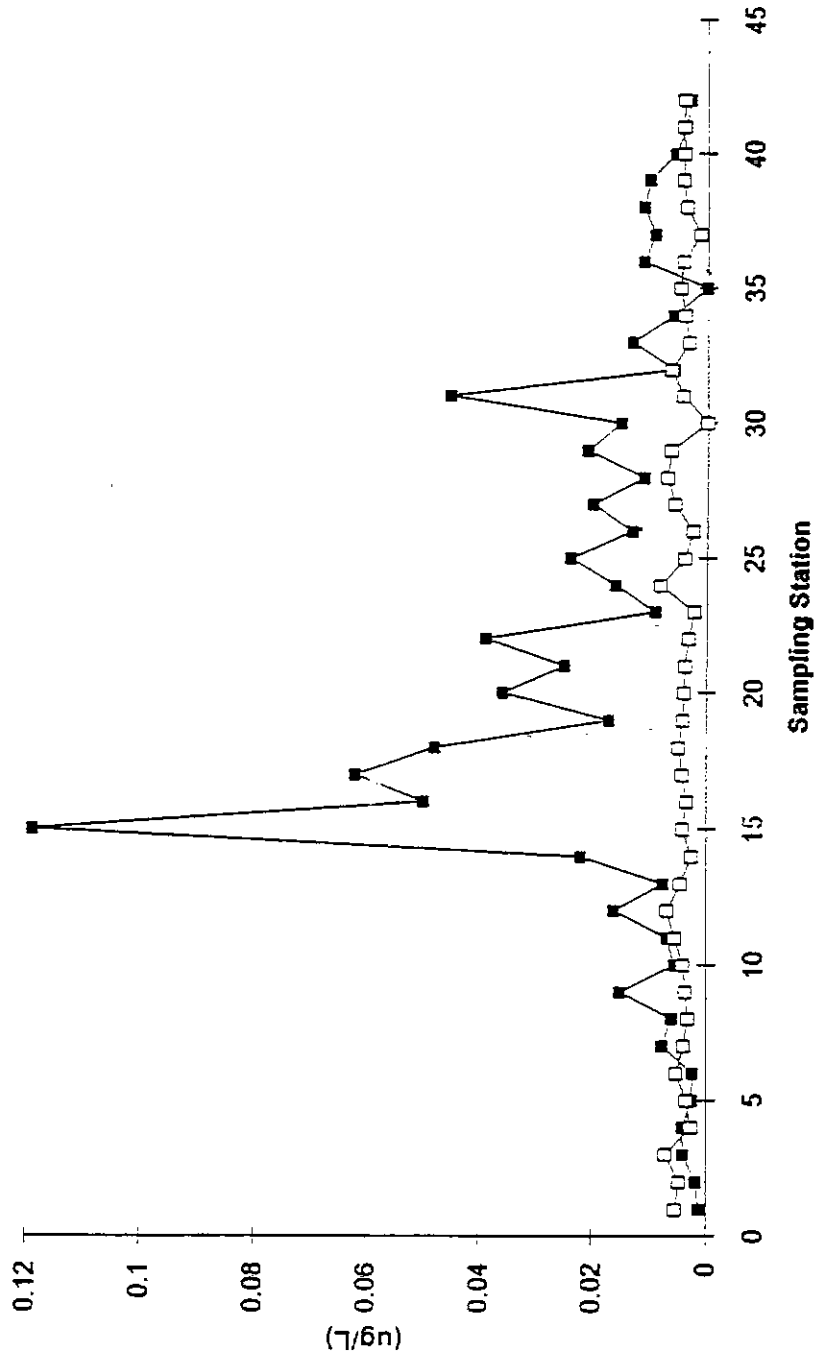


Measured vs. Modeled Dissolved Lead Concentrations.

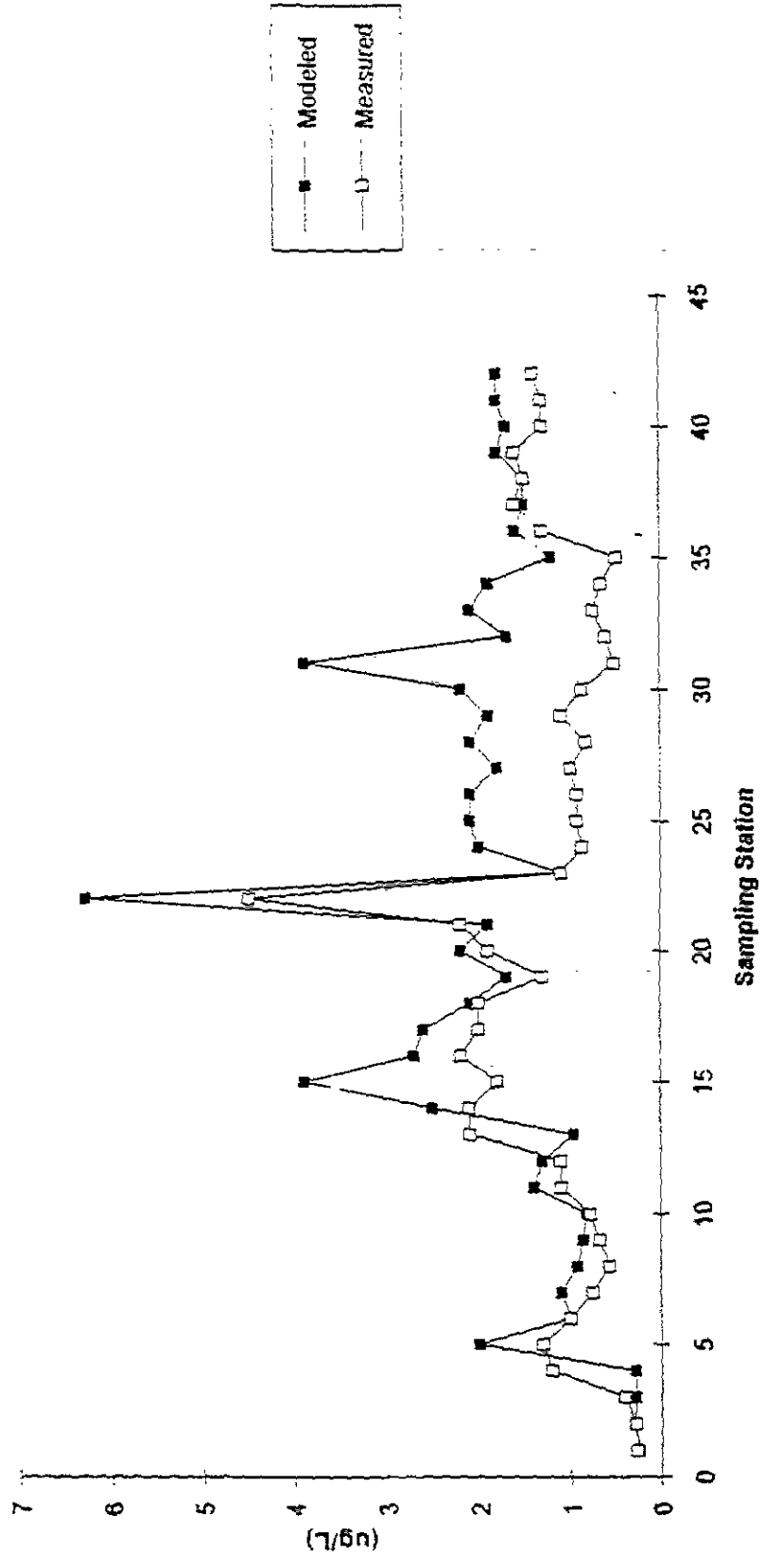


Modeled
Measured

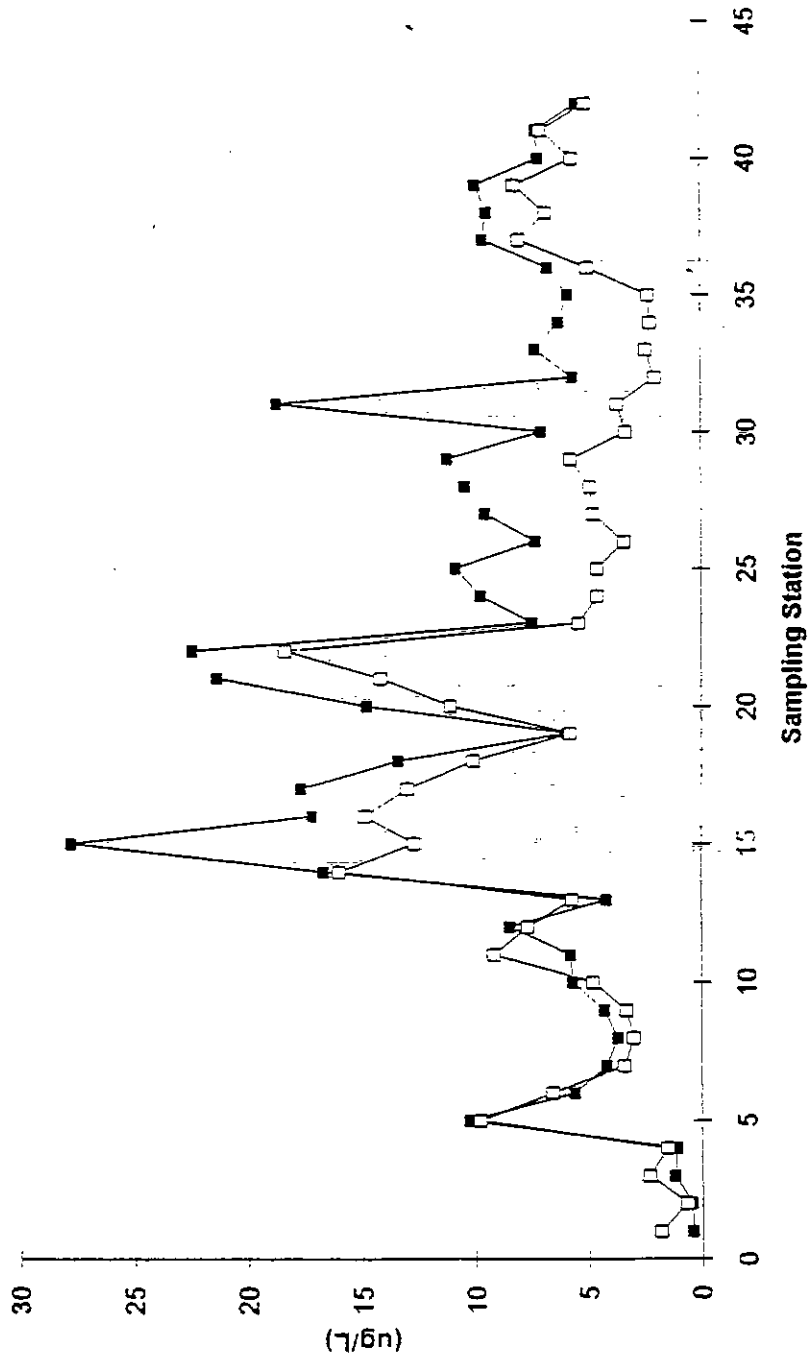
Measured vs. Modeled Dissolved Mercury Concentrations



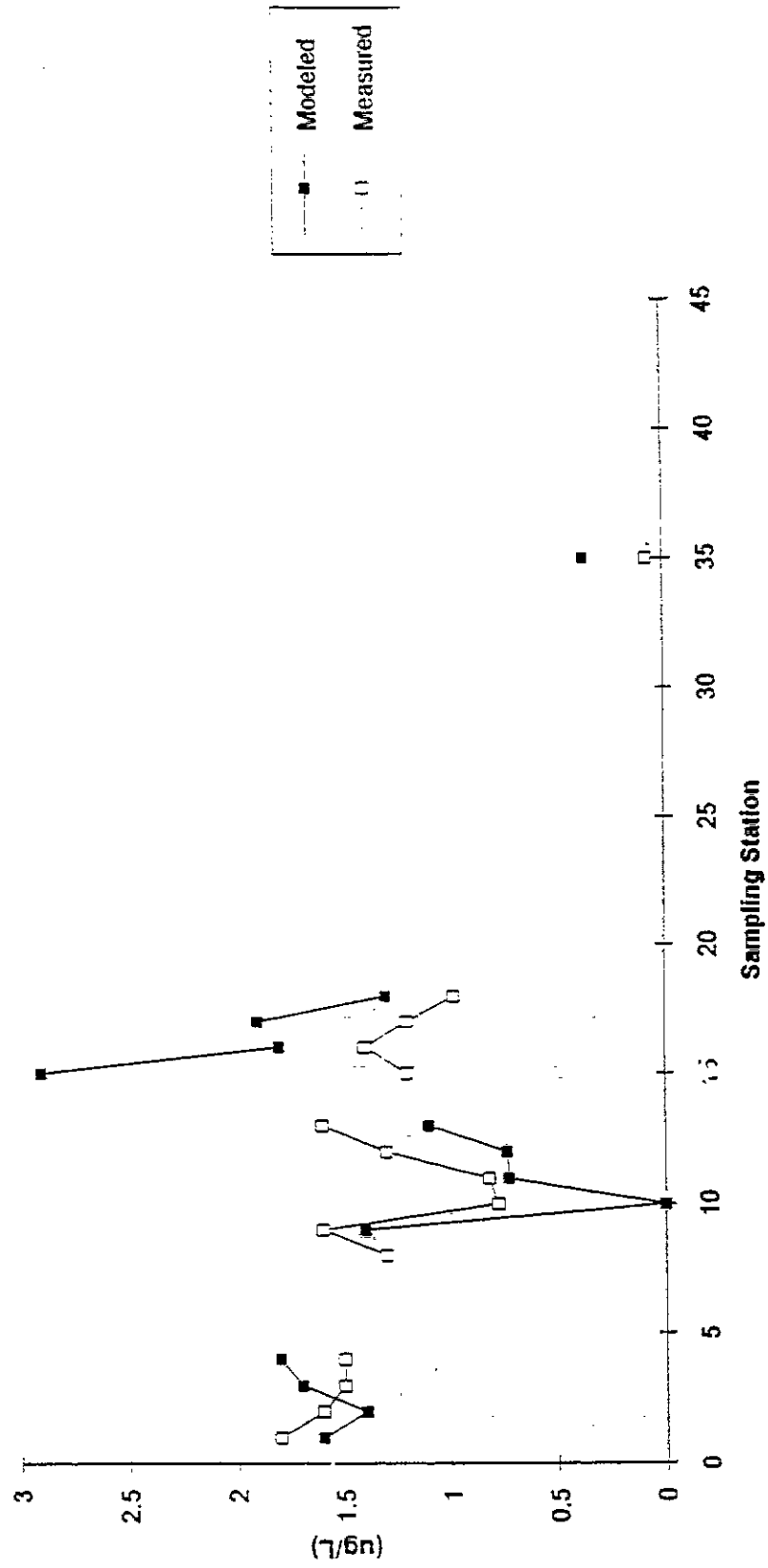
Measured vs. Modeled Dissolved Nickel Concentrations.



Measured vs. Modeled Dissolved Zinc Concentrations



Measured vs. Modeled Dissolved Arsenic Concentrations



**GUIDANCE DOCUMENT
ON CLEAN ANALYTICAL TECHNIQUES AND MONITORING**
October 1993

Guidance on Monitoring

o Use of Clean Sampling and Analytical Techniques

Appendix B to the WER guidance document (attached) provides some general guidance on the use of clean techniques. The Office of Water recommends that this guidance be used by States and Regions as an interim step while the Office of Water prepares more detailed guidance.

o Use of Historical DMR Data

With respect to effluent or ambient monitoring data reported by an NPDES permittee on a Discharge Monitoring Report (DMR), the certification requirements place the burden on the permittee for collecting and reporting quality data. The certification regulation at 40 CFR 122.22(d) requires permittees, when submitting information, to state: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Permitting authorities should continue to consider the information reported in DMRs to be true, accurate, and complete as certified by the permittee. Under 40 CFR 122.41(i)(8), however, as soon as the permittee becomes aware of new information specific to the effluent discharge that calls into question the accuracy of the DMR data, the permittee must submit such information to the permitting authority. Examples of such information include a new finding that the reagents used in the laboratory analysis are contaminated with trace levels of metals, or a new study that the sampling equipment imparts trace metal contamination. This information must be specific to the discharge and based on actual measurements rather than extrapolations from reports from other facilities. Where a permittee submits information

In addition to submitting the information described above, the permittee also must develop procedures to assure the collection and analysis of quality data that are true, accurate, and complete. For example, the permittee may submit a revised quality assurance plan that describes the specific procedures to be undertaken to reduce or eliminate trace metal contamination.

Appendix B. Guidance Concerning the Use of "Clean Techniques" and QA/QC in the Measurement of Trace Metals

Recent information (Shiller and Boyle 1987; Windom et al. 1991) has raised questions concerning the quality of reported concentrations of trace metals in both fresh and salt (estuarine and marine) surface waters. A lack of awareness of true ambient concentrations of metals in saltwater and freshwater systems can be both a cause and a result of the problem. The ranges of dissolved metals that are typical in surface waters of the United States away from the immediate influence of discharges (Bruland 1983; Shiller and Boyle 1985, 1987; Trefry et al. 1986; Windom et al. 1991) are:

<u>Metal</u>	<u>Salt water (ug/L)</u>	<u>Fresh water (ug/L)</u>
Cadmium	0.01 to 0.2	0.002 to 0.08
Copper	0.1 to 3.	0.4 to 4.
Lead	0.01 to 1.	0.01 to 0.19
Nickel	0.3 to 5.	1. to 2.
Silver	0.005 to 0.2	-----
Zinc	0.1 to 15.	0.03 to 5.

The U.S. EPA (1983, 1991) has published analytical methods for monitoring metals in waters and wastewaters, but these methods are inadequate for determination of ambient concentrations of some metals in some surface waters. Accurate and precise measurement of these low concentrations requires appropriate attention to seven areas:

1. Use of "clean techniques" during collecting, handling, storing, preparing, and analyzing samples to avoid contamination.
2. Use of analytical methods that have sufficiently low detection limits.
3. Avoidance of interference in the quantification (instrumental analysis) step.
4. Use of blanks to assess contamination.
5. Use of matrix spikes (sample spikes) and certified reference materials (CRMs) to assess interference and contamination.
6. Use of replicates to assess precision.
7. Use of certified standards.

In a strict sense, the term "clean techniques" refers to techniques that reduce contamination and enable the accurate and precise measurement of trace metals in fresh and salt surface waters. In a broader sense, the term also refers to related issues concerning detection limits, quality control, and quality assurance. Documenting data quality demonstrates the amount of confidence that can be placed in the data, whereas increasing the sensitivity of methods reduce the problem of deciding how to

interpret results that are reported to be below detection limits.

This appendix is written for those analytical laboratories that want guidance concerning ways to lower detection limits, increase precision, and/or increase accuracy. The ways to achieve these goals are to increase the sensitivity of the analytical methods, decrease contamination, and decrease interference. Ideally, validation of a procedure for measuring concentrations of metals in surface water requires demonstration that agreement can be obtained using completely different procedures beginning with the sampling step and continuing through the quantification step (Bruland et al. 1979), but few laboratories have the resources to compare two different procedures. Laboratories can, however, (a) use techniques that others have found useful for improving detection limits, accuracy, and precision, and (b) document data quality through use of blanks, spikes, CRMs, replicates, and standards.

In general, in order to achieve accurate and precise measurement of a particular concentration, both the detection limit and the blanks should be less than one-tenth of that concentration. Therefore, the term "metal-free" can be interpreted to mean that the total amount of contamination that occurs during sample collection and processing (e.g., from gloves, sample containers, labware, sampling apparatus, cleaning solutions, air, reagents, etc.) is sufficiently low that blanks are less than one-tenth of the lowest concentration that needs to be measured.

Atmospheric particulates can be a major source of contamination (Moody 1982; Adeloju and Bond 1985). The term "class-100" refers to a specification concerning the amount of particulates in air (Moody 1982); although the specification says nothing about the composition of the particulates, generic control of particulates can greatly reduce trace-metal blanks. Except during collection of samples and initial cleaning of equipment, all handling of samples, sample containers, labware, and sampling apparatus should be performed in a class-100 bench, room, or glove box.

Nothing contained or not contained in this appendix adds to or subtracts from any regulatory requirements set forth in other EPA documents concerning metal analyses. The word "must" is used in this appendix merely to indicate items that are considered very important by analytical chemists who have worked to increase accuracy and precision and lower detection limits in trace-metal analysis. Some items are considered important because they have been found to have received inadequate attention in some laboratories performing trace-metal analyses.

Two topics that are not addressed in this appendix are:

1. The "ultraclean techniques" that are likely to be necessary when trace analyses of mercury are performed.
2. Safety in analytical laboratories.

Other documents should be consulted if these topics are of concern.

Avoiding contamination by use of "clean techniques"

Measurement of trace metals in receiving waters **must** take into account the potential for contamination during each step in the process. Regardless of the specific procedures used for collection, handling, storage, preparation (digestion, filtration, and/or extraction), and quantification (instrumental analysis), the general principles of contamination control **must** be applied. Some specific recommendations are:

- a. Non-talc latex or class-100 polyethylene gloves **must** be worn during all steps from sample collection to analysis. (Talc seems to be a particular problem with zinc; gloves made with talc cannot be decontaminated sufficiently.) Gloves should only contact surfaces that are metal-free; gloves should be changed if even suspected of contamination.
- b. The acid used to acidify samples for preservation and digestion and to acidify water for final cleaning of labware, sampling apparatus, and sample containers **must** be metal-free. The quality of the acid used should be better than reagent-grade. Each lot of acid **must** be analyzed for the metal(s) of interest before use.
- c. The water used to prepare acidic cleaning solutions and to rinse labware, sample containers, and sampling apparatus may be prepared by distillation, deionization, or reverse osmosis, and **must** be demonstrated to be metal-free.
- d. The work area, including bench tops and hoods, should be cleaned (e.g., washed and wiped dry with lint-free, class-100 wipes) frequently to remove contamination.
- e. All handling of samples in the laboratory, including filtering and analysis, **must** be performed in a class-100 clean bench or a glove box fed by particle-free air or nitrogen; ideally the clean bench or glove box should be located within a class-100 clean room.
- f. Labware, reagents, sampling apparatus, and sample containers **must** never be left open to the atmosphere; they should be stored in a class-100 bench, covered with plastic wrap, stored in a plastic box, or turned upside down on a clean surface. Minimizing the time between cleaning and using will help minimize contamination.
- g. Separate sets of sample containers, labware, and sampling apparatus should be dedicated for different kinds of samples, e.g., receiving water samples, effluent samples, etc.
- h. To avoid contamination of clean rooms, samples that contain very high concentrations of metals and do not require use of "clean techniques" should not be brought into clean rooms.
- i. Acid-cleaned plastic, such as high-density polyethylene (HDPE), low-density polyethylene (LDPE), or a fluoroplastic, **must** be the only material that ever contacts a sample, except possibly during digestion for the total recoverable

- measurement. (Total recoverable samples can be digested in some plastic containers.) Even HDPE and LDPE might not be acceptable for mercury, however.
- j. All labware, sample containers, and sampling apparatus must be acid-cleaned before use or reuse.
1. Sample containers, sampling apparatus, tubing, membrane filters, filter assemblies, and other labware must be soaked in acid until metal-free. The amount of cleaning necessary might depend on the amount of contamination and the length of time the item will be in contact with samples. For example, if an acidified sample will be stored in a sample container for three weeks, ideally the container should have been soaked in an acidified metal-free solution for at least three weeks.
 2. It might be desirable to perform initial cleaning, for which reagent-grade acid may be used, before the items are allowed into a clean room. For most metals, items should be either (a) soaked in 10 percent concentrated nitric acid at 50°C for at least one hour, or (b) soaked in 50 percent concentrated nitric acid at room temperature for at least two days; for arsenic and mercury, soaking for up to two weeks at 50°C in 10 percent concentrated nitric acid might be required. For plastics that might be damaged by strong nitric acid, such as polycarbonate and possibly HDPE and LDPE, soaking in 10 percent concentrated hydrochloric acid, either in place of or before soaking in a nitric acid solution, might be desirable.
 3. Chromic acid must not be used to clean items that will be used in analysis of metals.
 4. Final soaking and cleaning of sample containers, labware, and sampling apparatus must be performed in a class-100 clean room using metal-free acid and water. The solution in an acid bath must be analyzed periodically to demonstrate that it is metal-free.
 5. After labware and sampling apparatus are cleaned, they may be stored in a clean room in a weak acid bath prepared using metal-free acid and water. Before use, the items should be rinsed at least three times with metal-free water. After the final rinse, the items should be moved immediately, with the open end pointed down, to a class-100 clean bench. Items may be dried on a class-100 clean bench; items must not be dried in an oven or with laboratory towels. The sampling apparatus should be assembled in a class-100 clean room or bench and double-bagged in metal-free polyethylene zip-type bags for transport to the field; new bags are usually metal-free.
 6. After sample containers are cleaned, they should be filled with metal-free water that has been acidified to a pH of 2 with metal-free nitric acid (about 0.5 mL per liter) for storage until use. At the time of sample collection, the sample containers should be emptied and rinsed at least twice with the solution being sampled before the actual

- sample is placed in the sample container.
- k. Field samples must be collected in a manner that eliminates the potential for contamination from the sampling platform, probes, etc. Exhaust from boats and the direction of wind and water currents should be taken into account. The people who collect the samples must be specifically trained on how to collect field samples. After collection, all handling of samples in the field that will expose the sample to air must be performed in a portable class-100 clean bench or glove box.
 - l. Samples must be acidified (after filtration if dissolved metal is to be measured) to a pH of less than 2, except that the pH must be less than 1 for mercury. Acidification should be done in a clean room or bench, and so it might be desirable to wait and acidify samples in a laboratory rather than in the field. If samples are acidified in the field, metal-free acid can be transported in plastic bottles and poured into a plastic container from which acid can be removed and added to samples using plastic pipettes. Alternatively, plastic automatic dispensers can be used.
 - m. Such things as probes and thermometers must not be put in samples that are to be analyzed for metals. In particular, pH electrodes and mercury-in-glass thermometers must not be used if mercury is to be measured. If pH is measured, it must be done on a separate aliquot.
 - n. Sample handling should be minimized. For example, instead of pouring a sample into a graduated cylinder to measure the volume, the sample can be weighed after being poured into a tared container; alternatively, the container from which the sample is poured can be weighed. (For saltwater samples, the salinity or density should be taken into account when weight is converted to volume.)
 - o. Each reagent used must be verified to be metal-free. If metal-free reagents are not commercially available, removal of metals will probably be necessary.
 - p. For the total recoverable measurement, samples should be digested in a class-100 bench, not in a metallic hood. If feasible, digestion should be done in the sample container by acidification and heating.
 - q. The longer the time between collection and analysis of samples, the greater the chance of contamination, loss, etc.
 - r. Samples must be stored in the dark, preferably between 0 and 4°C with no air space in the sample container.

Achieving low detection limits

- a. Extraction of the metal from the sample can be extremely useful if it simultaneously concentrates the metal and eliminates potential matrix interferences. For example, ammonium 1-pyrrolidinedithiocarbamate and/or diethylammonium diethyldithiocarbamate can extract cadmium, copper, lead,

- nickel, and zinc (Bruland et al. 1979; Nriagu et al. 1993).
- b. The detection limit should be less than ten percent of the lowest concentration that is to be measured.

Avoiding interferences

- a. Potential interferences must be assessed for the specific instrumental analysis technique used and each metal to be measured.
- b. If direct analysis is used, the salt present in high-salinity saltwater samples is likely to cause interference in most instrumental techniques.
- c. As stated above, extraction of the metal from the sample is particularly useful because it simultaneously concentrates the metal and eliminates potential matrix interferences.

Using blanks to assess contamination

- a. A laboratory (procedural, method) blank consists of filling a sample container with analyzed metal-free water and processing (filtering, acidifying, etc.) the water through the laboratory procedure in exactly the same way as a sample. A laboratory blank must be included in each set of ten or fewer samples to check for contamination in the laboratory, and must contain less than ten percent of the lowest concentration that is to be measured. Separate laboratory blanks must be processed for the total recoverable and dissolved measurements, if both measurements are performed.
- b. A field (trip) blank consists of filling a sample container with analyzed metal-free water in the laboratory, taking the container to the site, processing the water through tubing, filter, etc., collecting the water in a sample container, and acidifying the water the same as a field sample. A field blank must be processed for each sampling trip. Separate field blanks must be processed for the total recoverable measurement and for the dissolved measurement, if filtrations are performed at the site. Field blanks must be processed in the laboratory the same as laboratory blanks.

Assessing accuracy

- a. A calibration curve must be determined for each analytical run and the calibration should be checked about every tenth sample. Calibration solutions must be traceable back to a certified standard from the U.S. EPA or the National Institute of Science and Technology (NIST).
- b. A blind standard or a blind calibration solution must be included in each group of about twenty samples.

- c. At least one of the following must be included in each group of about twenty samples:
1. A matrix spike (spiked sample; the method of known additions).
 2. A CRM, if one is available in a matrix that closely approximates that of the samples. Values obtained for the CRM must be within the published values.
- The concentrations in blind standards and solutions, spikes, and CRMs must not be more than 5 times the median concentration expected to be present in the samples.

Assessing precision

- a. A sampling replicate must be included with each set of samples collected at each sampling location.
- b. If the volume of the sample is large enough, replicate analysis of at least one sample must be performed along with each group of about ten samples.

Special considerations concerning the dissolved measurement

Whereas the total recoverable measurement is especially subject to contamination during the digestion step, the dissolved measurement is subject to both loss and contamination during the filtration step.

- a. Filtrations must be performed using acid-cleaned plastic filter holders and acid-cleaned membrane filters. Samples must not be filtered through glass fiber filters, even if the filters have been cleaned with acid. If positive-pressure filtration is used, the air or gas must be passed through a 0.2-um in-line filter; if vacuum filtration is used, it must be performed on a class-100 bench.
- b. Plastic filter holders must be rinsed and/or dipped between filtrations, but they do not have to be soaked between filtrations if all the samples contain about the same concentrations of metal. It is best to filter samples from low to high concentrations. A membrane filter must not be used for more than one filtration. After each filtration, the membrane filter must be removed and discarded, and the filter holder must be either rinsed with metal-free water or dilute acid and dipped in a metal-free acid bath or rinsed at least twice with metal-free dilute acid; finally, the filter holder must be rinsed at least twice with metal-free water.
- c. For each sample to be filtered, the filter holder and membrane filter must be conditioned with the sample, i.e., an initial portion of the sample must be filtered and discarded.

The accuracy and precision of the dissolved measurement should be

assessed periodically. A large volume of a buffered solution (such as aerated 0.05 N sodium bicarbonate) should be spiked so that the concentration of the metal of interest is in the range of the low concentrations that are to be measured. The total recoverable concentration and the dissolved concentration of the metal in the spiked buffered solution should be measured alternately until each measurement has been performed at least ten times. The means and standard deviations for the two measurements should be the same. All values deleted as outliers must be acknowledged.

Reporting results

To indicate the quality of the data, reports of results of measurements of the concentrations of metals must include a description of the blanks, spikes, CRMs, replicates, and standards that were run, the number run, and the results obtained. All values deleted as outliers must be acknowledged.

Additional information

The items presented above are some of the important aspects of "clean techniques"; some aspects of quality assurance and quality control are also presented. This is not a definitive treatment of these topics; additional information that might be useful is available in such publications as Patterson and Settle (1976), Zief and Mitchell (1976), Bruland et al. (1979), Moody and Beary (1982), Moody (1982), Bruland (1983), Adeloju and Bond (1985), Berman and Yeats (1985), Byrd and Andreae (1986), Taylor (1987), Sakamoto-Arnold (1987), Tramontano et al. (1987), Puls and Barcelona (1989), Windom et al. (1991), U.S. EPA (1992), Horowitz et al. (1992), and Nriagu et al. (1993).

References

- Adeloju, S.B., and A.M. Bond. 1985. Influence of Laboratory Environment on the Precision and Accuracy of Trace Element Analysis. *Anal. Chem.* 57:1728-1733.
- Berman, S.S., and P.A. Yeats. 1985. Sampling of Seawater for Trace Metals. *CRC Reviews in Analytical Chemistry* 16:1-14.
- Bruland, K.W., R.P. Franks, G.A. Knauer, and J.H. Martin. 1979. Sampling and Analytical Methods for the Determination of Copper, Cadmium, Zinc, and Nickel at the Nanogram per Liter Level in Sea Water. *Anal. Chim. Acta* 105:233-245.

Bruland, K.W. 1983. Trace Elements in Sea-water. In: Chemical Oceanography, Vol. 8. J.P. Riley and R. Chester, eds. Academic Press, New York, NY. pp. 157-220.

Byrd, J.T., and M.O. Andreae. 1986. Dissolved and Particulate Tin in North Atlantic Seawater. Marine Chemistry 19:193-200.

Horowitz, A.J., K.A. Elrick, and M.R. Colberg. 1992. The Effect of Membrane Filtration Artifacts on Dissolved Trace Element Concentrations. Water Res. 26:753-763.

Moody, J.R. 1982. NBS Clean Laboratories for Trace Element Analysis. Anal. Chem. 54:1358A-1376A.

Moody, J.R., and E.S. Beary. 1982. Purified Reagents for Trace Metal Analysis. Talanta 29:1003-1010.

Nriagu, J.O., G. Lawson, H.K.T. Wong, and J.M. Azcue. 1993. A Protocol for Minimizing Contamination in the Analysis of Trace Metals in Great Lakes Waters. J. Great Lakes Res. 19:175-182.

Patterson, C.C., and D.M. Settle. 1976. The Reduction in Orders of Magnitude Errors in Lead Analysis of Biological Materials and Natural Waters by Evaluating and Controlling the Extent and Sources of Industrial Lead Contamination Introduced during Sample Collection and Processing. In: Accuracy in Trace Analysis: Sampling, Sample Handling, Analysis. P.D. LaFleur, ed. National Bureau of Standards Spec. Publ. 422, U.S. Government Printing Office, Washington, DC.

Puls, R.W., and M.J. Barcelona. 1989. Ground Water Sampling for Metals Analyses. EPA/540/4-89/001. National Technical Information Service, Springfield, VA.

Sakamoto-Arnold, C.M., A.K. Hanson, Jr., D.L. Huizenga, and D.R. Kester. 1987. Spatial and Temporal Variability of Cadmium in Gulf Stream Warm-core Rings and Associated Waters. J. Mar. Res. 45:201-230.

Shiller, A.M., and E. Boyle. 1985. Dissolved Zinc in Rivers. Nature 317:49-52.

Shiller, A.M., and E.A. Boyle. 1987. Variability of Dissolved Trace Metals in the Mississippi River. Geochim. Cosmochim. Acta 51:3273-3277.

Taylor, J.K. 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Chelsea, MI.

Tramontano, J.M., J.R. Scudlark, and T.M. Church. 1987. A Method for the Collection, Handling, and Analysis of Trace Metals in Precipitation. Environ. Sci. Technol. 21:749-753.

Trefry, J.H., T.A. Nelsen, R.P. Trocine, S. Metz., and T.W. Vetter. 1986. Rapp. P.-v. Reun. Cons. int. Explor. Mer. 186:277-288.

U.S. Environmental Protection Agency. 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. National Technical Information Service, Springfield, VA. Sections 4.1.1, 4.1.3, and 4.1.4

U.S. Environmental Protection Agency. 1991. Methods for the Determination of Metals in Environmental Samples. EPA-600/4-91-010. National Technical Information Service, Springfield, VA.

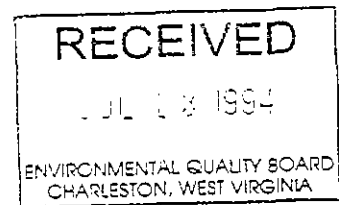
U.S. Environmental Protection Agency. 1992. Evaluation of Trace-Metal Levels in Ambient Waters and Tributaries to New York/New Jersey Harbor for Waste Load Allocation. Prepared by Battelle Ocean Sciences under Contract No. 68-C8-0105.

Windom, H.L., J.T. Byrd, R.G. Smith, and F. Huan. 1991. Inadequacy of NASQAN Data for Assessing Metals Trends in the Nation's Rivers. Environ. Sci. Technol. 25:1137-1142. (Also see Comment and Response, Vol. 25, p. 1940.)

Zief, M., and J.W. Mitchell. 1976. Contamination Control in Trace Element Analysis. Chemical Analysis Series, Vol. 47. Wiley, New York, NY.

July 11, 1994

West Virginia Environmental Quality Board
1615 Washington Street, East
Suite 301
Charleston, WV 25311-2126



Re: Koppers Industries, Inc. Comments
Triennial Review of West Virginia Water Quality Standards

Dear Sir or Madam:

The Environmental Quality Board has proposed many revisions to the existing rules contained in Title 46 Legislative Rules, Series I. The Proposed Rule is a result of the state's triennial review process. Koppers Industries, Incorporated, is appreciative of the hard work put forth in revising this rule and the thoughtful manner exhibited by its content; however, KII requests that serious consideration be given to the comments presented here.

Koppers Industries, Incorporated, (KII) a Pennsylvania Company, owns and operates a coal tar refining plant in Follansbee, WV. The plant is situated on the Ohio River at milepost 69.3 and utilizes the river for transportation, water intake, and an NPDES discharge. The predecessor company, Koppers Company, Incorporated (KCI) operated this facility for over 75 years.

Since the formation of KII in 1988, several million dollars in capital resources have been spent on waste water treatment improvements at the Follansbee plant. These improvements were undertaken with the understanding that expected future effluent limitations could be achieved with the new facilities now in place. The new facilities are working properly and maintain high effluent standards on a consistent basis. It is just as important to have consistency in the rules as it is to have consistency in waste water treatment operations. In this regard, KII notes that certain sections of the proposed rule are subject to (or will be subject to) various interpretations which could have a significant impact on the company's ability to meet more stringent limitations.

Section 5 establishes criteria for mixing zones and provides a mechanism for achieving water quality standards in the main body of the stream while allowing for end-of-pipe technological standards at the same time. KII applauds the board's efforts on establishing this concept. Section 7.2.a.B states that stream segments extending upstream from a public water supply for a distance of five miles must be protected by prohibiting the discharge of any pollutants in excess of the concentrations designated for its water use category. This requirement is unnecessary and unduly harsh. In its present form, an industrial discharger that is complying with every condition of its NPDES permit would be subject to more stringent limitations immediately after a public water supply intake is activated. This dilemma is further aggravated by the fact that the WVDEP has apparently interpreted the Section 7 rule to mean that mixing zones will be disallowed in the above noted 5-mile segment. KII requests that the Board amend the language to clarify and allow mixing zones to within one half mile of a public water supply.

West Virginia Environmental Quality Board

July 11, 1994

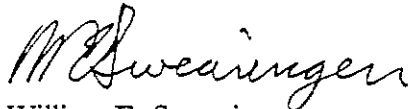
Page 2

Although the preceding item is of special concern to Koppers, other water quality standards are also important to us and in need of refinement. As a member of the West Virginia Manufacturer's Association we support and endorse their comments as well.

Koppers appreciates the opportunity to submit these comments and trusts that due consideration will be given to the concerns and suggestions given here.

If you have any questions concerning the issues addressed here or require additional information please call me at 412-227-2883 or write me at the above address.

Respectively submitted,



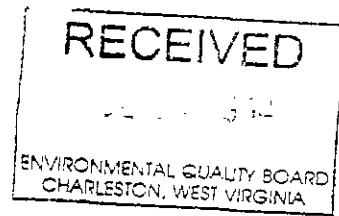
William E. Swearingen,
Manager, Environmental Programs

cc: T. A. Golubic; Follansbee Plant Manager



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
BELLE, WEST VIRGINIA 25015

AGRICULTURAL PRODUCTS DEPARTMENT
BELLE PLANT, 901 W. DU PONT AVENUE



July 13, 1995.

Ms. Frances E. Hunter
WV Water Resources Board
1615 Washington Street, East
Charleston, WV 25305

Dear Ms. Hunter:

Enclosed are our comments on the proposed revisions to the West Virginia Water Quality Standards. In addition, changes to the standards for polynuclear aromatic hydrocarbons are proposed, based on changes made to PAH water quality standards by EPA in 1992.

We also support the comments supplied by the West Virginia Manufacturing Association.

Sincerely,

R. F. SHERMAN
ENVIRONMENTAL COORDINATOR

RFS/jss
Enclosure
3.56

Comments Regarding June 1, 1994 Proposed Triennial
Revisions To The West Virginia Water Quality Standards

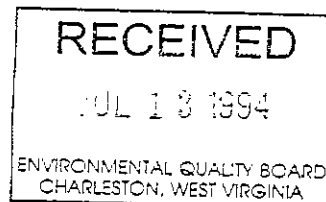
4 G.C.S.R. Series 1

By

E. I. du Pont de Nemours & Co., Inc.

Belle Plant

July 13, 1994



I. CHANGE IN CYANIDE WATER QUALITY CRITERIA

The proposed change from free cyanide to total cyanide analysis for water quality standards is not scientifically supported and could have a substantial effect on the Belle Plant. Currently, the Belle Plant discharges total cyanide to the Kanawha River under the NPDES permit program. Of this total cyanide, less than 10% of the permitted discharge consists of free cyanide and other forms that are amenable to chlorination. This proposed standards change could result in water quality-based permit limits that the Belle Plant would be unable to meet without making major changes, probably contract disposing of a major waste stream at a cost the the business could not support yet provide no improvement in actual water quality conditions in the Kanawha River.

The proposed revisions to the standards change the basis of the cyanide measurement from free to total cyanide and impose numerical criteria. While both of these changes are suggested by EPA in their 1984 Cyanide Water Quality Criteria Development Document, this document also states that "Free cyanide is a much more reliable index of toxicity to aquatic life than total cyanide because total cyanide can include nitriles (organic cyanides) and relatively stable metalocyanide complexes." Moreover, the recommended national criteria in the document states that:

"EPA believes that a measurement such as free cyanide would provide a more scientifically correct basis upon which to establish criteria for cyanide. The criteria were developed on this basis. However, at this time, no EPA approved methods for such measurement are available to implement the criteria through the regulatory programs of the Agency and the States. The Agency is considering development and approval of methods for measurements as free cyanide. Until available, however, EPA recommends applying the criteria using the total cyanide method. These criteria may be overly protective when based on the total cyanide method."

In fact, the proposed water quality standard when applied to the Belle discharge would be 10 times more protective than necessary for the protection of aquatic life.

Unfortunately, in the past 10 years, EPA still has not developed an acceptable analytical procedure for measuring free cyanide directly. However, recent regulatory activity has shown that EPA continues to support the desirability of using free cyanide as the proper basis for water quality criteria. In the 1993 Water Quality Guidance for the Great Lakes System, EPA proposed aquatic life criteria for cyanide is based on free cyanide analysis. The 1984 EPA cyanide water quality criteria document is referenced to support the use of free cyanide in the proposed Guidance.

Recently EPA has recognized that water quality criteria should be based on the bioavailable and toxic form of the pollutant - not on the total pollutant - where the bioavailable portion can be correlated with some acceptable analytical procedure. The argument on bioavailability of cyanide is very similar to EPA's recognition of bioavailability of metals which the West Virginia Manufacturers Association (WVMA) discusses in its comments to the board. In this case the use of soluble metal is accepted by EPA as a reasonable - and still conservative - indicator of bioavailable metal because some forms of soluble metal (i.e., chelated forms) are not bioavailable and toxic.

Other states have established cyanide criteria that allow for cyanide measurements that better represent the bioavailable forms. Both Maryland and Delaware allow cyanide to be measured as either free cyanide or as cyanide amenable to chlorination in their standards. Cyanide amenable to chlorination analysis would include free cyanide, alkaline salts, and some organic nitriles. Although this method would be more conservative than the free cyanide analysis and include some cyanide compounds that are not bioavailable, it would not include the relatively stable metalocyanides such as ferrocyanides.

It is our recommendation that the determination of cyanide criteria either remain based on free cyanide or be changed to allow cyanide amenable to chlorination analysis as a reasonable surrogate for free cyanide.

II. CHANGE IN AMMONIA WATER QUALITY CRITERIA

The proposed standards would adopt the same stringent chronic criteria of 20 ug/L for warm water fishery streams (Category B1) and small non-fishable streams (Category B3) as for trout waters (Category B2). This would mean substantially more stringent ammonia requirements for the Belle Plant since 50 ug/L is presently regarded as the instream limitation on unionized ammonia.

This is much more stringent than needed for non-trout waters as recommended in the EPA criteria document for ammonia. EPA ammonia criteria are given in separate tables for either the absence or presence of salmonids or other sensitive coldwater species (e.g., trout waters). The unionized ammonia values are provided within a matrix of pH and temperature values because the potential toxicity of ammonia is highly influenced by these factors. Some values have been picked off these tables and presented below as a comparison between trout (T) and non-trout (NT) water for unionized ammonia chronic criteria:

EPA Unionized ammonia chronic criteria (ug/L)

	5 oC	15 oC	25 oC
pH=7.5	T = 9 NT= 9	T =19 NT=19	T =19 NT=26

8.0	T =18 NT=18	T =35 NT=35	T =35 NT=50
8.5	T =18 NT=18	T =35 NT=35	T =35 NT=50

The corresponding comparison for unionized ammonia acute criteria is:

EPA unionized ammonia acute criteria (ug/L)

	5 oC	15 oC	25 oC
pH=7.5	T =64 NT=64	T =128 NT=128	T =181 NT=260
8.0	T =92 NT=92	T =184 NT=184	T =260 NT=370
8.5	T =92 NT=92	T =184 NT=184	T =260 NT=370

This shows that the trout waters acute and chronic toxicity requirements are substantially more stringent than for non trout waters at high temperature conditions that are generally more critical in determining discharge requirements because low flow conditions generally occur in the late summer and early fall period. The State is being overly conservative in proposing the same stringent limitations to all waters for all times of the year.

Many other states that have ammonia criteria for toxicity considerations apply them separately to trout and non trout waters (e.g., separate criteria for warm water and cold water fisheries). Virginia uses the tables given in the 1984 ammonia criteria document as the basis for their ammonia criteria requirements. South Carolina simply references the EPA 1984 ammonia criteria document and its tables as the basis for its criteria.

Pennsylvania and a few other states use equations relating unionized and total ammonia based on temperature and pH rather than tables. Pennsylvania also provides a basis for applying these criteria to specific streams for permitting purposes by establishing baselines under normally critical conditions for temperature, pH and flow with the following requirements from the Pennsylvania water quality standards:

"The pH and temperature used to derive the appropriate ammonia criteria shall be determined by one of the following methods:

- 1) Instream measurements, representative of median pH and temperature - July through September.

- 2) Estimates of median pH and temperature - July through September - based upon available data or values determined by the Department.

For the purposes of calculating effluent limitations based on this value the accepted design stream flow shall be the actual or estimated lowest 30-consecutive-day average flow that occurs."

It is recommended that the proposed water quality standards for West Virginia be correlated to the EPA ammonia criteria tables based on pH and temperature for unionized and total ammonia with separate tables for trout waters (Category B1) and non trout waters (Categories B2 and B3). Moreover, it is recommended that the same approach as described previously for the Pennsylvania water quality standards be used to establish appropriate conditions for establishing permit limits.

III. TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)

The current West Virginia Water Quality Criteria for total PAHs could have a significant impact on the Belle plant and other facilities because of low background levels of these compounds. The total PAH determination requires analysis of each individual compound (totalling 13) at or below minimum detection levels to determine compliances. This number of determinations below quantification levels increases the chances of false positive results.

The current criteria for total PAH is based on EPA Gold Book values for human health assuming potential carcinogenic for all PAHs at a 10⁻⁶ cancer risk. In 1992, EPA made significant changes to PAH water quality criteria. The National Toxic Rule, promulgated December 22, 1992, and representing the most recent EPA assessment of water quality criteria, has reevaluated the human health requirements for several PAHs. Acenapthene, acenapthylene, napthalene, and phenanthrene are no longer considered carcinogens. Consequently there is no criteria given in the National Toxics Rule for total PAH. EPA water quality criteria from the National Toxics Rule for other individual PAHs are presented in the table below.

HUMAN HEALTH CRITERIA (10⁻⁶ risk for carcinogens)

<u>Compound</u>	<u>Water & Organisms (Category A) (ug/L)</u>	<u>Organisms only (Category C) (ug/L)</u>
Anthracene	9,600	110,000
Benzo(a)anthracene	0.0028	0.031
Benzo(a)pyrene	0.0028	0.031
Benzo(b)fluoranthene	0.0028	0.031

<u>Compound</u>	<u>Water & Organisms (Category A) (ug/L)</u>	<u>Organisms only (Category C) (ug/L)</u>
Benzo(k)fluoranthene	0.0028	0.031
Chrysene	0.0028	0.031
Fluoranthene	300	370
Fluorene	1,300	14,000
Pyrene	960	11,000

In some cases this latest human health criteria information provides substantially different and much higher values than the 1986 Gold Book value for total PAHs. This reflects the original 1980 water quality criteria issuance that has now been superseded.

Virginia and Texas have recently adopted these new EPA criteria and do not have a criteria for total PAH.

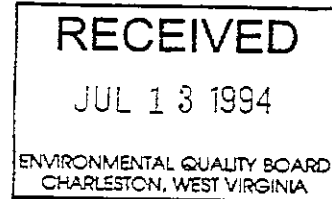
We recommend that the total PAH water quality criteria be eliminated from the proposed State water quality standards and replaced with water quality criteria for individual compounds as given in the above table from the 1992 National Toxics Rule.



WEST VIRGINIA MANUFACTURERS ASSOCIATION

2001 Quarrier Street, Charleston, WV 25311
Telephone: (304) 342-2123
FAX: (304) 342-4552

July 13, 1994



Mrs. Frances E. Hunter
Executive Secretary
State Water Resources Board
1615 Washington Street, East
Charleston, WV 25311

Re: Comments of the West Virginia
Manufacturers Association

Dear Fran:

Enclosed please find for filing the original and six (6) copies of the Comments of the West Virginia Manufacturers Association Regarding Triennial Review of West Virginia Water Quality Standards, 46 C.S.R. 1.

If you have any questions regarding this filing, please do not hesitate to contact me.

Sincerely yours,

Robert L. Foster

RLF:shb

Enclosures

Board of Director Members

3M Company	The Dean Company	Employers Service Corporation	Miles Inc.	TERRADON Corporation
Ashland Chemical Inc.	Downard Hydraulics, Inc.	Haltown Paperboard Co.	Monsanto Company	U S. Silica Company
BASF Corporation	DuPont	Helme Tobacco Company	P&WC Aircraft Services, Inc.	Union Carbide Corporation
Capitol Cement Corporation	Eagle Manufacturing	Kanawha Manufacturing Co.	PPG Industries, Inc.	W M. Cramer Lumber Co.
Corning Incorporated	EIMCO	Koppers Industries, Inc.	Ravenswood Aluminum Corp	Weirton Steel Corporation
Cytec Industries	Elkem Metals Company	Marbie King, Inc.	Rhone-Poulenc Ag Company	Wheeling-Pittsburgh Steel Corp.

RECEIVED

JUL 13 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

**BEFORE THE
ENVIRONMENTAL QUALITY BOARD**

**COMMENTS OF THE
WEST VIRGINIA MANUFACTURERS ASSOCIATION**

**REGARDING
TRIENNIAL REVIEW OF
WEST VIRGINIA WATER QUALITY STANDARDS
46 C.S.R. 1**

JULY 13, 1994

TABLE OF CONTENTS

	<u>Page</u>
I. Introduction	1
II. General Comments	1
A. Statutory References and References to the Board and Chief	1
B. Definitions (Pages 1-4)	2
III. Specific Comments	2
A. Section 2.7 - Intermittent Streams (Page 2)	2
B. Section 2.8 - Definition of Mixing Zone (Page 2)	3
C. Section 2.17 - Definition of Water	4
D. Section 2.15 Definition of Substantial and Widespread Economic and Social Impact (Page 4)	4
E. Section 2.22 - Definition of Zone of Initial Dilution (Page 4)	5
F. Section 4.1.b - Antidegradation Policy (Pages 5-6)	5
G. Sections 4.1.c and 4.1.d - Waters of Special Concern and Outstanding National Resource Waters (Page 7)	8
H. Mixing Zones	10
I. Section 5 - Determining Compliance With Mixing Zones (Pages 7-10)	11
J. Section 5 - Geographical Limits for Mixing Zones	12
K. Section 5.2.b - Criteria for Mixing Zones (Page 9)	13

L.	Section 5.2.h - Thermal Mixing Zones (Page 10)	14
M.	Section 6.1.d - Use Removals and Site-Specific Criteria (Page 12)	14
N.	Section 7.2.a - Water Use Category A (Page 17)	15
O.	Section 7.2.b - Applicability to Water Quality Standards	17
P.	Section 7.2.c - Exceptions to Water Quality Standards	18
Q.	Section 7.2.d - Site-Specific Changes to Water Quality Standards (Page 18)	19
R.	Section 7.3 - High Quality Water (Page 21)	19
S.	Section 8.3 - Changing Water Quality Criteria (Page 23)	20
T.	Appendix E Analytical Detection and Quantitation Levels	21
U.	Appendix E - Water Quality Criteria for the Management of Metals	25
V.	Appendix E - Expressing Criteria	28
W.	Appendix E - Criteria Calculation	29
X.	Appendix E - Adoption of More Stringent Criteria	30
Y.	Appendix E - Individual Criteria	31
IV.	Conclusion	35

**BEFORE THE ENVIRONMENTAL QUALITY BOARD
COMMENTS OF THE
WEST VIRGINIA MANUFACTURERS ASSOCIATION
REGARDING TRIENNIAL REVIEW OF
WEST VIRGINIA WATER QUALITY STANDARDS
46 C.S.R. 1**

I. Introduction

The West Virginia Manufacturers Association (WVMA) is a trade organization consisting of manufacturers and associated organizations throughout West Virginia. The WVMA participates in, and comments on, rulemakings that have a significant effect on its members' operations.

The Environmental Quality Board (the Board) has proposed significant changes to state water quality standards. The WVMA appreciates the work that the Board and its staff have put into revising the rule. Some of these changes will have a profound effect on manufacturers in this state. For that reason, the WVMA urges the Board to consider carefully the comments set forth below.

II. General Comments

A. Statutory References and References to the Board and Chief

The Division of Environmental Protection (DEP) Reorganization Bill went into effect on June 10, 1994. That Act changes statutory references from W.Va. Code 20-5A to W.Va. Code 22-11. In addition, the Water Resources Board is now referred to as the Environmental Quality Board. Revisions to reflect these changes should be made throughout the rule. Furthermore, at various places in the rule there are references to the "Chief" or to the "Chief, Water Resources Section, Division of

Natural Resources". (§§ 7.2.a.B, § 9.2, 9.3, etc). Standardization of the term "Chief" and inclusion of a definition of the term would be appropriate.

B. Definitions

Some of the new definitions have not been added in alphabetical order. As the definitions are being renumbered anyway, the WVMA suggests that all new definitions be added in alphabetical order.

III. Specific Comments

A. Section 2.7 - Intermittent Streams (Page 2)

At present the water quality standards do not properly distinguish between wet weather and intermittent streams. Wet weather streams are those that "flow only in direct response to precipitation or whose channels are at all times above the water table." 46 C.S.R. §1-2.18. Intermittent streams "have no flow during sustained periods of no precipitation and . . . do not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six (6) months." As can be seen by a comparison of the two definitions, all wet weather streams are also intermittent streams.

The difference between these two definitions becomes critical when they are applied to a stream that receives a NPDES-permitted discharge. Water quality standards do not apply in wet weather streams, but they do apply in intermittent streams when there is flow. Because water quality standards apply when there is flow in an intermittent stream, NPDES permits for discharges to such streams usually contain limits that apply at all times, even when there is no natural flow in

the stream. At such times, a permittee may be required to protect aquatic life that does not exist.

The WVMA believes that wet weather streams should not be treated as intermittent streams, and believes that water quality standards should not apply in either stream type. The best method of accomplishing this would be to delete the definition of "intermittent stream" and all references to intermittent streams in the rule. "Wet weather streams" could then be defined as

streams that flow only in direct response to precipitation, or the channels of which are at all times above the water table, or that do not support aquatic life whose life history requires residence in flowing water for a continuous period of at least six months.

In the alternative, the Board could clarify the standards by adding the following sentence to the definition of intermittent stream in §2.5:

Wet weather streams are not intermittent streams.

and by deleting the parenthetical language in §7.2.c.2 and replacing it with the following phrase:

or intermittent streams,

B. Section 2.8 - Definition of Mixing Zone (Page 2)

The rule does not contain a definition of "mixing zone". A definition based on the one found in the Water Quality Standards Handbook (WQS Handbook) EPA 823-B-93-002 (September, 1993) at page 5-2 would be appropriate:

2.8 A limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but lethal conditions are prevented.

C. Section 2.17 - Definition of Water

The definition of "water" is taken verbatim from the State Water Pollution Control Act but for purposes of this rule it is overbroad. It includes groundwater, which is the subject of separate quality standards. Consequently, the definition conflicts with §1.1, Scope, which correctly notes that the standards are for waters "standing or flowing over the surface of the State."

If left as written, the definition might cause this rule to be improperly applied. For example, the §6.2 description of Category A (Public Water Supply) might be interpreted as extending to wells. Therefore, the WVMA suggests that references to groundwater be removed from §2.17, so that it would read in the following fashion:

"Water," or "waters" shall mean any and all water on the surface of the ground, whether flowing, wholly or partially within this State, or bordering this State and within its jurisdiction, and shall include, without limiting the generality of the foregoing, natural or artificial lakes, rivers, streams, creeks, branches, brooks, ponds (except farm ponds, industrial settling basins and ponds and water treatment facilities), impounding reservoirs, springs, watercourses and wetlands.

D. Section 2.15 - Definition of Substantial and Widespread Economic and Social Impact (Page 4)

The Board should consider incorporating a definition of the "substantial and widespread economic and social impact" referred to in 40 C.F.R. §131.10(g)(6), and subsections 6.1.b and 8.3 of this rule, as that term is a basis for granting variances and use removals. The Environmental Protection Agency (EPA) has indicated that this term involves consideration of not only the possibility of closure of a plant and unemployment but also the effect of water quality standards on competitive position, profitability, and the possibility of price increases and shifts in

local revenues due to sales and tax effects. The Board should consider the same factors.

The WVMA suggests this definition:

2.22 "Substantial and Widespread Economic and Social Impact" includes, but is not limited to, the possibility of plant closure, unemployment, effects on competitive position, profitability, price increases and tax effects.

If this definition is not adopted by the Board, the WVMA hopes that the Board will clarify in its response to comments that it interprets this term in the same broad fashion.

E. Section 2.22 - Definition of Zone of Initial Dilution (Page 4)

The WVMA commends the Board for its development of a mixing zone policy that includes Zones of Initial Dilution (ZIDs). The Association suggests that a ZID be defined as

The region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports, in which water quality standards do not apply.

This definition is derived from the definition of a ZID found in a proposed EPA rule at 56 Fed. Reg. 2825 (January 24, 1991).

F. Section 4.1.b - Antidegradation Policy (Pages 5-6)

Section 4.1.b requires "satisfaction of the intergovernmental coordination of the State's continuing planning process" before water quality can be lowered in a high quality stream. However, there is no explanation of what constitutes "intergovernmental coordination" or what is a "continuing planning process." Has a group been formally constituted to provide such intergovernmental coordination?

Who performs the intergovernmental coordination of the state's planning process, and what criteria do they apply in determining when degradation of state waters is allowed? The January 10, 1994 letter from Stanley L. Laskowski to Dr. David Samuel suggested that a description of antidegradation implementation procedures must be provided to EPA before it can fully approve the Board's antidegradation provisions. Have the procedures been described and made available for public comment?

This is a matter of great practical importance to any person who applies for a NPDES permit or for state certification under Section 401 of the Clean Water Act. The universe of "high quality waters" is so broad, and the meaning of "maintained at their existing high quality" is so vague, that a permittee is left without notice of what implicates antidegradation review. One might improperly interpret such a provision to call into question the terms of NPDES permits that allow discharges of substances to a stream in excess of existing quality concentrations.

In addition to the question of who allows degradation to occur, there is an issue as to whether a public hearing is called for in all circumstances. The state rule provides that there can be no degradation of state waters without the "opportunity for public comment and hearing. . . ." This is broader than the federal regulation from which it is drawn, 40 C.F.R. §131.12, which only requires public participation and does not specify a public hearing. Public participation is already an integral part of any NPDES permit or §401 certification application, and any interested member of the public can participate by filing comments and requesting

a hearing. If a hearing is not held, because it is not requested or the Office of Water Resources deems it unnecessary, the lack of a hearing should not invalidate a NPDES permit that allows discharges of substances at concentrations greater than existing in-stream concentrations.

EPA does not require a separate antidegradation hearing in all circumstances. It has said that

The antidegradation public participation requirement may be satisfied in several ways. The State may hold a public hearing or hearings. The State may also satisfy the requirement by providing public notice and the opportunity for the public to request a hearing. . . .To ease the resource burden on both the State and the public, standards issues may be combined with hearings on. . .permits.

WQS Handbook at 4-11. The WVMA suggests deleting the phrase "comment and hearing" and replacing it with the word "*participation*" as a means of clarifying that a public hearing need not be held, but that public participation of a type deemed appropriate by the Chief is mandatory.

The last phrase of §4.1.b is redundant of the first phrase and can be eliminated because the Board previously decided, during the last triennial review, that all waterbodies should have the fishable/swimmable uses applied to them. Therefore, if any waterbody is to be degraded below the "levels necessary to sustain the national water quality goal uses of protection and propagation of fish, shellfish and wildlife and recreation in and on the water," a variance, site-specific criteria, or use removal is required. Antidegradation would not be implicated in such a situation because a more stringent review would be required by the Board.

The WVMA offers the following revision of §4.1.b that incorporates all its proposed changes to the antidegradation provisions. The proposed language is intended to address all EPA concerns about the antidegradation provisions of the rule, including the requirement of an "intergovernmental coordination" process. The WVMA includes such language in its proposal in the expectation that the Board will describe this process and allow comment on it before implementing it.

b. 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 participation, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. Lower water quality that is allowed under a permit or certificate issued by the chief after opportunity for public participation shall be deemed to satisfy the requirements of this subsection. The Board and the chief shall assure that all new and existing point sources shall achieve the highest established statutory and regulatory requirements applicable and shall assure the achievement of cost-effective and reasonable best management practices for non-point source control.

G. Sections 4.1.c and 4.1.d - Waters of Special Concern and Outstanding National Resource Waters (Page 7)

The distinction between §§4.1.c and 4.1.d is unclear. In §4.1.c, there is no activity allowed that reduces water quality; in §4.1.d, waters are maintained, protected, and improved where necessary. Both could be construed as prohibiting a discharge of any substance in excess of existing concentrations.

The WVMA believes §4.1.c is intended to require additional antidegradation protection for some rivers, but not the total prohibition on degradation anticipated by §4.1.d. This would be consistent with the "Tier 2.5" approach that EPA has approved on the grounds that it "allows states to provide a

very high level of water quality protection without precluding unforeseen future economic and social development considerations." WQS Handbook at 4-2. The WVMA commends the Board for its willingness to consider this sort of innovative approach. However, if the differences between the protections afforded to "Waters of Special Concern" (WSC) and "Outstanding National Resource Waters" (ONRW) are not extremely clear, the beneficial effect of the new language is lost.

The WVMA believes that some additional procedural protections could be afforded to WSC that would place them in a more protected position than high quality waters without prohibiting any lowering of water quality. This could be done by requiring a decision by the Environmental Quality Board on the desirability of allowing the degradation to occur, after a public hearing and presentation of evidence. The Board would be empowered to require additional controls or monitoring with respect to the parameters for which contamination was to be increased, if necessary to protect the use of the stream.

The WVMA believes that these matters could be best addressed by revising §4.1.c. to provide additional procedural protections against unwarranted degradation:

In waters that constitute a water of special concern, designated in Subsection 7.3.d, no activities that result in the reduction of existing ambient water quality shall be allowed unless the Environmental Quality Board determines, after a public hearing and presentation of evidence, that the change is necessary to accommodate important economic or social development in the areas in which the waters are located.

The Board should also consider moving §7.3 to §4, because §7.3 identifies the types of streams that fall into the various categories of antidegradation review

that are referred to in §4. There is no particular reason to leave §7.3 in §7, as §7 is otherwise dedicated to denominating river segments and identifying where water quality standards apply. Section 7.3 makes more sense as §4.2.

H. Mixing Zones

The WVMA does not believe that any changes are needed in the present mixing zone section. Section 5 sets out all the factors the Chief should consider before granting a mixing zone, and allows the Chief to request any information needed to make a decision on the allowability of mixing zone. EPA has exceeded its authority in disapproving §5, and is subject to challenge for having done so. The water quality standards merely allow mixing zones to be established, and allow the Chief to gather information to properly permit them. More than this should not be required by EPA.

If geographically-defined mixing zones have not been established through the NPDES process, it is not because there is no authority for them. Rather, there is no need for them. The "instantaneous mix" calculation employed by the Office of Water Resources has been a satisfactory substitute for spatially-limited mixing zones, and could continue to be. If the Board is concerned that there would be no restraint on acutely toxic conditions at the discharge, a separate narrative criteria could be established that would prohibit any mixing zone calculation that would result in lethality to aquatic life. This would relieve the Board of the need to develop acute criteria for aquatic life.

The WVMA urges the Board to add the following to §5:

5.6 The chief may calculate effluent limitations for discharges to mixing zones with or without defining them spatially or geographically.

5.7 The chief shall apply this section so as to prevent lethality to aquatic life and significant human health risks.

If the Board elects not to use the existing language, the WVMA recommends the changes proposed in the following sections.

I. Section 5 - Determining Compliance With Mixing Zones (Pages 7-10)

The proposed mixing zone provisions call for sizing mixing zones by areal extent rather than allowing an "instantaneous mix" calculation by the Office of Water Resources. Delineating mixing zones in this fashion may require additional efforts on the part of the permittee to identify the limits of the mixing zone as part of the permit application process and to demonstrate that the mixing zone complies with the water quality standards once the permit is issued. For example, the new mixing zone provisions presume that NPDES permits could be written to require end-of-pipe sampling for technology-based limits and instream sampling for water quality-based limits. This instream sampling could be expensive, unwieldy, and even dangerous.

It is possible to reduce the amount of instream sampling without compromising the protections afforded by this rule. Once the mixing zone has been delineated and shown to be effective at preventing exceedances of water quality standards at certain effluent concentrations and river flows, the permittee should not be required to measure the concentration of the parameter of concern in the river if the discharge flow and the effluent concentration of that substance is no greater than, and the river flow is no less than, it was when the confirmation was provided to the

Chief. A permittee should be allowed to request NPDES limits that enable the permittee to report an end-of-pipe measurement for all parameters, assuming that the physical features of the mixing zone have not changed. The effect would be to allow end-of-pipe effluent measurement for both technology-based and water quality-based permit limits rather than requiring two tests -- one of the effluent and one of the river.

The following language would allow permittees the flexibility to avoid additional, unnecessary sampling:

5.3. The Chief may determine the sampling methods by which this section shall be implemented in any permit in which a mixing zone is allowed. Such sampling shall not be done in the receiving water if it is not necessary to verify compliance with water quality standards.

J. Section 5 - Geographical Limits for Mixing Zones

The WVMA believes that the Board should not establish presumptive mixing zone dimensions and volumes as it has in §§5.2.d, 5.2.e and 5.2.g.B. The narrative protections (protection against lethality, free passage of aquatic life, no overlap of a drinking water intake, etc.) found in the rule are sufficient to protect stream uses, and limiting the size arbitrarily does nothing more helpful.

If the Board elects to continue to use the geographical limits identified in §5, it should make mandatory the relief from those limits provided by §5.2.i. That subsection should be changed to begin:

i) The chief must waive the requirements of subsections (d), (e) and (g)(B) above if a discharger provides an acceptable demonstration of. . . ."

While a permittee and the Chief may debate what constitutes "an acceptable demonstration," there is no reason the Chief should not grant relief from the boundary limitations if it is determined that the demonstration is sufficient.

The WVMA also requests an explanation of the last sentence in §5.2.a, which states that "[m]ixing zones will not be allowed until applicable limits are assigned by the Chief in accordance with this section." Is this a reference to NPDES permit limits or geographical limits of mixing zones? If the latter, is it intended as a restatement of the first sentence, which requires "definable geometric limits for mixing zones"?

K. Section 5.2.b - Criteria for Mixing Zones (Page 9)

Section 5.2.b. provides that acute criteria cannot be exceeded outside a mixing zone, except in a ZID. The WVMA does not interpret this to prevent the establishment of a mixing zone where no acute criteria has been developed. For example, acute criteria are not provided for the human health categories (A and C), because those numbers are human health criteria and are to be applied only as chronic numbers. (See the WQS Handbook at 3-4.) EPA clearly contemplates development of mixing zones for chronic criteria set to protect human health, as discussed in the WQS Handbook in Section 5.1.3.

The rule should clarify that, unless an acute criterion has been adopted for a parameter, there is no reason to limit the concentration of that substance in a properly-sized mixing zone. To establish that the lack of acute criteria is not an impediment to creation of a mixing zone, this language could be added, as §5.2.1:

l) Mixing zones are allowed for all substances listed in Appendix E. Where acute criteria for a substance has not be developed, the discharger is not required to meet acute water quality criteria in the mixing zone, but must prevent lethal effects to aquatic life and significant human health risks.

L. Section 5.2.h - Thermal Mixing Zones (Page 10)

The WVMA urges the Board to consider adoption of a separate subsection for thermal mixing zones because they differ substantially from other types of mixing zones. Thermal mixing zones may actually provide a benefit to aquatic life by warming spawning areas, or benefit humans by warming a swimming area or keeping a public water intake ice-free. Heat is a transitory pollutant, is not bioaccumulative, and poses no environmental harm in a properly - sized mixing zone.

The WVMA suggests that §5.2.h be eliminated and §5.2 be changed in this way:

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

A new subsection could then be added to provide

5.3 Thermal mixing zones shall be established by the Chief in a manner that will not adversely alter the designated uses of the receiving water, nor cause or contribute to any of the conditions prohibited in Section 3. A successful demonstration conducted under Section 316(a) of the Clean Water Act shall constitute compliance with all provisions of this section, but is not a prerequisite to establishing a thermal mixing zone.

M. Section 6.1.d - Use Removals and Site-Specific Criteria (Page 12)

The last sentence of §6.1.d refers to the method of removing uses, but provides no guidance as to the state rule that governs changes to water quality standards. It would be appropriate to note in §6.1.d. that the procedure for changing uses, as allowed in §6.1.b, is set forth in 46 C.S.R. 6.

Section 6.1.d also states that revisions of state water quality standards must be made with the concurrence of U.S. EPA. While EPA has the power to review and disapprove water quality standards, it does not have unlimited discretion to approve or disapprove every change to the state standards. There is often a range of reasonable actions that the state may take, some of which may be more or less desirable from EPA's standpoint, but all of which are acceptable. Requiring the concurrence of EPA invites the agency to disapprove standards on a discretionary basis as opposed to EPA assuring itself that the state chooses among acceptable alternatives. Conferring such discretionary authority is an unconstitutional delegation of power to United States Environmental Protection Agency.

The WVMA urges that the phrase "made with the concurrence of EPA" be changed to "*reviewed by EPA*". If EPA chooses to disapprove a portion of the rule after completing its review, it has independent authority to do so, regardless of the provisions of West Virginia water quality standards. The standards should not, however, allow EPA to disapprove any part of the rule on a discretionary basis.

N. Section 7.2.a - Water Use Category A (Page 17)

The application of Appendix E criteria to the public water supply use, Category A, is open to multiple interpretations. Section 7.2.a.B states that "each segment extending upstream from the intake of a water supply public (Water Use Category A), for a distance of five (5) miles 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." This language has been interpreted by the Office of Water Resources (OWR) as prohibiting mixing zones

within five miles of a public water intake, because permit limits consistent with a mixing zone result in exceedance of the criteria within the zone. The result is unnecessarily stringent NPDES permit limits for any discharger within five miles of a drinking water intake.

The better interpretation of §7.2.a.B is that it defines the length of river subject to the Category A use, and provides that Category A criteria apply in such waters. Under this approach, mixing zones are still allowed in Category A segments because they allow initial dilution while still protecting against exceedance of human health criteria at drinking water intakes. There is no reason for Category A criteria to be met end-of-pipe if discharges to rivers assigned other uses are allowed mixing zones. Indeed, there is less justification for prohibiting mixing zones in Category A waters, because the chronic criteria apply at intakes and humans are never exposed to the acute criteria. In rivers assigned Category B, however, mixing zones are allowed even though aquatic life may be exposed to acute criteria in the mixing zone.

The WVMA urges the Board to delete §7.2.a.B because it serves no purpose. Section 5 already prohibits a mixing zone from overlapping a water supply intake. Outside a mixing zone, only chronic criteria, which are deemed protective of human health, apply. Therefore, even if mixing zones are allowed the most protective water quality criteria always apply at the point drinking water is removed from the river. It makes no difference whether a mixing zone is 1/2 mile from the intake or 4 1/2 miles -- the chronic criteria apply at the drinking water intake and at all other places outside the mixing zone.

If the Board does not believe the chronic criteria are protective of human health, it should explain why they are not and propose changes. If, on the other hand, the criteria are protective (as the WVMA believes is the case) the Board should not prohibit discharges with end-of-pipe concentrations that exceed the Appendix E criteria. This could be changed by deleting §7.2.a.B. and amending §6.2.e. in this fashion:

e. Shall apply to the stream segment extending upstream from the intake for a distance of 5 miles. (See Appendix B for a partial listing.)

In the alternative, the Board could clarify that §7.2.c., which designates where water quality standards do not apply, was meant to apply to the Category A use in the same manner it applies to other uses. Changing the rule to reflect that intent does not mean lowering the standard for the protection of public water supplies; it only means that the standard will apply at all places in the stream except, for example, in a ZID four and one half miles upstream. This change could be brought about by adding the following phrase to the end of the first sentence in §7.2.a.B:

except in mixing zones or ZIDs

This change would also serve to clarify that antidegradation review is not required where there is an increased concentration of substances in a mixing zone.

O. Section 7.2.b - Applicability to Water Quality Standards

Water quality standards apply in all state waters except in the circumstances set out in §7.2.c. Those exceptions to the application of water quality standards do not apply to the "free from" narrative criteria in §3, however. The

WVMA believes that this exposes an important inconsistency. When, for example, stream flow falls below the 7Q10, numeric criteria from Appendix E do not apply, but the narrative criteria do. This is true even though the numeric criteria may be of greater environmental benefit than the narrative protection against transient, unpleasant odors afforded by §3.2.c or the protection against "distinctly visible color" provided by §3.2.f. Nevertheless, the narrative criteria are protected and the numeric criteria are not.

The WVMA believes that the very good reasons the Board has for justifying relief from numeric criteria are just as convincing when applied to some or all of the narrative criteria. The WVMA urges the Board to amend §7.2.b. to provide that, at a minimum, the purely aesthetic narrative criteria do not apply in state waters whenever numeric criteria do not apply. This could be accomplished by changing the last phrase of §7.2.b in the following fashion:

nor the requirements of Section 3 that pertain to taste, color, or odor

P. Section 7.2.c - Exceptions to Water Quality Standards

The Board has proposed changing §7.2.c.C. so that water quality standards do not apply in ZIDs, as opposed to the current language which provides that water quality standards do not apply in the mixing zone. This change was presumably made because acute criteria, which may not be exceeded in a mixing zone, have now been developed. However, the change calls into question the Chief's authority to grant mixing zones where no acute criteria have been proposed. Furthermore, there are other aspects of water quality standards, including

antidegradation, that should not apply in mixing zones. The WVMA suggests this subsection be rewritten in this fashion:

C. In any mixing zone or zone of initial dilution established pursuant to Section 5, except that where acute criteria has been adopted, the acute criteria shall apply between the boundary of the zone of initial dilution and the boundary of the mixing zone.

Q. Section 7.2.d - Site-Specific Changes to Water Quality Standards (Page 18)

The WVMA commends the Board for its willingness to amend this section to provide specifically that it contains variances, site-specific criteria, and use removals. We believe that most, if not all, of the adjustments to water quality standards set out in §7.2 are site-specific criteria or use removals, which do not require any further approval by the Board. To the extent that any of the water quality standards adjustment in §7.2.d. is a variance, or to the extent that the Board wishes to grant a variance in the future, the adjustment should be specifically identified as a variance so that only the variances are reconsidered during each triennial review.

The WVMA suggests that §7.2.d. be revised to read:

d. State-wide water quality standards shall apply except where site-specific criteria, variances, or use removals have been approved following application and hearing, as provided in 46 C.S.R. 6. The following are the use removals, site-specific criteria, and variances allowed in State waters (note: variances apply only to the discharger named and must be reconsidered every three years):

R. Section 7.3 - High Quality Water (Page 21)

The WVMA has suggested that §7.3 be moved to §4. Whether or not this is done, §7.3.a. should be rewritten to clarify that §§7.3.b. and 7.3.c. are all high quality waters. As presently written, §§7.3.b. and 7.3.c. appear to be separate categories of water.

Section 7.3.a. could be rewritten in the following fashion:

a. High quality waters, as defined in Section 2.6, include all streams designated in the West Virginia Natural Stream Preservation Act, West Virginia Code Chapter 22, Article 13, and all streams listed in the West Virginia High Quality Streams, Fifth Edition.

The WVMA offers this suggestion for purposes of consolidation and clarification. It continues to question whether the list of high quality streams accurately reflects high quality water as that term is defined in §2.6, though.

S. Section 8.3 - Changing Water Quality Criteria (Page 23)

The WVMA believes that the provisions relating to changing water quality criteria should be set out in §8.3 so that they are clearly presented and gathered in one place. To accomplish this end, a subsection authorizing development of site-specific criteria could be added to the variance language at §8.3.

Site-specific criteria should be allowed where less stringent criteria will allow a state to maintain a designated use. The EPA has specifically provided that the states can use either numerical values or a narrative to establish criteria, and that numerical values can be based upon 304(a) guidance, 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods. 40 C.F.R. §131.11. Site-specific criteria acknowledges that a use can be maintained even where

the criteria may be set at less stringent levels than would otherwise apply for that use (e.g., the default criteria under Appendix E). Procedures for deriving site-specific water quality criteria are referenced in the WQS Handbook.

The WVMA urges adoption of the following:

8.3 Changing Water Quality Criteria

a. A variance from numeric criteria may be granted to a discharger if it can be demonstrated that one of the conditions outlined in subsections 6.1.d.A-F 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 Board every three years. In granting a variance, the Board shall follow the requirements for revision of water quality standards as required by the State Act, §303 of the Federal Act, and the procedural regulations for applying for less restrictive uses or criteria (46 C.S.R. Series 6).

b. The Board may establish criteria that is less stringent than that set forth in Appendix E for any waterbody or portion of a waterbody if the less stringent criteria will not prevent attainment of any use assigned to that waterbody. When considering whether to establish less stringent criteria the Board shall follow the procedures set forth in 46 C.S.R. 6.

T. Appendix E - Analytical Detection and Quantitation Levels

Certain water quality criteria are set at very low levels, which causes significant analytical problems. The accuracy of all analytical test methods deteriorates as the concentration of the substance being measured decreases; therefore, testing results become progressively less precise. At a certain level, test methods lose their capacity to quantify reliably the concentration of constituents being measured. At some lower concentration, test methods lose their capacity to detect whether the constituents being measured are even present. This imprecision is due to a host of interferences, including matrix effects. Although some test

methods detect at lower levels than others, all methods lose their detection capability at some point.

This analytical unreliability or imprecision is a very real concern to the NPDES permittee who is subject to severe penalties for any noncompliance with permit effluent limitations. At present, neither the NPDES rules nor the water quality standards allow the permit writer to address this troublesome compliance issue. Permit limits are set at levels necessary to protect water quality standards even when those limits cannot be reliably measured. The result can be false-positive results (i.e., the appearance of a permit exceedance created by this analytical variability rather than the level of pollutant in the sample) that can subject the permittee to potential enforcement action.

The Office of Water Resources has tried to address this problem by allowing permit compliance be determined using the minimum detection level (MDL)¹ when water quality-based permit limits are established below the MDL. This practice is undesirable for two reasons. First, it is not reflected in any statute or regulation, and therefore the permittee might not be able to rely upon it in an enforcement action. Second, it is still insufficiently accurate to prevent false positive results.

A more acceptable level at which to determine compliance with permits is what is known as the analytical "quantitation level." This is the lowest level greater than the MDL at which an analyst can determine with acceptable confidence

¹The lowest concentration below which an analyst cannot determine, with acceptable confidence (99%), whether or not the substance being measured is present.

the actual concentration of the substance being measured. Below the quantitation level, the variability is too great to rely upon the numerical value produced by the testing method. Although one cannot rely on single measured values below the quantitation level for numerical significance, one can rely on such values to determine whether a particular substance is present in a sample (so long as the values are not less than the minimum detection level discussed above).

EPA is in the process of providing definitive guidance on this issue in its draft National Guidance for the Permitting, Monitoring and Enforcement of Water Quality-based Effluent Limitation Set Below Analytical Detection/Quantitation Levels (March 22, 1994). That guidance suggests using a minimum level or a compliance level, with analytical results below the minimum level reported as zero. If a minimum level is not available, one can be calculated by multiplying the method detection limit by a factor of 3.18.

Implementation of EPA's draft guidance might be accomplished by means of special guidance that treats nondetect results as an analytical value of zero. For example, EPA Region VI has issued a guidance memorandum dated July 1, 1991 entitled "The Use of Minimum Quantitation Levels (MQLs) in Water Quality-Based Permits" (Attachment I). Under that guidance, compliance with permit limits for water quality criteria that is below the MDL is determined using "Minimum Quantification Level" (MQL) where the $MQL = 3.3 \text{ MDL}$. Any analytical value below the MQL is considered to be zero. Therefore, Region VI recognizes that the MQL is the lowest concentration at which a particular substance can be accurately measured

and at which permit compliance can be determined with the appropriate degree of confidence.

Other nearby states which have addressed this issue include Virginia, New Jersey, and Ohio. These three states have proposed using the Practical Quantitation Limit (PQL) to determine compliance with water quality criteria below the detection limit. They stipulate that the PQL is five times the MDL, which is consistent with the latest edition of "standard methods"². Virginia has adopted the Region VI approach, and published compliance quantitation levels for each pollutant.

This triennial review is an opportunity for the Board to acknowledge the problem of analytical variability and to propose and adopt a provision in the water quality standards that will allow it to be addressed for purposes of NPDES permits. Until EPA develops a standard method of determining a PQL the Board should adopt its own. The following language which could be added to §8.1, is recommended to do so:

For purposes of permits issued by the chief, water quality standards are deemed protected where the discharge concentration of a substance is nondetectable at the practical quantitation level. The Practical Quantitation Level (PQL) is five times the minimum detection level (MDL). The permittee has the option to develop permit-specific quantitation levels using a methodology approved by the Chief.

²American Public Health Association, American Water Works Association and Water Pollution Control Federation, 1989. Standard Methods for the Examination of Water and Wastewater, 18 ed. American Public Health Assoc., Washington, DC.

U. Appendix E - Water Quality Criteria for the Management of Metals

The water quality standards do not specify whether criteria are expressed in terms of total or dissolved metals. The EPA guidance on which the criteria are based was developed using dissolved metal concentrations. This is appropriate, because the portion of total metal that is dissolved in the water column is the fraction of metal that is bioavailable and can exert a toxic effect on the aquatic environment (i.e. pass through biological membranes and react chemically with an organism).

NPDES rules, on the other hand, require setting permit limits in terms of total metals. The effect, in West Virginia and elsewhere, is to impose more stringent NPDES permit limits on metal discharges than are necessary for protection of designated uses. The imposition of these unnecessarily stringent water quality-based effluent limits for metals is costing dischargers significant capital, operation, and maintenance expenses for treatment facilities that are not necessary for protection of human health or the aquatic environment.

EPA's water quality criteria for metals are based on toxicity tests performed in purified water that was reconstituted for the test by the addition of mineral salts. Toxicity tests are conducted by completely dissolving into solution the soluble salt of the metal to be tested. Since toxicity of many trace metals is a function of the chemical form (species) of the metal, laboratory tests such as these are not representative of actual receiving water conditions. For example, toxicity to copper is directly related to the free metal ion Cu^{+2} . Free ion concentration of copper

depends on the formation of copper complexes with inorganic ions and organic complexing agents. Mitigating factors, such as suspended solids and organic matter that are present in natural aquatic environments, were not accounted for during EPA's tests.

The toxicity of metals in the aquatic environment is significantly affected by site-specific factors. A receiving stream or river's natural physical and chemical characteristics (e.g. particle adsorption, organic complex formation, co-precipitation, etc.) significantly reduce the amount of free metal ion that is available to induce toxicity. These factors alter the bioavailability of the metal, thereby altering the metal's toxicity in the water column. Generally speaking, as the fraction of dissolved metal in the water column decreases, the metal's bioavailability decreases, and the metal's toxic effect diminishes accordingly.

EPA has acknowledged that the concentration of dissolved metal more closely reflects the bioavailable fraction of the metal in the water column. As a result, the EPA's Office of Water recently recommended that the dissolved metal concentration be used to establish permit limits and measure compliance with water quality criteria. "It is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal." Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1, 1993 memorandum from Martha Prothro. While regulations governing the NPDES program require permit limits for metals to

be stated as "Total Recoverable Metal" (40 C.F.R. §122.45(c)), this rule does not preclude the state from expressing water quality criteria for metals in terms of dissolved metal.

If water quality standards are expressed as dissolved metals, and permit limits are written as total metals, EPA recommends use of a translator mechanism, which would express the relationship between dissolved and total metal concentration, to report compliance with water quality criteria. The guidance provides alternate methods to determine the total metal concentration that corresponds to a dissolved concentration, specifying the fraction of total metal in the effluent that would exist as dissolved metal in the receiving stream. This approach will more accurately reflect actual toxic impacts of effluent on ambient receiving waters and allow permit limits to be set accordingly.

A number of states have adopted water quality criteria for metals in terms of ambient dissolved metal concentration. To relate the dissolved metal portion to the total metal concentration, they incorporated language into their regulations and/or developed guidelines for establishing the use of chemical translators in their water quality-based permits. Texas, for example, expresses its water quality criteria for metals in terms of dissolved metal concentration (Title 31 TAC 307.6). A Texas permitting guidance manual specifies how to calculate permit limits as total recoverable metal from the dissolved metal criteria. Maryland recently revised its water toxic regulations to include water quality criteria for metals expressed as dissolved concentration. To calculate permit limits as total recoverable metal concentration, the new regulation includes chemical and/or biological translators

(Code of Maryland Regulations 26.08.04.02-4). The Commonwealth of Virginia expresses its ambient water quality standards for most metals as dissolved metal concentration (VR680-21-0.1.14). Translators may be used to calculate permit limits as total recoverable. Virginia's Office of Water Resources Management (OWRM) issued a detailed guidance (OWRM Guidance Memorandum No. 93-016) on sampling and data analysis to implement its chemical translator procedure.

This triennial review provides the Board an opportunity to adopt EPA's new policy regarding the use of dissolved metal for establishing and measuring compliance with water quality criteria. The Board, by inserting the following language as the second sentence in §8.1, would reflect the fact that water quality criteria for metals are based on the dissolved metal concentration in the aquatic environment, and would allow dischargers to measure compliance in terms of the dissolved (bioavailable) fraction of the metal.

Appendix E numerical water quality criteria for metals and metalloids are expressed as the dissolved concentration.

To implement procedures for dischargers to translate from dissolved to total metal concentration for purposes of NPDES permits, the Chief could use the EPA's May, 1992 and October, 1993 guidance documents, or provide the permittee the alternative of developing a more appropriate translator.

V. Appendix E - Expressing Criteria

The criteria in Appendix E are generally derived from EPA's Gold Book. However, they are not applied in the state standards as they are intended by the Gold Book. The Gold Book numbers are not never-to-be exceeded numbers; they are

numbers that are not to be exceeded more than once every three years as a four day average for chronic criteria, and once every three years as a 1-hour average for acute criteria. The criteria should be expressed in this fashion by adding §8.1.d:

d. Criteria in Appendix E are expressed as numbers that are not to be exceeded more than once every three years as a one hour average for acute criteria and a four day average for chronic criteria.

EPA has recognized this same problem. In the January 10, 1994 letter from EPA to Dr. Samuel, Mr. Laskowski noted on page 11 that "EPA's criteria are expressed in terms of magnitude, duration and frequency, to meet the scientific basis of the criteria. However, the State's standards seem to be expressed as never-to-be exceeded values." EPA went on to state that, if duration and frequency weren't specified for the criteria, they would be interpreted as never-to-be-exceeded, end-of-pipe numbers. EPA is clearly inviting the State to adopt language of the sort recommended by the WVMA.

W. Appendix E - Criteria Calculation

Certain Category A and Category B criteria were developed after taking into account average fish consumption of 6.5 grams per day. EPA used this national average in calculating uptake of toxics by humans through ingestion of fish. States are not bound by this average consumption rate, though.

The EPA exposure model was based on estimates or measures of national averages. . . .EPA has suggested that States select more appropriate fish and other aquatic life consumption rates for local populations. Some States have done so.

57 Fed. Reg. 6088 (December 27, 1992). See also WQS Handbook, page 305. If fish consumption in West Virginia is lower than the national averages (the criteria for Category C and Category A uses should be adjusted upward, because the exposure to toxics will not be as great as the exposure on which the criteria were predicated.

During the 1991 triennial review, the Board reviewed average fish consumption in West Virginia and determined that it was 1.1 grams per day. This figure is 17% of the national average, and suggests that the national criteria are too high for West Virginia. The state criteria should be adjusted upward to reflect the lower-than-average fish consumption rate.

X. Appendix E - Adoption of More Stringent Criteria

Some of the criteria adopted by the Board is more stringent than federal criteria set out in the Gold Book or in the National Toxics Rule. EPA noted this as well in the January 10, 1994 from Stanley Laskowski to M. Samuel, stating that "[u]nfortunately, there is very little scientific justification for some of the criteria adopted by the State."

The WVMA encourages the Board to identify, with regard to each substance for which a criteria was developed, the basis for that criteria if it is set at a concentration greater than either the Gold Book or the National Toxics Rule would require. Our review suggests that one or more of the criteria for the following substance exceed federal guidance:

Arsenic
Barium
Beryllium
Cadmium
Chloride

Copper
Cyanide
Dissolved Oxygen
Fluoride
Iron
Manganese
Mercury
Nickel
Nitrite
Chlordane
DDT
Dieldrin
Endrin
Toxaphene
Methoxychlor
Benzene
Hexachlorobenzene
Chloroform
1,2 - dichloroethane
1,1,1 - trichloroethane
1,1,2,2 - tetrachloroethane
1,1 - dichloroethylene
Polynuclear Aromatic Hydrocarbons
Phenolic materials
Radioactivity
Selenium
Silver
Total residual chlorine
Zinc

Y. Appendix E - Individual Criteria

1. Ammonia. It is not clear why the criteria for ammonia have been proposed for change. Ammonia is not among the parameters listed by EPA as erroneous or questionable. Nevertheless, the Board has proposed applying the ammonia for trout water to warm water streams. The result is ammonia criteria that are substantially more stringent than needed for the protection of warm water aquatic life.

The WVMA supports establishing ammonia criteria that follows the EPA ammonia criteria tables based on pH and temperature for unionized and total ammonia, with separate tables for trout water and non-trout water.

2. Arsenic. The Board has selected an arsenic criteria which may not be scientifically sound. The EPA Science Advisory Board (EPA-SAB-EHC-89-038, letter to William Reilly dated September 28, 1980) concluded with a recommendation that EPA re-evaluate its risk assessment of arsenic. EPA has ignored the conclusions of the Science Advisory Board, even though it acknowledged that there are serious questions about the arsenic human health standards. Because of this uncertainty, the WVMA urges the Board to adopt a concentration of 50 ug/l for protection of public water supplies, which has been promulgated by Virginia and Maryland.

3. Beryllium. In its National Toxic Rule, 57 Fed. Reg. 60848 (December 22, 1992), EPA decided not to promulgate human health criteria for beryllium. EPA suggested that, in setting NPDES permit limits, states should use their existing narrative criteria for toxics. The Board, on the other hand, has slightly tightened the criteria. The WVMA urges the Board to continue with the existing criterion for Public A users or remove the criterion until better information is available.

4. Cadmium. EPA did not publish human health criteria for Cadmium in the National Toxics Rule because they were not "scientifically defensible." Until proper criteria is developed, the WVMA urges the Board to set no criteria for cadmium for the protection of human health.

5. Cyanide. The Board has proposed changing the cyanide measurement from a free cyanide measurement to a total cyanide figure. It is not

apparent what triggered this change, as EPA did not mention cyanide among the parameters it wants the Board to change, and there is no reason for the state to change its cyanide standard. This issue was considered before in a previous triennial review, and the decision was made to measure free cyanide. Nothing has changed in the interim to make that decision an unreasonable choice. Furthermore, while the Gold Book indicates EPA's preference for total cyanide measurement, it does so only because there is no EPA-approved method for free cyanide measurement.

If the Board decides not to use free cyanide for expressing the criteria, it should use some other method that most closely measures the portion of the cyanide that is bioavailable.³ In this case, that would be cyanide amenable to chlorination. Both Maryland and Delaware allow cyanide to be measured as free cyanide or cyanide amenable to chlorination.

This Board has already considered the issue of cyanide measurement and has come down strongly on the side of setting limits for free cyanide. In its 1980 Rationale for revisions to water quality standards made that year, the Board noted that it had selected a cyanide criterion that was 80% lower than the previous criterion, but went on to add that "[t]he consensus of scientific opinion supports a criterion of 5 ug/l free cyanide." A suggestion that the criterion be set as 25 ug/l total cyanide was rejected because it allowed a potential for toxic concentrations of free cyanide. From this history it is apparent that the Board was properly concerned with free cyanide, and developed its limit accordingly. The WVMA sees no reason for the

³EPA has recently begun to recognize the need to measure bioavailable forms of metals, and is now recommending that metals criteria be established in dissolved form.

Board to change its criteria, especially in light of the lack of EPA objection to the current standard.

The total cyanide criteria will have a profound effect on some NPDES dischargers in West Virginia. Those that discharge complexed cyanide that is not readily bioavailable will see their permit limits dramatically reduced, even though the proportion of the effluent that could cause harm has not changed. Therefore, the WVMA urges the Board to continue to express the criteria for cyanide in terms of free cyanide. If that is not done, the Board should establish the criteria as cyanide that is amenable to chlorination.

6. Mercury. The human health standard for mercury in Category A and Category C waters is a .5 ug/g total body burden for an aquatic species. In the National Toxics Rule, however, EPA set an action level for mercury in aquatic life of 1 mg/kg, which is higher than the Board's standard. The WVMA encourages the Board to adopt the 1 mg/kg standard as the body burden criterion in West Virginia.

7. Selenium. EPA did not propose a human health standard for selenium in the National Toxics Rule pending development of new epidemiological data and other issues regarding consumption and exposure. In light of this reluctance of EPA to develop a standard, the WVMA urges the Board to refrain from developing its own independent standard until further information is available.

8. Silver. The WVMA has two objections to the criteria for silver. First, there is serious question regarding whether the silver criteria should be revised. Second, the Board has apparently chosen aquatic life criteria as the human health standard.

9. Total Polynuclear Aromatic Hydrocarbons (PAHs). The State has set a total limit for PAHs rather than individual limits for each PAH. However, in the National Toxics Rule, EPA re-evaluated the human health effects of several PAHs and determined that they are no longer carcinogens. For others, the criteria proposed in the National Toxics Rule is much higher than the criteria in the Gold Book.

The WVMA supports deletion of the total PAH water quality criteria and replacing it with the individual human health criteria for the carcinogenic PAHs.

IV. Conclusion

The WVMA hopes that careful consideration will be given to its concerns and proposals. We look forward to working with the Board during the triennial review process.

Respectfully submitted this July 13, 1994.

WEST VIRGINIA MANUFACTURERS ASSOCIATION

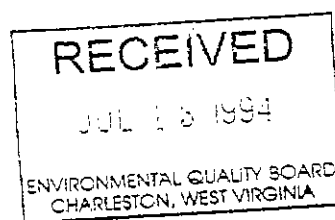
The West Virginia Mining & Reclamation Association

1624 Kanawha Blvd., East
Charleston, WV 25311

and the

The West Virginia Coal Association

1301 Laidley Tower
Charleston, WV 25301



On behalf of both Associations and their members,
Mr. K.O. Damron, Vice President,
West Virginia Mining & Reclamation Association
submits the following comments
this 13th day of July, 1994
to supplement verbal comments
presented during a formal
Public Hearing
in Charleston, West Virginia
on the 7th of July, 1994, in response to

Proposed Legislative Rules **Environmental Quality Board**

Series 1, Requirements
Governing Water Quality Standards

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association submits the following comments, this 13th day of July, 1994, on behalf of the WVMRA and the West Virginia Coal Association, to supplement verbal comments presented during a formal Public Hearing in Charleston, West Virginia, on the 7th of July, 1994, in response to Proposed Legislative Rules, Environmental Quality Board, Series 1, Requirements Governing Water Quality Standards:

Page 1 of 6

I. ABOUT THE PUBLIC HEARING:

A. OUR REPRESENTATION:

The West Virginia Mining and Reclamation Association represents over 125 coal producing member companies and over 200 associate member companies who provide products and services to the coal industry. Our comments on this proposed rule are on behalf of all of the members of the WVMRA and the members of the West Virginia Coal Association.

These written comments are intended to supplement verbal comments made during the public hearing of July 7, 1994, and replace the written comments submitted on that date.

B. OUR APPRECIATION FOR THIS OPPORTUNITY:

We are grateful for this opportunity to offer suggested improvements to this rule. Further, we believe the intent of this rule is a positive one for the coal industry and the State of West Virginia, and, therefore, we applaud the Environmental Quality Board for proposing this new rule.

II. BACKGROUND:

A. THE INDUSTRY:

The coal mining industry in West Virginia produces hundreds of millions of tons of high quality coal for domestic and foreign use as an energy source for the production of electricity, steel and a host of other applications. Employment directly in West Virginia mines and indirectly in the mining support trades and the hundreds of millions of dollars of taxes generated by coal related sources are the **economic backbone** of the Mountain State.

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association
submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a
formal Public Hearing in Charleston, West Virginia, today, in response to
Proposed Legislative Rules, Environmental Quality Board, Series 1, Requirements Governing
Water Quality Standards:

Page 2 of 6

A recent study found that one out of every ten payroll dollars in West Virginia comes from the coal industry. It was further revealed that one of every three business tax dollars being collected by the State comes directly from the coal industry.

Every influence which alters the production of West Virginia coal changes the fragile **competitive balance** between coal mines here and coal mines in other coal producing states and other nations. Therefore, changes in the governmental regulations affecting this industry must be made with the potential negative impacts of those changes foremost in the minds of those considering such changes.

III. SUGGESTED AMENDMENTS TO THE PROPOSED RULE:

A. ABOUT OUR WRITTEN COMMENTS:

The following suggested amendments are intended to improve the language of the proposed rule.

B. SPECIFIC AMENDMENTS RECOMMENDED:

AMENDMENTS NUMBER 1 AND 2:

On Page 4, Section 46-1-2, Paragraph 2.20, by **AMENDING** the language to read as follows:

2.20. "Coal mining operation" means a coal mining operation which begins after February 4, 1987, at a site which coal mining was conducted before August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law or a coal mining operation abandoned after August 3 1977, but before January 21, 1981 for which available bond is insufficient to provide for adequate reclamation or coal mining operations where mining was completed between August 4, 1977 and November 5, 1990 which remains unreclaimed due to insolvency of a surety company occurring during the same period.

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association
submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a
formal Public Hearing in Charleston, West Virginia, today, in response to
Proposed Legislative Rules, Environmental Quality Board, Series 1, Requirements Governing
Water Quality Standards:

Page 3 of 6

And on Page 4, Section 46-1-2, Paragraph 2.21, by **AMENDING** the language to read as follows:

2.21. "Remined area" means only that area on any coal remining operation on which coal mining was previously conducted before August 3, 1977, and abandoned or left in an inadequately reclaimed condition for which there are no continuing reclamation responsibilities under State or Federal law or a coal mining operation abandoned after August 3, 1977, but before January 21, 1981, for which available bond is insufficient to provide for adequate reclamation or coal mining operations where mining was completed between August 4, 1977, and November 5, 1990, which remains unreclaimed due to insolvency of a surety company occurring during the same period.

JUSTIFICATION FOR AMENDMENTS NUMBER 1 AND 2:

The two definitions in the proposed rule must have been a drafting oversight. These proposed amendments would bring this portion of the definitions in the proposed rule into conformity with the definitions found in the Federal Register for the same terms as provide for in the Federal Energy Act of 1992 (See Attachment A). Further, this new language will provide more opportunities for coal operators to go back into old mining areas and apply new reclamation standards to the land, therefore providing both new employment opportunities and a better finished reclamation product than existed prior to the "remining". Remining is truly a "win-win" experience: A mining opportunity is created and the land is left in a greatly improved condition.

AMENDMENT NUMBER 3:

On Page 7, Section 46-1-4, Paragraph 4.1, Line d., by **STRIKING** the new language which reads: **In addition to the waters listed in subsection 7.3.e, additional waters may be nominated for inclusion in that category by any interested party or by the Board on its own initiative.**

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association
submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a
formal Public Hearing in Charleston, West Virginia, today, in response to
Proposed Legislative Rules, Environmental Quality Board, Series 1, Requirements Governing
Water Quality Standards:

Page 4 of 6

JUSTIFICATION FOR AMENDMENT NUMBER 3:

Including new streams or watersheds in the "protected" category is a major event. Every effort should be made to maintain a very formal process of adding protected streams, since these protected areas often cause the watershed to be restricted from any industrial or commercial opportunities. A significant portion of the our State is protected today, limiting our chances of adding businesses and NEW JOBS. This new language would enable "any interested party" the opportunity to begin the process of "protecting" a stream, whether there is merit in the proposal or not. There are environmental extremists in West Virginia, today, who would abuse this privilege and cause significant distress in the business community. Therefore, this new proviso is unnecessary and should be deleted.

AMENDMENTS NUMBER 4:

On Page 12, Section 46-1-6, after paragraph 6.1, line d., by adding the following line, numbered "e.":

e. The standards for metals in the waters of the State as outlined throughout this rule shall apply to the "dissolved" quantities of those metals, not to the "total" metal quantities of the waters.

JUSTIFICATION FOR AMENDMENT 4:

"Dissolved" quantities of metals in water are those quantities that could possibly be of harm to aquatic life. "Total" quantities of metals in the water CAN NOT be considered as harmful to aquatic life since total quantities include metals which can ONLY become harmful after being exposed to hydrochloric acid, nitric acid AND temperatures in excess of 103 degrees F. Obviously, these two acids and a temperature of 103 are not present either in the waters of the State or within the digestive systems of the aquatic life found in the waters of the State. Anyone who alleges that "total" metals should be the standard, rather than "dissolved" metals is not interested in promoting a better environment for aquatic life, rather they are intending to subvert business opportunities in the State.

AMENDMENT NUMBER 5:

On Page 23, Section 46-1-8, Paragraph 8.4, Line a, by **AMENDING** the language to read as follows:

a. In any application for an NPDES remaining permit to discharge pollutants from or affected by a coal mining remaining operation, the applicant may request, and the Chief may grant, alternate water quality based effluent limits for iron, manganese, and pH. Effluent limits resulting in concentrations of these parameters which are higher than existing numeric standards are allowable upon a demonstration to the Chief that the remaining operation will result in improved water quality. Any decision by the Chief is subject to review by the Board and by EPA. Notwithstanding subsection 8.3 above, such demonstration shall be the only one required regarding water quality related effluent limitations.

JUSTIFICATION FOR AMENDMENT NUMBER 5:

This is a more logical system of review and approval than is suggested in the proposed rule. This will provide for the decision of the Chief to be reviewed by either the Board or the EPA.

AMENDMENTS NUMBER 6, 7 and 8:

On Page 9, Appendix E, Paragraph 8.15.2.,

And on Page 12, Appendix E, Paragraph 8.17.2.,

And on Page 20, Appendix E, Paragraph 8.23.1.,

by **AMENDING** the language to read the same as Amendment Number 4 (above).

JUSTIFICATION FOR AMENDMENTS NUMBER 6, 7 and 8:

Same justification as above in Amendment Number 5.

Mr. K.O. Damron, Vice President, West Virginia Mining & Reclamation Association submits the following comments, this 7th day of July, 1994, to supplement verbal comments presented during a formal Public Hearing in Charleston, West Virginia, today, in response to Proposed Legislative Rules, Environmental Quality Board, Series 1, Requirements Governing Water Quality Standards:

Page 6 of 6

IV. SUMMARY:

We hope you will agree the eight amendments suggested herein will improve the language of the proposed rule. Again, we applaud your efforts to improve the water quality of the State while still permitting commerce, specifically coal mining, to continue to provide employment opportunities for our citizens.



**K.O. DAMRON
VICE PRESIDENT
WEST VIRGINIA MINING &
RECLAMATION ASSOCIATION**

Thursday
June 2, 1994

ATTACHMENT A

Surface Mining Reclamation and Enforcement Report

Part V

**Department of the
Interior**

Office of Surface Mining Reclamation and
Enforcement

30 CFR Part 701, et al.
Lands Eligible for Remining; Proposed
Rule

Rec'd 6/13/94 - B.S.

DEPARTMENT OF THE INTERIOR**Office of Surface Mining Reclamation and Enforcement**

30 CFR Parts 701, 773, 785, 816, and 817

RIN 1029-AB74

Lands Eligible for Remining**AGENCY:** Office of Surface Mining Reclamation and Enforcement, Interior.**ACTION:** Proposed rule.

SUMMARY: The Office of Surface Mining Reclamation and Enforcement (OSM) proposes to amend its existing regulations in light of recently enacted changes to Title V of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended by the Energy Policy Act of 1992. The proposed rules are intended to provide incentives for the remining and reclamation of lands eligible for expenditures under section 402(g)(4) or 404 of SMCRA.

DATES: *Written comments:* OSM will accept written comments on the proposed rule until 5 p.m., Eastern time, on August 1, 1994.

Public hearings: Upon request, OSM will hold public hearings on the proposed rule in Washington, DC; and in the States of California, Georgia, Idaho, Massachusetts, Michigan, North Carolina, Oregon, Rhode Island, South Dakota, Tennessee, and Washington at times and on dates and locations to be announced in the Federal Register prior to the hearings. OSM will accept requests for public hearings until 5 p.m., Eastern time, on June 23, 1994. Individuals wishing to attend, but not testify, at any hearing should contact the person identified under **FOR FURTHER INFORMATION CONTACT** before the hearing date to verify that the hearing will be held.

ADDRESSES: *Written comments:* Hand-deliver to the Office of Surface Mining Reclamation and Enforcement, Administrative Record, room 660, 800 North Capitol Street, Washington, DC; or mail to the Office of Surface Mining Reclamation and Enforcement, Administrative Record, room 660 NC, 1951 Constitution Avenue, NW., Washington, DC 20240.

Public hearings: The addresses and times for any hearings held will be announced prior to the hearings.

Requests for public hearings: Submit requests orally or in writing to the person and address specified under **FOR FURTHER INFORMATION CONTACT**.

FOR FURTHER INFORMATION CONTACT: Douglas J. Growitz, P.G., Office of

Surface Mining Reclamation and Enforcement, room 640 NC, 1951 Constitution Avenue, NW, Washington, DC 20240; Telephone: 202-343-1507.

SUPPLEMENTARY INFORMATION:

- I. Public Comment Procedures
- II. Background
- III. Discussion of Proposed Rule
- IV. Procedural Matters

I. Public Comment Procedures

Written Comments: Written comments submitted on the proposed rule should be specific, should be confined to issues pertinent to the proposed rule, and should explain the reason for any recommended change. Where practicable, commenters should submit three copies of their comments. Comments received after the close of the comment period (see **DATES**) or delivered to an address other than those listed above (see **ADDRESSES**), may not be considered or included in the Administrative Record for the final rule.

Public hearings: OSM will hold a public hearing on the proposed rule on request only. The time, date, and address for any hearing will be announced in the Federal Register at least 7 days prior to the hearing.

Any person interested in participating at a hearing at a particular location should inform Mr. Growitz (see **FOR FURTHER INFORMATION CONTACT**), either orally or in writing, of the desired hearing location by 5 p.m., Eastern time, on June 23, 1994. If no one has contacted Mr. Growitz to express an interest in participating in a hearing at a given location by that date, a hearing will not be held. If only one person expresses an interest, a public meeting rather than a hearing may be held and the results included in the Administrative Record.

If a hearing is held, it will continue until all persons wishing to testify have been heard. The hearing will be transcribed. To assist the transcriber and ensure an accurate record, OSM requests that each person who testifies at a hearing provide the transcriber with a written copy of his or her testimony. To assist OSM in preparing appropriate questions, OSM also requests, if possible, that each person who plans to testify submit to OSM at the address previously specified for the submission of written comments (see **ADDRESSES**) an advance copy of his or her testimony.

II. Background

The House of Representatives Report from the Committee on Interior and Insular Affairs on the Comprehensive National Energy Policy Act of 1992 (*H.R. Rep. 474*, 102 Cong., 2d Session at 85 (1992)) contains the following

statements: "The [coal remining] provisions of this section seek to make coal available that otherwise would be bypassed by providing incentives for industry to extract and reprocess, in an environmentally sound manner, coal that remains in abandoned mine lands and refuse piles. Current law reclamation performance standards were devised to address surface coal mining on undisturbed lands; the unintended result is to discourage remining. Remining also serves to mitigate the health, safety, and environmental threats posed to coalfield residents from abandoned mine lands by augmenting the work done under the Abandoned Mine Reclamation Program." These statements succinctly characterize a basic and long-standing conflict associated with remining.

On October 24, 1992, the President signed into law the Energy Policy Act of 1992, Public Law 102-486, section 2503, Coal Remining, which, in part, amended Sections 510, 515(b)(20), and 701 of SMCRA in order to provide the following initiatives to encourage remining in an environmentally-sound manner: 1. The revegetation success liability period for certain remining operations has been reduced to five years in the West and two years in the East; 2. Remined lands shall remain eligible for Title IV reclamation following bond release; and 3. The permittee of a remining operation shall not be subject to subsequent permit blocking under Section 510(c) of SMCRA for any violation resulting from an unanticipated event or condition occurring on the remining site. (Section 510(c) is implemented by 30 CFR 773.15.)

III. Discussion of Proposed Rules**A. Introduction**

Regarding the above-mentioned remining amendments to SMCRA which are the subject of this rulemaking, OSM sought input from environmental groups, industry, and State regulatory authorities concerning the extent to which new regulations would need to expand or clarify statutory language in order to effectively implement Congressional intent. Comments received during this outreach have been considered in developing this proposal. Other provisions in section 2503 of the Energy Policy Act prescribe specific regulatory initiatives regarding the removal or on-site reprocessing of abandoned coal refuse sites. These initiatives will be implemented under a separate rulemaking.

B. Proposed Rules

1. 30 CFR Part 701—Permanent Regulatory Program

Section 701.5, Definitions, is proposed to be amended by adding two terms defined in section 2503(c) of the Energy Policy Act. *Lands eligible for remining* would be defined as in the Energy Policy Act by reference to sections 404 and 402(g)(4) of the SMCRA. Thus, the following sites would be included under this definition: sites that were mined for coal or affected by mining activities and abandoned or left in an inadequate reclamation status prior to August 3, 1977, and for which there is no continuing reclamation responsibility under State or other Federal laws; coal sites in each State abandoned after August 3, 1977, but before the State received primacy under SMCRA and for which available bond is insufficient to provide for adequate reclamation; or coal sites where mining was completed between August 4, 1977, and November 5, 1990, and which remain unreclaimed due to the insolvency of a surety company occurring during that same period.

Unanticipated event or condition is proposed to be defined consistent with the definition contained in the Energy Policy Act to mean an event or condition at an operation on lands eligible for remining under section 404 or 402(g)(4) of SMCRA that was not contemplated by the applicable surface coal mining and reclamation permit.

2. 30 CFR Part 773—Requirements for Permits and Permit Processing

OSM proposes to amend Section 773.15, Review of Permit Applications, in two ways.

A new proposed subparagraph (c)(13) would require the regulatory authority to utilize data and analyses provided under existing permit information rules and proposed § 785.25, discussed in the next section, in order to find that the proposed permit area contains lands eligible for remining and to set a threshold beyond which conditions or events arising subsequent to permit issuance may be presumed to constitute "unanticipated events or conditions" for the purpose of applying the permit-block exclusion of proposed paragraph (f) of § 773.15.

The regulatory authority would evaluate the potential environmental and safety problems and associated analysis provided by the applicant based on a review of procedures used, supporting data and documentation, and mitigation plans. After acceptance of the estimates and findings provided

by the applicant, the regulatory authority would set the threshold. The threshold which will be determined on a case-by-case basis is therefore set at permit issuance.

OSM believes the information provided by the applicant under proposed new § 785.25, which contains additional permit requirements tailored specifically to remining problems, is compatible with the development of a threshold. Two elements of proposed 785.25 are considered to be particularly well suited for this purpose: 1. The permit applicant's estimate of the maximum impacts associated with each identified potential environmental or safety problem; and 2. the permit applicant's estimate of the probability of each potential environmental or safety problem occurring. Furthermore, OSM believes that a threshold expressed quantitatively in terms of either or both of these two elements would provide the clearest guidance for operators, be easier to regulate for the regulatory authorities, and would minimize subsequent controversy and disputes between the operator and regulatory authority as to what events or conditions were indeed "unanticipated".

OSM is therefore seeking comments on three issues associated with formulating a threshold: 1. Whether either or both of the two elements described above, or some combination of the two, would provide an appropriate base for such formulation; 2. methods by which the base may be expressed in quantifiable terms; and 3. whether additional guidance is needed for the regulatory authority in the final rule and what the nature of that guidance should be.

Proposed paragraph (f) would be added to implement the Energy Policy Act's section 2503(a) mandate for an exclusion from permit blocking provisions of 510(c) of SMCRA. The proposed rule would waive the permit-block provisions of paragraph (b) of § 773.15 in cases where a violation occurred at a remining site and the violation was attributed to an unanticipated event or condition. In such cases, the person holding the remining permit would not be rendered ineligible for a new permit based on the violation. Statutory authority for the permit-block exclusion would expire on September 30, 2004.

The scope of the permit-block exclusion of proposed paragraph (f) derives from the statutory term "violation resulting from an unanticipated event or condition at a surface coal mining operation." The question has arisen whether the non-

payment of delinquent penalties assessed after a notice of violation or a failure-to-abate cessation order based on an "on the ground" violation resulting from an unanticipated event or condition should be covered by the Energy Policy Act exclusion. Such delinquencies, which are violations, would be covered by the exclusion if they were construed as "resulting from an unanticipated event or condition at a surface coal mining operation." OSM is seeking comments on the extent to which such violations should be covered by the exclusion in section 2503(a) of the Energy Policy Act.

Another question that might arise is whether the operator of a previously undisturbed site would be subject to permit blocking for an unabated violation on his site which originated from an unanticipated event on a nearby or adjacent remining operation. Whether or not an event or condition on an adjacent site is a violation is a fact specific inquiry and depends on whether the surface coal mining operation on the adjacent site caused or contributed to the event or condition. Therefore, if the operator of the previously undisturbed site contributed to the event or condition which originated on the remining site and that operator does not abate the violation, the operator of the previously undisturbed site would be permit blocked. The proposed paragraph (f) exemption for permit blocking only relates to violations occurring on lands eligible for remining.

OSM is seeking comments on any other examples of the interplay between remining operations and adjacent surface coal mining operations that may need to be explained in the final rulemaking.

3. 30 CFR Part 785—Requirements for Permits for Special Categories of Mining

OSM proposes to add new § 785.25, Lands eligible for remining. (Sections 785.23 and 785.24 are being reserved for a separate rulemaking.) The permit requirements in proposed section 785.25 for operations on lands eligible for remining are intended to supplement information requirements in existing rules as they would apply to operations on lands eligible for remining. The types of new permit information being proposed would be required only to the extent that they are not provided under existing regulations. For example, provisions related to the determination of probably hydrologic consequences at §§ 780.21 and 784.14 of the permanent program regulations require baseline information on flow and quality of ground water and surface water and an

estimate of the impacts of the proposed operation on these baseline conditions such as findings on: Whether adverse impacts may occur to the hydrologic balance; whether acid-forming or toxic-forming materials are present that could contaminate surface or ground water supplies; and whether surface or ground water used for any legitimate purpose in the permit or adjacent area will be contaminated, diminished or interrupted.

The permit requirements of §§ 780.21 and 784.14 were intended to identify and control probable impacts to hydrology from coal removal associated with the first time disturbance of the land. Hence, they do not in most cases address the unique environmental or safety problems and impacts that can arise from the redisturbance of abandoned mine lands. The proposal would fill in this gap by focusing on the identification of: Potential environmental and safety problems specific to lands eligible for re-mining; maximum impacts that could result and the probability for the type of problem to occur; and mitigation measures to meet applicable performance standards. The purpose of these requirements is to provide the regulatory authority with a sound basis for setting a threshold beyond which conditions or events arising subsequent to permit issuance may be presumed to be unanticipated at the site. Furthermore, these requirements will help to ensure that potential environmental and safety problems commonly linked to abandoned mine land sites are not overlooked at the permitting stage and, thus, inadvertently contribute to the occurrence of unanticipated events or conditions which might result in more severe environmental or safety problems from the re-mining operation than may currently exist at the site.

Thus, OSM believes it is essential that all reasonable evaluations be conducted in order to identify the probability for serious environmental or safety problems to occur. While there are potential economic and environmental benefits to be gained through re-mining, there also exists the potential for significant environmental degradation and safety problems. For example, if a re-mining operation unintentionally caused a sudden discharge of water or blowout from an adjacent water-filled abandoned mine, significant quantities of acid mine discharge could be released and create severe ecological harm in the receiving streams. It is important, therefore, in granting re-mining permits that the applicant identify the potential environmental and safety problems associated with the site, maximum

impacts associated with these problems, and the probability for each type of problem to occur. These categories of information will assist the regulatory authority in setting a threshold beyond which conditions or events arising subsequent to permit issuance may be presumed to constitute unanticipated events or conditions. In order to provide a permit applicant for a re-mining operation some certainty regarding the potential scope of the 510(c) permit-blocking provision, the applicant shall be expected to provide all required information related to the potential environmental and safety problems of the re-mining site.

OSM recognizes the difficulty of accurately predicting certain impacts such as acid mine drainage even on the basis of extensive baseline information. OSM is therefore soliciting comments on other specific information needed to be provided by the applicant that will be useful in developing a threshold for unanticipated events.

OSM is also requesting estimates on the number of hours to develop the information required by § 785.25 and is seeking suggestions on efficient and effective ways to develop this information and present it in the permit application.

4. 30 CFR Part 816—Permanent Program Performance Standards—Surface Mining Activities

OSM is proposing to amend subparagraphs (c)(2) and (c)(3) of section 816.116, *Revegetation: Standards for Success*. The change at (c)(2) would reduce the period of applicant responsibility for revegetation success at sites eligible for re-mining from five to two years in areas of more than 26.0 inches of average annual precipitation and for these sites provide that vegetative parameters for grazing land, pasture land, or cropland shall equal or exceed the approved success standard during the growing season of any two years of the responsibility period. The change at (c)(3) would reduce the applicant responsibility for revegetation success from ten to five years in areas of 26.0 inches or less of annual average precipitation. The authority for these changes would expire on September 30, 2004.

5. 30 CFR Part 817—Permanent Program Performance Standards—Underground Mining Activities

OSM is proposing to amend subparagraphs (c)(2) and (c)(3) of § 817.116, *Revegetation: Standards for Success*. The change at (c)(2) would reduce the period of applicant responsibility for revegetation success

from five to two years in areas of more than 26.0 inches of average annual precipitation, and the change at (c)(3) would reduce the applicant responsibility for revegetation success from ten to five years in areas of 26.0 inches or less of annual average precipitation. The authority for these changes would expire on September 30, 2004.

IV. Procedural Matters

Federal Paperwork Reduction Act

The collections of information contained in this rule have been submitted to the Office of Management and Budget for approval as required by 44 U.S.C. 3501 *et seq.* The collection of this information will not be required until it has been approved by the Office of Management and Budget.

Public reporting burden for this collection of information is estimated to average 80 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other collection of information, including suggestions for reducing the burden, to the Office of Surface Mining Reclamation and Enforcement, Information Collection Clearance Officer, room 640 NC, 1951 Constitution Ave., Washington, DC 20240; and the Office of Management and Budget, Paperwork Reduction Project (1029-0040 and 1029-0041), Washington, DC 20503.

Executive Order 12778; Civil Justice Reform Certification

This proposed rule has been reviewed under the applicable standards of section 2(b)(2) of Executive Order 12778, *Civil Justice Reform* (56 FR 55195). In general, the requirements of section 2(b)(2) of Executive Order 12778 are covered by the preamble discussion of this proposed rule. Additional remarks follow concerning individual elements of the Executive Order:

A. What is the preemptive effect, if any, to be given to the regulation?

To retain primacy, States have to adopt and apply standards for their regulatory programs that are no less effective than those set forth in OSM's regulations. Any State law that is inconsistent with or that would preclude implementation of the proposed regulation would be subject to preemption under section 505 of SMCRA and its implementing regulations at 30 CFR 730.11.

Section 505(b) of that act provides that any provision of State law which

provides for more stringent land use and environmental controls and regulation of surface coal mining and reclamation operations than do the provisions of SMCRA or any regulations issued pursuant thereto shall not be construed to be inconsistent with SMCRA. Therefore, to the extent that the proposed regulation would provide less stringent land use and environmental controls than presently contained in State law, the proposed regulation would not preempt the State provisions and would not necessitate changes to approved State programs. A more definitive answer to this question will depend on the provisions of any final rule adopted in this rulemaking.

B. What is the effect on existing Federal law or regulation, if any, including all provisions repealed or modified?

This proposed rule modifies the implementation of SMCRA, as described herein, and is not intended to modify the implementation of any other Federal statute. The preceding discussion of this proposed rule specifies the Federal regulatory provisions that are affected by this proposed revision.

C. Does the rule provide a clear and certain legal standard for affected conduct rather than a general standard, while promoting simplification and burden reduction?

The standards established by this rule are as clear and certain as practicable, given the complexity of the topics covered and the mandates of SMCRA. The purpose of this proposed rule is to establish clear and certain standards in order to implement a more effective program.

D. What is the retroactive effect, if any, to be given to the regulation?

This rule is not intended to have retroactive effect.

E. Are administrative proceedings required before parties may file suit in court? Which proceedings apply? Is the exhaustion of administrative remedies required?

No administrative proceedings are required before parties may file suit in court challenging the provisions of this proposed rule under section 526(a) of SMCRA, 30 U.S.C. 1276(a).

Prior to any judicial challenge to the application of the rule, however, administrative procedures must be exhausted. In situations involving OSM application of the rule, applicable administrative procedures may be found at 43 CFR part 4. In situations involving State regulatory authority application of provisions equivalent to those contained in this proposed rule, applicable administrative procedures are set forth in the particular State program:

F. Does the rule define key terms, either explicitly or by reference to other regulations or statutes that explicitly define those items?

Terms which are important to the understanding of this proposed rule are set forth in 30 CFR 700.5, 701.5, 773.15 and 785.23. New definitions are located in section 701.5.

G. Does the rule address other important issues affecting clarity and general draftsmanship of regulations set forth by the Attorney General, with the concurrence of the Director of the Office of Management and Budget, that are determined to be in accordance with the purposes of the Executive Order?

The Attorney General and the Director of the Office Management and Budget have not issued any guidance on this requirement.

Executive Order 12866

This proposed rule has been reviewed under Executive Order 12866.

Regulatory Flexibility Act

The Department of the Interior has determined, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, that the proposed rule will not have a significant economic impact on a substantial number of small entities. This determination is based on the findings that the regulatory additions is the rule will not change costs to industry or to the Federal, State, or local governments. Furthermore, the rule produces no adverse effects on competition, employment, investment, productivity, innovation, or the ability of the United States enterprises to compete with foreign-based enterprises in domestic or export markets.

National Environmental Policy Act

OSM has prepared a draft environmental assessment (EA) of this proposed rule and has made a tentative finding that it would not significantly affect the quality of the human environment under section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4332(2)(C). It is anticipated that a finding of no significant impact (FONSI) will be made for the final rule in accordance with OSM procedures under NEPA. The EA is on file in the OSM Administrative Record at the address specified previously (see ADDRESSES). The EA will be completed and a finding made on the significance of any resulting impacts prior to promulgation of the final rule.

Author

The principal author of this proposed rule is Douglas J. Growitz, P.G., Hydrologist, Branch of Research and

Technical Standards, Office of Surface Mining Reclamation and Enforcement, room 640 NC, 1951 Constitution Avenue, NW., Washington, DC 20240, Telephone: 202-343-1507.

List of Subjects

30 CFR Part 701

Law enforcement, Surface mining, Underground mining.

30 CFR Part 773

Reporting and recordkeeping requirements, Administrative practice and procedure, Surface mining, Underground mining.

30 CFR Part 785

Reporting and recordkeeping requirements, Surface mining, Underground mining.

30 CFR Part 816

Environmental protection, Reporting and recordkeeping requirements, Surface mining.

30 CFR Part 817

Environmental protection, Reporting and recordkeeping requirements, Underground mining.

Dated: May 11, 1994.

Nancy Keir Hayes,

Acting Assistant Secretary, Land and Minerals Management.

Accordingly, OSM proposes to amend 30 CFR parts 701, 773, 785, 816 and 817 as set forth below:

PART 701—PERMANENT REGULATORY PROGRAM

1. The authority citation for part 701 is revised to read as follows:

Authority: 30 U.S.C. 1201 *et seq.*, as amended; Pub. L. 100-34; and Pub. L. 102-486.

2. Section 701.5 is amended by adding alphabetically definitions of "lands eligible for re-mining" and "unanticipated event or condition" as follows:

§ 701.5 Definitions.

* * * * *

Lands eligible for re-mining means those lands that would otherwise be eligible for expenditures under section 404 or under section 402(g)(4) of the Act.

* * * * *

Unanticipated event or condition as used in §§ 773.15 and 785.23 of this chapter means an event or condition at a surface coal mining operation on lands eligible for re-mining that was not contemplated by the applicable permit

to conduct surface coal mining operations.

PART 773—REQUIREMENTS FOR PERMITS AND PERMIT PROCESSING

3. The authority citation for part 773 is revised to read as follows:

Authority: 30 U.S.C. 1201 *et seq.*, as amended; Pub. L. 100-34; 16 U.S.C. 470 *et seq.*; 16 U.S.C. 1531 *et seq.*; 16 U.S.C. 661 *et seq.*; 16 U.S.C. 703 *et seq.*; 16 U.S.C. 668a; 16 U.S.C. 469 *et seq.*; 16 U.S.C. 470aa *et seq.*; and Pub. L. 102-486.

4. Section 773.15 is amended by adding new paragraphs (c)(13) and (f) to read as follows:

§ 773.15 Review of permit applications.

(c) * * * (13) Based upon the data and analyses provided under parts 779, 780, 783, and 784, as applicable, and § 785.25 of this chapter, the regulatory authority has: (i) determined that the permit contains lands eligible for re-mining; and (ii) set a threshold beyond which conditions or events arising subsequent to permit issuance may be presumed to constitute unanticipated events or conditions for the purposes of § 773.15(f) of this chapter.

(f) *Lands eligible for re-mining.* Until September 30, 2004, the prohibitions of paragraph (b) of this section shall not apply to any violation resulting from an unanticipated event or condition at a surface coal mining and reclamation operation on lands eligible for re-mining under a permit held by the person making such application.

PART 785—REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

5. The authority citation for part 785 is revised to read as follows:

Authority: 30 U.S.C. 1201 *et seq.*, as amended; Pub. L. 100-34; and Pub. L. 102-486.

6. Section 785.25 is added to read as follows:

§ 785.25 Lands eligible for re-mining.

(a) This section applies to any person who conducts or intends to conduct a surface coal mining operation on lands eligible for re-mining.

(b) Any application for a permit under this section shall be made according to all requirements of this subchapter applicable to surface coal mining and reclamation operations. In addition, the application shall:

(1) To the extent not otherwise addressed in the permit application, identify potential environmental and safety problems associated with the site, the maximum degree of impact attributable to each problem, and the probability that each type of problem will occur. These problems would include but are not limited to impacts of acid mine drainage on the hydrologic balance, sudden discharges of water from adjacent water-filled mine workings, and sediment and safety issues associated with abandoned spoil.

(2) Describe mitigative measures for each potential environmental or safety problem in order to meet applicable performance standards.

PART 816—PERMANENT PROGRAM PERFORMANCE STANDARDS—SURFACE MINING ACTIVITIES

7. The authority citation for part 816 is revised to read as follows:

Authority: 30 U.S.C. 1201 *et seq.*, as amended; sec. 115 of Pub. L. 98-146, 30 U.S.C. 1257; Pub. L. 100-34; and Pub. L. 102-486.

8. Section 816.116 is amended by revising paragraphs (c)(2) and (c)(3) to read as follows:

§ 816.116 Revegetation: Standards for success.

(c)(2) In areas of more than 26.0 inches of annual average precipitation, the period of responsibility shall continue for a period of less than five full years, except that, on lands eligible

for remaining, the period of responsibility (until September 30, 2004) shall be two full years. In areas with a five-year period of responsibility, the vegetation parameters identified in paragraph (b) of this section for grazing land, pasture land, or cropland shall equal or exceed the approved success standard during the growing season of any two years of the responsibility period, except the first year. In areas with a two-year period of responsibility, the vegetative parameters identified in paragraph (b) of this section for grazing land, pasture land, or cropland shall equal or exceed the approved success standard during the growing season of any two years of the responsibility period. Areas approved for the other uses identified in paragraph (b) of this section shall equal or exceed the applicable success standard during the growing season of the last year of the responsibility period.

(3) In areas of 26.0 inches or less average annual precipitation, the period of responsibility shall continue for a period of not less than 10 full years, except that, on lands eligible for re-mining, the period of responsibility (until September 30, 2004) shall be five years. Vegetation parameters identified in paragraph (b) of this section shall equal or exceed the approved success standard for at least the last two consecutive years of the responsibility period.

PART 817—PERMANENT PROGRAM PERFORMANCE STANDARDS—UNDERGROUND MINING ACTIVITIES

9. The authority citation for part 817 is revised to read as follows:

Authority: 30 U.S.C. 1201 *et seq.*, as amended; sec. 115 of Pub. L. 98-146, 30 U.S.C. 1257; Pub. L. 100-34; and Pub. L. 102-486.

10. Section 817.116 is amended by revising paragraphs (c)(2) and (c)(3) to read as follows:

§ 817.118 Revegetation: Standards for success.

* * * * *

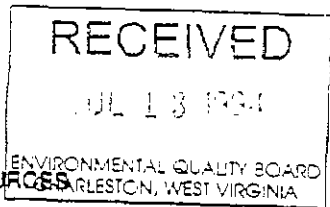
(c)(2) In areas of more than 26.0 inches of annual average precipitation, the period of responsibility shall continue for a period of not less than five full years, except that, on lands eligible for re-mining, the period of responsibility (until September 30, 2004) shall be two full years. In areas with a five-year period of responsibility, the vegetation parameters identified in paragraph (b) of this section for grazing land, pasture land, or cropland shall equal or exceed the approved success

standard during the growing season of any two years of the responsibility period, except the first year. In areas with a two-year period of responsibility, the vegetative parameters identified in paragraph (b) of this section for grazing land, pasture land, or cropland shall equal or exceed the approved success standard during the growing season of any two years of the responsibility period. Areas approved for the other uses identified in paragraph (b) of this section shall equal or exceed the applicable success standard during the growing season of the last year of the responsibility period.

(3) In areas of 26.0 inches or less average annual precipitation, the period of responsibility shall continue for a period of not less than 10 full years, except that, on lands eligible for re-mining, the period of responsibility (until September 30, 2004) shall be five years. Vegetation parameters identified in paragraph (b) of this section shall equal or exceed the approved success standard for at least the last two consecutive years of the responsibility period.

* * * * *

[FR Doc. 94-13417 Filed 6-1-94; 8:45 am] BILLING CODE 4310-05-M



DEPARTMENT OF COMMERCE, LABOR & ENVIRONMENTAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
1201 Greenbrier Street
Charleston, WV 25311-1088

Gaston Caperton
Governor
John M. Ranson
Cabinet Secretary

David C. Callaghan
Director
Ann A. Spaner
Deputy Director

Memorandum

To: Libby Chatfield
Environmental Quality Board

From: Mark A. Scott, Chief *MAS*
Office of Water Resources

Date: July 13, 1994

Subject: Comments to proposed 46 CSR 1

=====

Attached are a rewritten Anti-degradation and additions to the Water Use Category sections of the rule.

Our proposed Anti-degradation section combines definitions, original anti-degradation, language and subsection 7.3. The two definitions, High Quality Waters and Outstanding National Resource Waters can be deleted if used no where else in the rule. Also subsection 7.3 can be deleted if used in no other way in the rule.

Additions are being suggested to Water Use Categories B, C, D, and E, and the addition of an entirely new category F.

If you have any questions or want to discuss these suggestions further give me a call.

§46-1-4. Anti-Degradation Policy.

4.1. It is the policy of the State of West Virginia that water uses and the level of water quality and quantity necessary to sustain those uses shall be maintained and protected as follows:

The Board and the chief 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 for non-point source control.

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.

In addition to the waters listed below, additional waters may be nominated for inclusion in a category by any interested party or by the Board on its own initiative.

Tier 1--

4.1.1. 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 on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards.

Tier 2--

4.1.2. The existing High Quality Waters of the State must be maintained at their existing high quality unless it is determined through 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 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.

4.1.2.a. 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, and

4.1.2.b. High quality waters include but are not limited to the following streams or stream segments.

4.1.2.b.A. those which receive annual stockings of trout but

which do not support year-round trout populations, and

4.1.2 b B All streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code §22-13-1.

Tier 2:

4.1.3. Waters of Special Concern are of exceptional ecological or recreational value and are to be protected, maintained and enhanced to insure preservation of these values. Expanded or new sources of pollutants may be allowed as long as no statistically significant change to ambient water quality occurs and/or the ecological or recreational values remain unimpaired. Waters of Special Concern include:

4.1.3.a. All Federally designated rivers under the "Wild and Scenic Rivers Act" Public Law 95-542, as amended, 16 U.S.C. 1271, et seq.

4.1.3.b. All naturally reproducing trout streams.

4.1.3.c. All streams and other bodies of water in State and National Forests and Recreation Areas.

4.1.3.d. National Rivers. "National Parks and Recreation Act of 1978." Public Law 95-625, as amended, 16 U.S.C. 1, et seq.

4.1.3.e. All wetlands listed in the U.S. Department of Interior, Fish and Wildlife Service's Regional Concept Plan for West Virginia, Emergency Wetlands Resources Act of 1986, Public Law 89-645.

Tier 3:

4.1.4. Outstanding National Resource Waters are those whose unique character, ecological or recreational value or pristine nature constitutes a valuable national or state resource. 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, the following waters of the State; All streams and rivers within the boundaries of Wilderness Areas designated by The Wilderness Act (16 U.S.C.A Sections 1131 et seq.) within the state.

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:

- a. All community domestic water supply systems;
- b. All non-community domestic water supply systems, (i.e. hospitals, schools, etc.);
- c. All private domestic water systems;
- d. All other surface water intakes where the water is used for human consumption; and
- e. Shall apply to the stream segment extending upstream from the intake for a distance as defined in subsection 7.2.a.B of this series. (See Appendix B for partial listing).

6.3. Category B -- Propagation and maintenance of fish and other aquatic life. -- This category includes:

- a. **Category B1 -- Warm water fishery streams and associated wetlands. --** Streams or stream segments and associated wetlands which contain a fish population composed overwhelmingly of warm water species. (These are primarily sport fisheries and may be stocked with trout seasonally).
- b. **Category B2 -- Trout Waters. --** As defined in Section 2.14 (See Appendix A for a representative list.)
- c. **Category B3 -- Small non-fishable streams and wetlands. --** Streams, stream segments, or wetlands which because of their size, flow patterns, or nature of the ecosystem, do not offer sport fishing, but provide aquatic habitat and nursery areas and generally contain populations of minnows, darters, aquatic invertebrates, herpifauna, etc.

6.4. Category C -- Water contact recreation. -- This

category includes swimming, fishing, wading, water skiing and certain types of pleasure boating such as sailing or canoeing in very small craft and outboard motor boats which may occur on stream segments and in wetlands.

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

- a. **Category D1 -- Irrigation. -- This category includes**

all stream segments used for irrigation. Irrigation is not a use applicable to wetlands.

b. **Category D2 -- Livestock watering.** -- This category includes all stream segments used for livestock watering. Livestock watering is not a use applicable to wetlands.

c. **Category D3 -- Wildlife.** -- This category includes all stream segments and wetlands used by, or provide habitat for 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. This category is not applicable to wetlands.

a. **Category E1 -- Water Transport.** -- This category includes all stream segments modified for water transport and having permanently maintained navigation aides. Water transport is not a use applicable to wetlands.

b. **Category E2 -- Cooling Water.** -- This category includes all stream segments having one (1) or more users for industrial cooling. Cooling water is not a use which is applicable to wetlands.

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. Power production is not a use applicable to wetlands. (See Appendix C for representative list)

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. This category is not a use applicable to wetlands.

6.7 Category F -- Ecosystem Protection

a. **Category F1 -- Floodwater Attenuation.** -- This category includes wetlands that serve to attenuate downstream flooding by containing high water within the wetland periphery reducing flood damage downstream.

b. **Category F2 -- Water Quality Improvement.** -- This category includes wetlands that by filtering water which flows into and through the wetland environment provide a water quality improvement.

c. **Category F3 -- Areas of Special Biological Significance.** -- This category includes wetlands that support flora and fauna which are considered State rare, threatened or endangered or are Federally-listed as such.

d. **Category F4 -- Ground Water Exchange --** This category includes wetlands which provide discharge or recharge of groundwater. Discharge is considered to be inflow to a wetland from an aquifer, seeps, or springs that increases the available supply of surface water. Recharge is outflow from a wetland down gradient to an aquifer or downstream to surface water for base flow maintenance. Exchange may include ground water discharge in one season followed by recharge later in the year.

~~Additions to what was Section 7.3.d. Waters of Special Concern~~

~~NOTE: THIS GOES IN THE WATERS OF SPECIAL CONCERN CATEGORY FOLLOWING NATIONAL FORESTS AND RECREATION AREAS~~

~~D. All wetlands which are listed for West Virginia in the Regional Wetlands Concept Plan as prepared by the Department of Interior, Fish and Wildlife Service as required by the Emergency Wetlands Resources Act of 1986 (Public Law 99-645).~~



July 13, 1994

Federal Express

Ms. Libby Chatfield
State Water Resources Board
1615 Washington Street, East
Charleston, WV 25311-2126

Subject: Comments on Proposed WV 46 CSR Series 1
Requirements Governing Water Quality Standards
Site Specific Water Quality Standard for Opequon Creek

Dear Ms. Chatfield:

Attached please find comments on the above-referenced subject.

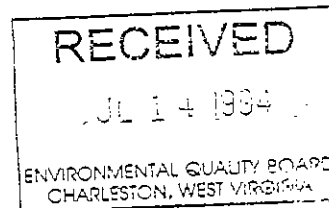
Thank you for this opportunity to comment, as well as that at the public hearing in Charleston on July 7, 1994. Please do not hesitate to contact me at (304) 725-2031 if you have any questions.

Sincerely,

Mark D. Pugh
Plant Manager
3M, Middleway West Virginia

Attachment

c: Dr. Eli McCoy, Deputy Director, Department of Environmental Protection
Mark A. Scott, Chief, Office of Water Resources
Randy Sovic, Industrial Branch, Office of Water Resources



**Comments to the West Virginia Water Quality Board:
Proposed Site-Specific Water Quality Standard for
Aluminum in Opequon Creek**

The following comments are submitted in support of the proposed site-specific water quality standard for aluminum in Opequon Creek, stated in Section 7.2.d.B.(b) of Proposed WV 46 CSR Series 1, *Requirements Governing Water Quality Standards*.

In the last triennial review of the above Series 1 rule, the standard for aluminum in trout waters was revised from its long-standing value of 0.5 mg/L to the new value of 0.087 mg/L. 3M believes strongly that this standard does not reasonably apply to Opequon Creek. The standard is based on U. S. EPA's aluminum criterion document, which derived the 0.087 mg/L value from results of tests on aquatic organisms but which tests were done under conditions of water quality that differ greatly from the waters of Opequon Creek. In particular, the near-neutral pH and hardness levels in Opequon Creek water act to greatly reduce the toxicity of aluminum to aquatic organisms.

The burden in meeting the 0.087 mg/L standard in Opequon Creek would provide no increase in protection of aquatic life over the previously existing standard of 0.5 mg/L. For the 3M plant in Middleway, WV, to meet the 0.087 mg/L standard would in fact result in a net decrease in environmental benefit. Wastewater treatment requiring significant use of energy would be needed, and this treatment would also generate its own waste sludge which would require treatment and ultimately disposal in a landfill.

Also of concern to the 3M plant in Middleway, its employees and families, and the surrounding communities, is that the very large capital expenditure that would be required for wastewater treatment would significantly decrease the economic viability of the plant. This manufacturing plant operates in an intensely competitive global marketplace, and a major capital expenditure of this type could potentially place many of the plant's 270 jobs at risk.

3M initially discussed all of these concerns in June of 1993 in a meeting with the Deputy Director of WV DNR and the Chief of the Office of Water Resources. On the same day, 3M met with the WV Water Resources Board, and as a result of these meetings, 3M worked jointly with WV Water Resources Board, WV DNR, and U. S. EPA, Region III, to decide on a proper technical approach for evaluating the toxicity of aluminum in Opequon Creek to aquatic organisms.

The technical approach agreed upon was to use U. S. EPA's method of Water-Effect Ratios for Metals (WER). A written proposal for evaluation of Opequon Creek was

submitted by 3M to EPA and the State following detailed discussions with EPA in Philadelphia regarding specifics of how to apply the WER procedure to Opequon Creek. 3M made several subsequent revisions to the study protocol requested by U. S. EPA, Region III, prior to beginning the actual stream sampling and other activities of the study.

The WER concept is essentially a numerical ratio of the toxicity of a substance in the waters of a particular stream versus the toxicity of the same substance in standard laboratory waters of such a type that were used in setting the original standard. The testing of Opequon Creek resulted in a WER of greater than 10, meaning that a water quality standard for aluminum equal to more than 10 times the existing standard of 0.087 mg/L (that is >0.87 mg/L) would be protective of the aquatic life of Opequon Creek. The actual site specific standard proposed by 3M is 0.5 mg/L (500 μ g/L), which is equal to the value of the aluminum standard which has applied for many years to Opequon Creek.

The WER study for Opequon Creek was performed by Dr. Donald Mount, who is nationally recognized as a leading authority in the subject of toxicity to aquatic organisms and in analytical methods for assessing aquatic toxicity. Dr. Mount is retired from U. S. EPA where he was director of EPA's national water research laboratory in Duluth, MN. Dr. Mount is also credited with having developed the 7-day, *Ceriodaphnia dubia* chronic toxicity test which, for the first time, provided U. S. EPA and the states with a tool for setting numerical standards for chronic toxicity in NPDES permits .

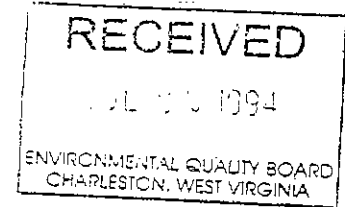
In summary, a site-specific standard for aluminum in Opequon Creek of 0.5 mg/L, which is equal to the value which has existed for many years, is a balanced, environmentally progressive, and well-placed standard for Opequon Creek. A study of Opequon Creek, using methods developed by U. S. EPA, shows that naturally-occurring conditions in the stream greatly reduce the toxicity of aluminum, and that aluminum concentrations in Opequon Creek greater than the proposed site-specific standard of 0.5 mg/L would be protective of aquatic life in the stream.

3M would be pleased to answer any questions that the WV Water Quality Board might have on this proposed standard. The Board's thoughtful consideration of this matter is greatly appreciated.

Respectfully submitted, July 13, 1994
by Mark D. Pugh, 3M Plant Manager, Middleway, WV

WV Environmental Quality Board
1615 Washington Street East
Charleston, WV 25311-2126

July 13, 1994



Dear Board Members:

Please consider these comments regarding the proposed changes to Series I requirements governing water quality standards.

1. I object to the creation of a special category under 7.3 of "Waters of Special Concern". This category shifts waters such as federally-designated Wild and Scenic Rivers, naturally reproducing trout streams, and streams in state and national Forests and recreation areas from the previous designation as National resource waters. Under section 4.1.d, national resource waters "shall be maintained and protected and improved where necessary". No such requirement is proposed for the waters of special concern category in 4.1.c. Thus, the change will represent a clear step backwards for these important waters. Furthermore, the only waters left in the National resource waters category are streams and rivers within the boundaries (note spelling) of designated Wilderness Areas. Since Wilderness Areas are declared by federal law to be free from human interference, the opportunities to improve these waters where needed will be effectively null. Thus, this rule change eliminates the mandate to improve where needed many of the state's important water resources, and mandates that improvement is limited to streams where such action would violate federal law. I recommend that the section be rewritten to return it and the corresponding definitions and antidegradation policy to their original.

2. Section 5.2 regarding mixing zones should be amended as follows:

5.2.c should be changed to preclude mixing zones within a stream or river for 5 miles above a public water supply intake. This is needed to be consistent with section 7.2.a.B. This is especially important for those water supplies that are in small headwaters streams.

5.2.i should be deleted. It appears to undo all of the criteria for defining mixing zones in the paragraphs above. If not completely omitted, substantially more detailed criteria should be defined to specify the conditions for receiving any such waiver.

3. Section 8.4 regarding reminging is unacceptable. While reminging represents a limited opportunity to improve water quality in a few segments, the wholesale exemption of water quality criteria implied herein to a profit making entity automatically guarantees that the downstream users will continue to pay for the poor water quality associated with mining activities. I recommend that the section be deleted completely. If not, language should be added to assure that applicants for reminging variances demonstrate that current water quality criteria cannot be met and that existing water quality will be improved. I do not believe the reminging variances are needed or appropriate, and they are certainly not appropriate in those instances where water quality criteria could be achieved with appropriate effort on the part of the applicant.

Thank you for the opportunity to comment.

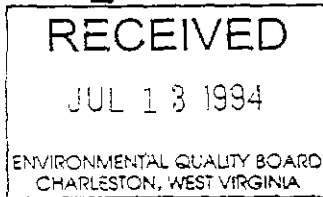
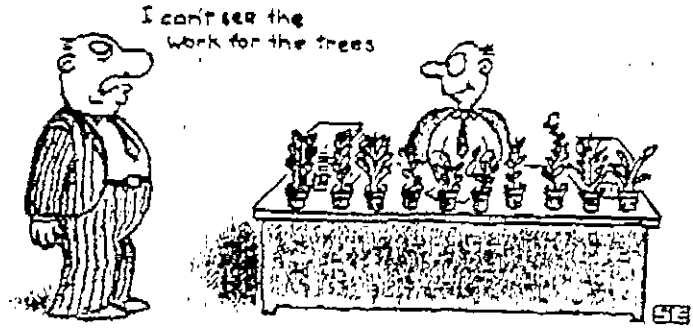
Sincerely,

James Kotcon
James Kotcon

*Rt 12 Box 400
Morgantown, WV 26505*



West Virginia - Citizen Action Group



Just the FAX...

To: WV ENVIRONMENTAL QUALITY BOARD

From: Jim KOTCON

RT. 12 Box 400 MORGANTOWN, WV 26505

Number of Pages Including Cover Page: 2

If there is a problem with this transmission, please contact WV-CAG at 346-5891 (FAX and telephone number).

1324 Virginia Street, East

Charleston, WV 25301

304/346-5891



WEST VIRGINIA COAL ASSOCIATION

RECEIVED
JUL 13 1994
ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

July 13, 1994

VIA HAND DELIVERY

Dr. Charles R. Jenkins, Chairman
West Virginia Environmental Quality Board
1615 Washington Street, East
Charleston, WV 25311-2126


RE: Comments to Proposed Revisions to
46 C.S.R. Series 1, Requirements
Governing Water Quality Standards

Dear Dr. Jenkins:

Attached are comments of the West Virginia Coal Association ("Association") to the proposed revisions to the State Water Quality Standards. These comments are in addition to, and should be considered together with, joint comments being filed by the Association and the West Virginia Mining & Reclamation Association.

Should you have any questions whatsoever regarding the text of these comments, please do not hesitate to notify me immediately.

Sincerely,


William B. Raney,
President

WBR/efb

Enclosure

1301 Laidley Tower • Charleston, West Virginia 25301 • Telephone (304) 342-4153

WEST VIRGINIA COAL: MORE IMPORTANT THAN EVER

We've Got A Job To Do!



WEST VIRGINIA COAL ASSOCIATION

COMMENTS TO PROPOSED REVISIONS TO STATE WATER QUALITY STANDARDS 46 C.S.R. SERIES 1

The West Virginia Coal Association (the "Association") is pleased to submit comments on the proposed revisions to the State Water Quality Standards, 46 C.S.R. Series 1. We congratulate the Board for proposing a variance from water quality standards for coal remining NPDES permit holders. This action will produce positive economic and environmental results by removing some of the disincentives to remining and consequently reclaiming previously mined and unreclaimed areas. While the Board's Notice of Hearing suggests that the proposed regulations are limited to revising water quality standards for Opequon Creek and the proposed remining variance, the regulations go much further. Accordingly, the Association's comments are not limited strictly to those revisions.

COMMENTS

Proposed additions are indicated by underscoring, deletions by strike-out.

C.S.R. § 46-1-2. Definitions.

2.4 "Existing Uses" are those uses actually attained in a water body on or after November 28, 1975, whether or not they are included as designated uses within these water quality standards. ~~, whether or not they are included in the water quality standards.~~

The Association recommends that Section 2.4 be revised to make the definition identical to the language used in Section 4.1.a, which sets forth the State's anti-degradation policy to maintain and protect, among other things, existing uses. Section 2.4's current language is less clear than the language contained in section 4.1.a..

2.17 "Water" or "waters" shall mean, for purposes of these regulations only, those surface waters ~~any and all water on or beneath the surface of the ground, whether percolating, standing, diffused or flowing,~~ wholly or partially within this state, or bordering this state and within its jurisdiction, which would be characterized as "waters of the United States" under section 502 of the Clean Water Act, 33 U.S.C. § 1362, and the regulations promulgated thereunder, and shall include, without limiting the generality of the foregoing, natural or artificial lakes, rivers, streams, creeks, branches, brooks, ponds (except farm ponds, industrial settling basins and ponds and water treatment facilities), impounding reservoirs, ~~springs, wells,~~ water courses and wetlands.

WEST VIRGINIA COAL ASSOCIATION

The Association recognizes that the definition of "waters" proposed by the Board is identical to the definition of "waters of the State" set forth in of the Water Pollution Control Act, W. Va. Code § 22-11-3(23). However, the proposed definition is inappropriate for several reasons.

First and foremost, the proposed definition of "water" or "waters" to include groundwater within the scope of the proposed water quality standards conflicts with the State's groundwater protection program and places the continued vitality of that entire program in doubt. Recognizing that the Federal Clean Water Act ("CWA") did not address groundwater, the Legislature enacted the Groundwater Protection Act ("GWPA") in 1991 to protect the State's groundwater resources. Both the Board and the Division of Environmental Protection have promulgated comprehensive regulations establishing groundwater quality standards and protective practices to protect those standards. Section 4 of the GWPA authorized the Board to promulgate groundwater quality standards to protect groundwater uses and the Board did so in August, 1993, establishing groundwater quality standards for approximately 70 contaminants. See 46 C.S.R. Series 12. Many of the contaminants for which groundwater quality standards were promulgated are also covered in the proposed water quality standards. By defining "waters" to include groundwater, the proposed regulations establish and make applicable contradictory standards for many of the same contaminants. The proposed regulations would also have the unintended result of requiring NPDES permits to address groundwater quality when the groundwater protection program is entirely separate and distinct from the NPDES program. Furthermore, the proposed water quality standards express allowable concentrations for metals in terms of total metals, while the groundwater quality standards express such concentrations in terms of dissolved metals. See C.S.R. § 46-12-3.5.

Second, the proposed definition of "waters" is inappropriate in the context of water quality standards being revised in compliance with Section 303(c)(1) of the CWA because the CWA applies to surface waters only -- not groundwater. See Exxon Corporation v. Train, 554 F.2d 1310, 1324-26 (5th Cir. 1977); Kelley, People of State of Michigan v. United States, 618 F.Supp. 1103, 1105-06 (W.D. Mich. 1985). Since the proposed regulations are being promulgated pursuant to Section 303(c)(1) of the CWA, the waters to which these standards apply must be construed consistently with the "waters" subject to regulation under the CWA.

Third, defining "waters" to include groundwater would present inconsistencies with Federal enforcement of the CWA. If the proposed definition is adopted, EPA conceivably could enforce State NPDES permit conditions relating solely to groundwater quality, despite the fact that EPA has no statutory authority to do so under the CWA itself. In addition, discharges affecting groundwater within the state could become subject to citizen suit provisions of Section 505 of the CWA to the extent a State NPDES permit incorporated permit limitations based on groundwater quality despite the fact that the GWPA does not authorize citizens' suits.

The Association's proposed definition eliminates any inconsistency between the proposed revisions to the water quality standards and the groundwater protection program by making the definition of "waters," for purposes of the proposed water quality standards only, consistent with the scope of regulation under the CWA. A less desirable alternative would be to leave the term

WEST VIRGINIA COAL ASSOCIATION

"waters" undefined, as it is under the current water quality standards, since both the regulatory agencies and the regulated community, not to mention the environmental community, understand what "waters" the standards apply to. Deleting the proposed definition entirely would leave this understanding intact. The Association urges the Board to adopt either recommendation.

C.S.R. § 46-1-4 Anti-degradation Policy.

4.1. It is the policy of the State of West Virginia that instream water uses ~~and wetland uses~~ shall be maintained and protected as follows:

The Association suggests that the above language be stricken for several reasons. Wetlands are defined in Section 2.17 of the proposed regulations as "waters" of the State. Therefore, the above language is redundant.

4.1.d. [Outstanding National Resource Waters].

In all cases, waters which constitute an outstanding national resource as designated in subsection 7.3.e shall be maintained and protected and improved where necessary. In addition to the waters listed in subsection 7.3.e, additional waters may be nominated for inclusion in that category by any party which would be considered a party adversely affected by an order made and entered by the director or aggrieved by failure or refusal of the Chief to act, as more fully set forth in W. Va. Code § 22-11-21, interested party or by the Board on its own initiative. No additional waters shall be included in the outstanding national resource waters category unless the nomination to include such waters has undergone rulemaking in accordance with the requirements of the West Virginia Administrative Procedures Act, W. Va. Code § 29A-3-1 et seq., and W. Va. Code § 22B-3-4.

The Association recommends that the Board strike the above-referenced language because the term "any interested party" is undefined and is not consistent with the terminology used in the Water Pollution Control Act. The Association believes that the judicial concept of standing should be applicable to qualify the persons entitled to nominate waters for inclusion in the category of outstanding national resource water. In addition, the Association believes that any decision to include additional waters within the category of outstanding national resource waters can be made only through legislative rulemaking. The recommended language makes this requirement clear.

C.S.R. § 46-1-6 Water Use Categories

WEST VIRGINIA COAL ASSOCIATION

6.3.d. Category B4 -- Wetlands. -- As defined in section 2.17; certain numeric stream criteria may not be appropriate for application to wetlands (see Appendix E).

The Association recommends that the Board retain current Section 6.3.d which the proposed regulations would otherwise delete. Section 4.1 requires that existing instream water uses (which include wetlands) be maintained and protected. If Section 6.3.d is deleted, however, there would be no wetland use to be maintained and protected under Section 4.1. How wetlands are protected under the proposed regulations becomes even more confusing because proposed Appendix E retains the B4 use category applicable only to wetlands--yet the Board proposes to delete the B4 use category altogether in Section 6.3.d. The proposed regulations therefore make no sense as they pertain to wetlands.

C.S.R. § 46-1-8.4. Variances from specific water quality for remining activities.

a. In any application for a State NPDES Remining permit to discharge pollutants from or affected by a coal remining operation, the applicant may request alternate water quality-based effluent limits for iron, manganese and pH. Water quality-based effluent limits resulting in concentrations of those parameters which are higher than existing numeric water quality standards are allowable upon demonstration to the Chief that the remining operation will result in the potential for improved water quality from or affected by the remining operation

The foregoing revision to section 8.4.a is intended to make the variance consistent with the language contained in section 301(p)(2) of the CWA, 33 U.S.C. § 1311(p)(2). Under Section 301(p) of the CWA, applicants for a remining NPDES permit with modified requirements for pH, iron and manganese need only demonstrate that the coal remining operation will result in the "potential" for improved water quality from the remining operation. The requirement that the applicant prove that water quality will, in fact, be improved is more stringent than the applicable federal provisions and wrongly makes the applicant a "guarantor" of water quality from the remining operation.

The State Legislature has made clear, in the DEP Reorganization Act (H.B. 4065), that it is the policy of this State to promulgate no new environmental regulations after July 1, 1994 which are more stringent than parallel federal regulations unless specific written reasons demonstrate that such provisions are reasonably necessary to address special State considerations. See W. Va. Code § 22-1-3a. While § 22-1-3a is written in terms of DEP only, the Legislature's intent that this standard apply to all environmental rulemaking is made clear by the fact that it vested all environmental rulemaking with DEP, with the narrow exception of the Board's authority to promulgate surface and groundwater quality standards. The Board should strive to ensure that

WEST VIRGINIA COAL ASSOCIATION

its rules comport with this expression of the Legislature's intent. Absent "exceptional" circumstances, therefore, the Board should adopt the recommended language.

C.S.R. § 46-1-8.15.2. [Iron]

Effluent limitations resulting in concentrations greater than 1.5 mg/l total iron in the stream are allowable for NPDES coal remining operations only upon a demonstration to the Chief by the applicant in the NPDES remining application. This demonstration must show that the remining operation will result in the potential for improved water quality, and is subject to approval by the Board and review by EPA. ~~This exception does not apply to trout waters.~~

The foregoing revision to section 8.15.2 brings the water quality standard for iron for remining operations seeking a State NPDES permit into conformity with Section 301(p)(2) of the CWA, as is more fully stated in the Association's Comment to Section 8.4.a above. The Association proposes that the language concerning trout waters be stricken to the extent that it makes no sense to prohibit modified iron limitations where remining operations will have the effect of improving the quality of trout waters.

C.S.R. § 46-1-8.17.2 [Manganese]

Effluent limitations which may result in concentrations greater than 1.0 mg/l manganese in the stream are allowable for NPDES coal remining operations only upon a demonstration to the Chief by the applicant in the NPDES remining application. This demonstration must show that the remining operation will result in the potential for improved water quality after remining, and will be subject to approval by the Board and review by EPA. ~~This exception does not apply to trout waters.~~

See Association Comment to C.S.R. § 46-1-8.15.2 above.

C.S.R. § 46-1-8.23.1 [pH]

Effluent limitations which may result in pH values less than 6.0 are allowable for NPDES remining operations only upon a demonstration to the Chief by the applicant in an NPDES remining application. This demonstration must show that the remining activity will result in the potential for improved water quality upon completion of the remining activity, and is subject to approval by the Board and review by EPA. ~~This exception does not apply to trout waters.~~

See Association Comment to C.S.R. § 46-1-8.15.2.

WEST VIRGINIA COAL ASSOCIATION

OTHER COMMENTS

As a general matter, the Association recommends that the Board establish water quality standards for metals based upon dissolved concentrations rather than total recoverable concentrations. The Association notes that industry representatives and trade groups are unanimous in urging the Board to adopt dissolved metal standards and that EPA and many states have already adopted standards in terms of dissolved metals.

EPA's current water quality guidance document, published on May 20, 1992 (the "EPA Guidance") (Attachment 1), supersedes all prior statements in EPA documents concerning analytical methods for measuring metals concentrations. The EPA Guidance suggests that dissolved metals standards are more appropriate for establishing water quality criteria. EPA recommends a toxicity testing approach for adjusting metals criteria for site-specific ambient water characteristics, and suggests the following methods for implementing water quality standards based on dissolved metals:

- (1) Dissolved Metals with Downward Adjustment of Current Water Quality Criteria. This method measures dissolved metals in ambient waters and compares such measurements to criteria appropriate for dissolved metals, adjusting downward existing water quality criteria (if based on total recoverable metals) to account for the typical dissolved fraction of metals in dilution water.
- (2) Dissolved Metals Analysis Combined with a Water-Effect Ratio to Adjust Criteria. For implementing metals criteria established from laboratory toxicity tests, EPA suggests an adjustment of the criteria value by measuring a pollutant's water-effect ratio on the receiving water to obtain a site-specific criteria value. The EPA Guidance sets forth specific procedures for arriving at the water-effect ratio.

The EPA Guidance also notes that many of the methods it recommends are already in use in numerous states. These states include: Alabama, Arizona, Connecticut, Florida, Hawaii, Louisiana, Maryland, Missouri, Nebraska, New Mexico, New York, North Carolina, South Carolina, Tennessee and Virginia. For example, the State of Virginia adopted, on March 25, 1992, surface water quality standards utilizing dissolved metals criteria. See VR680-21-01.14, note 1 (effective May 20, 1992) (Attachment 2). These standards were not only approved by EPA (Attachment 3) -- they were adopted by a technical advisory committee which included, among others, EPA Region III representatives. Although the water quality standards are expressed in dissolved metals concentrations, the VPDES program's effluent limitations are still

WEST VIRGINIA COAL ASSOCIATION

expressed in total recoverable metals. To account for the difference between the two criteria, Virginia has adopted a chemical translator allowing dischargers to submit sampling data supporting revision of the permit's effluent limits to reflect dissolved metals. (Attachment 4).

Establishing groundwater quality standards based on dissolved metals criteria is not only appropriate, it is advisable under both EPA and state agency pronouncements and actions. The most current EPA guidance on the issue of metals criteria in state water quality standards suggests EPA is moving toward adoption of water quality criteria based on dissolved metals. Moreover, EPA has approved numerous state water quality standards programs based on dissolved metals.

Adopting standards based on dissolved metals will account more accurately for the bioavailability and toxicity of dissolved metals in water while protecting human health and the environment. Moreover, such standards will promote the effective use of pollution control resources while fostering economic development by reducing non-compliance due to overprotective and inaccurate metals criteria.

ABE03594

FRL-4140-21

Water Quality Criteria; Availability of Guidance and Request for Comment

Agency: Environmental Protection Agency.

ACTION: Notice of availability of interim guidance on interpretation and implementation of ambient water quality criteria for protection of aquatic life from the toxic effects of metals.

SUMMARY: Pursuant to section 301(a)(1) of the Clean Water Act, EPA has developed interim guidance on interpretation and implementation of metals criteria in State water quality programs for protection of aquatic life. The guidance deals with issues stemming from differences in the biological availability of metals in ambient waters and in laboratory toxicity test waters. It recommends chemical analytical methods for use with metals criteria, and recommends a toxicity testing approach for adjusting criteria for site-specific ambient water characteristics. As interim guidance, it represents EPA's current recommendations on implementation of metals criteria. Many of the methods recommended in the guidance are already in use in some States. EPA will consider all public comments in deciding the content and timing of revisions to the guidance.

DATES: Written comments should be addressed to the person listed directly below by September 3, 1992.

FOR FURTHER INFORMATION CONTACT: Call Ecological Risk Assessment Branch at (202) 290-0658 and request "Interim Metals Guidance", or write Charles Delos, Mail Code WH-588, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460.

AVAILABILITY OF DOCUMENT: This notice announces the availability of the following document for public review and comment and as interim guidance: "Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals". Copies of the document may be obtained upon request, as described above. The document is also available for public inspection during normal business hours at: Public Information Reference Unit, U.S. Environmental Protection Agency, room 2404 (rear), 401 M Street SW., Washington, DC 20460. Copies of this document are also available for review in the EPA Regional Office libraries.

BACKGROUND INFORMATION: Section 304(a)(1) of the Clean Water Act (33 U.S.C. 1314(a)(1)) requires EPA to publish and periodically update ambient water quality criteria. These criteria are

to reflect the latest scientific knowledge on the identifiable effects of pollutants on public health and welfare, aquatic life, and recreation.

Over the years, EPA has issued a number of ambient water quality criteria for the protection of aquatic organisms and their uses from the toxic effects of metals. With respect to today's notice, the following metals criteria are of particular interest; antimony and silver, published November 28, 1980 (45 FR 79318); arsenic, cadmium, chromium, copper, lead, and mercury, published July 29, 1985 (50 FR 30784); nickel, published December 3, 1986 (51 FR 43665); zinc, published March 2, 1987 (52 FR 6213); selenium, published January 5, 1988 (53 FR 177); aluminum, published August 30, 1988 (53 FR 33177), and antimony and silver, published as draft revisions of the above mentioned 1980 criteria, May 14, 1990 (55 FR 19988).

The guidance announced in today's notice supersedes all statements in the above documents concerning analytical methods for measuring metals concentrations. The guidance does not supplant the numerical criteria set forth in the above documents.

REQUEST FOR COMMENTS: EPA is publishing the document as interim guidance. As such, it represents EPA's current guidance for use in all States. EPA is also soliciting comments on the guidance, and will consider such comments in deciding the content and timing of revisions to the guidance. Due to the complexity of metals specification and its effect on toxicity, the guidance, based on the currently available information, does not solve all problems relating to metals bioavailability. EPA anticipates continuing research on metals toxicity, and thus anticipates revising the guidance from time to time, as necessary.

EPA will consider immediate revision of the guidance if the public comment so warrants. EPA will also consider the public comments in planning future work on metals criteria and in making later revisions to the guidance. Comments are especially solicited regarding specific methods for directly measuring bioavailability of metals, and for predicting the environmental fate of particulate and complexed metals.

With the publication of this interim guidance, EPA is granting a petition by Kilpatrick & Cody and the Santa Ana River Dischargers Association to modify its criteria document recommendations regarding analytical methods for metals.

EPA is currently considering a petition by the City of Colorado Springs et al. to: (1) Develop part 136 analytical methods to test for acid soluble and dissolved

metals, and (2) either reinterpret 40 CFR 122.45(c) or modify the rule to allow water quality-based effluent limitations for metals to be expressed in either dissolved or acid soluble form. The interim guidance issued today does not represent a final Agency response to the matters raised in the petition. However, by recommending techniques for accounting for the differing bioavailability of metals in different locations, EPA believes that today's guidance may serve to mitigate the petition's concerns that strict application of total recoverable metals methodology may be unnecessarily overprotective. EPA currently anticipates that it will issue a final response to the petition after receipt and consideration of comments on today's interim guidance.

Dated: May 28, 1992.

Tudor T. Davies,
Director, Office of Science and Technology.
[FR Doc. 92-13214 Filed 6-4-92; 8:45 am]
BILLING CODE 6540-60-M

FEDERAL COMMUNICATIONS COMMISSION**Public Information Collection Requirement Submitted to Office of Management and Budget for Review**

May 28, 1992.

The Federal Communications Commission has submitted the following information collection requirement to OMB for review and clearance under the Paperwork Reduction Act of 1980 (U.S.C. 3507).

Copies of this submission may be purchased from the Commission's contractor, Downtown Copy Center 1114 21st Street NW., Washington, D.C. 20038, (202) 452-1422. For further information on this submission contact Judy Boley, Federal Communications Commission, (202) 632-7513. Persons wishing to comment on this information collection should contact Jonas Neihardt, Office of Management and Budget, room 3235 NEOB, Washington, DC 20503, (202) 395-4814.

OMB Number: 3060-0106.

Title: Section 43.61, Reports of Over-Telecommunications Traffic.
Report Number: FCC Report 43.6
Action: Revision of a currently approved collection.

Respondents: Business or other for-profit (including small business).
Frequency of Response: Annual.
Other: Corrections are reported months after the annual filing.

**Interim Guidance on
Interpretation and Implementation of
Aquatic Life Criteria for Metals**

May 1992

Health and Ecological Criteria Division
Office of Science and Technology
U.S. Environmental Protection Agency
Washington, DC 20460

United States
Environmental Protection
Agency

Office of Science and Technology
Health and Ecological Criteria Div.
Washington, DC 20460

May 1992

Water



Interim Guidance on
Interpretation and Implementation
of Aquatic Life Criteria for Metals

FACT SHEET

Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals

BACKGROUND

A water-borne metal may exist in many forms, including metals dissolved in a variety of complexes, metals adsorbed to particulate matter, and metals incorporated within particulate matter. The various forms and complexes differ in their biological availability and toxicity. Because the fraction of metal in any particular form varies, the same metal concentration may exert different toxicity from place to place and from time to time. Differences between laboratory toxicity test waters and many ambient waters may make the interpretation of field concentration measurements problematic.

Metals criteria documents issued in 1980 recommended the use of the total recoverable method for ascertaining attainment of criteria. Beginning in 1984 the criteria documents have recommended the use of an acid soluble method. Applied to state-wide criteria, the use of either of these methods offers a high degree of protection, but may result in overestimating toxicity.

Recognizing these problems, EPA is issuing new guidance, representing its current recommendations on approaches for implementing aquatic life criteria for metals, measuring attainment of such criteria, and determining the need for water quality-based controls.

SYNOPSIS OF INTERIM GUIDANCE

The interim guidance presents three reasonable approaches that differ in their complexity. Readers are referred to the guidance document for the complete recommendations and associated technical discussion and supporting information.

- (1) The simplest approach is to measure total recoverable metals in ambient waters, and to compare such measurements to national or state-wide criteria.
- (2) A closer focus on biologically available metals can be obtained by measuring dissolved metals in ambient waters, and comparing such measurements to criteria appropriate for dissolved metal. Since effluent limits, for both technical and legal (40 CFR 122.45) reasons, are generally expressed in terms of total recoverable metal, it is necessary to translate between the total recoverable concentration in the effluent and the dissolved concentration in the ambient water.

- (3) Because of the complexity of metal chemistry, there is no one chemical analytical method that can accurately determine the metals that are bioavailable and toxic. For implementing metals criteria established from laboratory toxicity tests, an adjustment of the criteria value can address this constraint. It involves measuring a pollutant's water-effect ratio in the receiving water covered by the standard. The water-effect ratio compares the toxicity of a pollutant in the actual site water to its toxicity in laboratory water, for two or more aquatic species. Because the metal's toxicity in laboratory water is the basis for the national criterion, the water-effect ratio is used in an adjustment to obtain a site-specific value. Implemented in conjunction with either of the first two alternatives, this adjustment may either increase or decrease the numeric value of the criterion.

EFFECT OF INTERIM GUIDANCE

The subject guidance encourages greater flexibility in the implementation of aquatic life criteria for metals, while in no way relaxing the level of protection intended for the criteria. The interim guidance recommends three options ranging from very simple and environmentally conservative to more complex but more accurate. While all the basic options have previously been applied by States and approved by EPA, the guidance is intended to clarify EPA recommendations on metals criteria implementation.

The interim guidance is expected to facilitate the implementation of the metals criteria, and promote the effective use of pollution control resources.

AVAILABILITY OF DOCUMENT

Copies of the complete document "Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals" may be obtained from EPA through the contact below. The document is also available for public inspection and copying during normal business hours at: Public Information Reference Unit, U.S. Environmental Protection Agency, Room 2404, 401 M Street, S.W., Washington, D.C. 20460. Copies of the document are also available for review in the EPA Regional Office libraries.

For a copy of the document call (202) 260-0658 and request the "Interim Metals Guidance", or write:

Charles Delos
Health and Ecological Criteria Division (WH-586)
U.S. Environmental Protection Agency
Washington, DC 20460

FAX: (202) 260-9830

Foreword

This document provides guidance for interpreting and implementing aquatic life criteria for metals in waters of the United States. It is issued in support of EPA regulations and initiatives involving the application of water quality criteria and standards. This document is agency guidance only. It does not establish or affect legal rights or obligations. It does not establish a binding norm, or prohibit alternatives not included in the document. It is not finally determinative of the issues addressed. Agency decisions in any particular case will be made by applying the law and regulations on the basis of specific facts when regulations are promulgated or permits are issued.

This document is expected to be revised periodically to reflect advances in this rapidly evolving area. Comments from readers are welcomed. Send comments to Health and Ecological Criteria Division (WH-586), U.S. EPA, 401 M Street SW, Washington, DC 20460.

Introduction

The principal problem in relating discharges of toxic metals to environmental impacts is the different toxicities of various metal species in ambient waters, and the varying fractions of such species with location and time. This results in the same metal concentration exerting different toxicity from place to place and from time to time. The chemical species involved include metals dissolved in a variety of forms, and metals sorbed to or within particulate matter. Metals may differ markedly from each other with respect to speciation and bioavailability.

Although metal toxicity may vary depending on the chemical characteristics of the water body, the national criteria have been designed to protect all or almost all bodies of water. However, this does not mean that the national criteria will always be overprotective. For example, some untested locally important species might be very sensitive to the material of concern, or the local aquatic organisms might have increased sensitivity due to diseases, parasites, other pollutants or water quality conditions, or extreme flow or temperature conditions [2].

Another problem involves metal speciation in effluents, and the potential transformations that may occur in moving from the chemical environment of the effluent to the chemical environment of the receiving water. Consequently, in contrast to an ambient measurement, which should respond predictably to metal that is actually bioavailable, an effluent measurement needs to respond also to metal that may not be bioavailable under effluent chemical conditions, but would possibly become bioavailable under ambient chemical conditions.

Because of the complexity of metal speciation and its effect on toxicity, the relationship between measured concentrations and toxicity is not precise. Consequently, any chemical analytical method that could be recommended would not guarantee precise comparability between concentrations measured in the field and concentrations employed in the toxicity tests underlying the criteria. However, the three approaches presented in this guidance should provide acceptable approximations.

Background on Analytical Methods

EPA has recognized four methods of sample preparation for metals analysis. These lead to measurement of: (a) total metals, (b) total recoverable metals, (c) acid soluble metals, and (d) dissolved metals. Ordinarily, the four methods measure all of the dissolved metal present at the time of sampling. They differ in the amount of particulate metal that they measure.

The total metals procedure, the total recoverable metals procedure [3], and the acid soluble metals procedure [4, 5] measure metals that are dissolved in water

Synopsis

This guidance addresses the use of EPA (and corresponding State) metals criteria in water quality standards intended to protect aquatic life. This guidance also addresses the derivation of NPDES permit limits from such criteria. The main body of the document presents recommendations on the best current approaches for implementing aquatic life criteria for metals and measuring attainment of such criteria. This guidance supersedes past criteria document statements expressing criteria in terms of an acid soluble analytical method. Appendix A presents a case study illustrating derivation of site-specific criteria (item 3 below). Appendix B presents recommendations on the derivation of NPDES permit limits from ambient metals criteria. As described in Appendix B, it supersedes part of the Technical Support Document [1] discussion of metals.

The principal issue is the correlation between metals that are measured and metals that are biologically available. The bioavailability and toxicity of metals depend strongly on the exact physical and chemical form of the metal, and on the species affected. The form of the metal, in turn, can vary depending on the chemical characteristics of the surrounding water matrix. Because of differences between various effluents and site waters, and between laboratory toxicity test waters and many site waters, establishment and implementation of metals criteria are not straight forward. Consequently, this guidance presents three reasonable approaches that differ in their complexity.

- 1) The simplest approach is to measure total recoverable metals in ambient waters, and to compare such measurements to national or state-wide criteria.
- 2) A closer focus on biologically available metals can be obtained by measuring dissolved metals in ambient waters, and comparing such measurements to criteria appropriate for dissolved metal. Since effluent limits, for both technical and legal (40 CFR 122.45) reasons, are generally expressed in terms of total recoverable metal, it is necessary to translate between the total recoverable concentration in the effluent and the dissolved concentration in the ambient water.
- 3) Because of the complexity of metal chemistry, there is no one chemical analytical method that can accurately determine the metals that are bioavailable and toxic. For implementing metals criteria established from laboratory toxicity tests, an adjustment of the criteria value can address this constraint. It involves measuring a pollutant's water-effect ratio in the receiving water covered by the standard. The water-effect ratio compares the toxicity of a pollutant in the actual site water to its toxicity in laboratory water, for two or more aquatic species. Because the metal's toxicity in laboratory water is the basis for the national criterion, the water-effect ratio is used in an adjustment to obtain a site-specific value. Implemented in conjunction with either of the first two alternatives, this adjustment may either increase or decrease the numeric value of the criterion.

or become dissolved when treated with acid. They differ in the concentration of acid and in the temperature used during the analytical procedure, both decreasing in the order cited above.

The dissolved procedure [3] measures metal that passes through a 0.45 μm filter at the time of sample collection. The results from this procedure are reported as "dissolved", although it may include metal that was bound to micro-particles (<0.45 μm) at the time of sample collection. More recent dissolved procedures recommend positive-pressure, in-line filtration through polycarbonate membrane filters having a uniform pore size selected from a range of 0.1-0.4 μm [6], and emphasize ultra-clean laboratories, labware, and reagents [7, 13]. Measurements using different filter sizes may, however, give different results.

Metals criteria documents issued in 1980 recommended the use of the total recoverable method. Beginning in 1984, although a final acid soluble method was not available, the criteria documents have stated that an acid soluble method would be a better way of measuring attainment of the criteria. Noting the unavailability of a final method, they recommended the continued use of the total recoverable method, which they acknowledge may be overly protective.

Because the acid soluble method uses a less rigorous digestion, it was expected that it would generally measure less of the particulate metal than the total recoverable method. It was therefore believed that the acid soluble method would more accurately measure bioavailable metal. Recently available ambient and effluent data suggest, however, that acid soluble results are ordinarily nearly identical to total recoverable results, while being somewhat different from dissolved results. Because an increased understanding of the complexity of metals bioavailability indicates that the acid soluble method will not significantly improve the correlation between measured metal and bioavailable metal, this guidance is not recommending the use of this method.

Bioavailability and Toxicity

Bioavailability and toxicity vary with the form of the metal. Particulate metal is generally expected to have less bioavailability than dissolved metal. Nevertheless, the toxicity of ambient particulate metal is not necessarily zero. For example, some metal that is in the particulate phase in the ambient water environment may become dissolved in the chemical environment associated with the gill or the gut.

In natural waters, some metals may exist in a variety of dissolved species that differ significantly in toxicity. For copper, the divalent free cation and some inorganic complexes have substantial toxicity, whereas dissolved organic

complexes generally have significantly less toxicity. As a result, the same concentration of dissolved copper may exert different toxicity in different waters.

Toxicity tests that form the basis for the criteria are usually performed in an untreated or slightly treated natural water from an uncontaminated source, or in water that has been first purified and then reconstituted by the addition of appropriate mineral salts. Because such dilution water is generally lower in metal-binding particulate matter and dissolved organic matter than most ambient waters, these toxicity tests may overstate the ambient toxicity of non-biomagnified metals that interact with particulate matter or dissolved organic matter.

In most but not all toxicity tests underlying the criteria, the percentage of metal in the particulate phase is fairly low. For ambient waters, on the other hand, recent data suggest that typically 30-80 percent of the copper, nickel, and zinc, and 90-95 percent of the lead may be in a particulate phase measured by the total recoverable method but not by the dissolved method.

In freshwater laboratory tests, organic carbon concentrations of a few mg/L are typical, with chronic tests having higher concentrations than acute tests. In ambient waters, organic carbon concentrations are typically somewhat higher than this, and may be substantially higher at the edge of small mixing zones.

Because of the greater fraction of particulate metal in ambient waters, as well as the higher levels of dissolved organic binding agents in ambient waters, the fraction of metal that is biologically available may often be lower under ambient field conditions than under laboratory conditions, particularly for fresh waters.

Dissolved and Total Recoverable Approaches

Aquatic life criteria in ambient waters may be implemented either as total recoverable metal or as dissolved metal. Effluent limits must generally be expressed as total recoverable metal. For analyses of metals in the low $\mu\text{g/L}$ range or below, ultra-clean sample handling techniques [7, 13] should be used.

Ambient Waters:

When used for expressing ambient water quality criteria, the total recoverable method provides greater safety than does the dissolved method. Nevertheless, when used for ambient waters, total recoverable measurements may result in overestimating the toxicity. While toxicity testing has shown dissolved measurements to be better predictors of toxicity than total recoverable measurements, there are also some potential concerns with this approach, as discussed below.

First, EPA water quality criteria are generally based on the reported total recoverable concentrations in the toxicity tests. If used for dissolved standards, the criteria values need to be downwardly adjusted to account for the typical dissolved fraction in test dilution water. For copper, approximately 86 percent of the reported total concentration was dissolved during freshwater acute toxicity tests with the more sensitive species. Consequently, the copper freshwater acute criterion should be adjusted to 86 percent of its total recoverable criterion in order to serve as a dissolved criterion, particularly in waters having low concentrations of dissolved organic binding agents. While the adjustment may be small for most metals, a few metals, such as aluminum, may require much larger adjustments to account for the much lower percentage dissolved typically occurring during toxicity tests. Chronic criteria may require larger adjustments than acute criteria, due to the higher particulate concentrations caused by the addition of food during chronic tests.

Except for copper in fresh water, the factors are not yet available for converting EPA's published criteria into dissolved criteria. A re-examination of data underlying the metals criteria is now underway to compile the dissolved concentrations measured during toxicity tests. While preliminary analysis does not indicate that these dissolved adjustment factors are of sufficient magnitude to be of great concern, they should be considered in any adoption of dissolved metal standards subsequent to distribution of this information.

Second, by measuring comparatively little of the particulate fraction, it may be possible that the dissolved method could occasionally understate the toxicologically effective concentration. Although toxicity data suggest that this is not ordinarily a problem, it is more likely to be a concern if the dissolved concentration is only a very small percentage of the particulate concentration, such as may occur with aluminum.

In some situations the dissolved method may overstate the toxicologically effective concentration. When certain metals (such as copper) become complexed with elevated concentrations of dissolved organic matter, a reduction in toxicity may occur, compared to toxicity in laboratory water, which is low in organic matter. Where dissolved organic matter is likely to interact with the toxicant, the water-effect ratio approach is likely to be more accurate and is currently the recommended solution.

A review of the limited number of available site-specific studies found that the water-effect ratio (site water LC50 versus lab water LC50) was generally significantly larger than the measured total recoverable versus dissolved ratio [10]. These limited freshwater data thus suggest that use of properly formulated dissolved criteria would be at least as protective as criteria derived from careful measurements of water-effect ratios.

Effluents:

The dissolved method is generally not applied to effluents to determine achievement of effluent quality goals. Such use is generally barred by regulation (40 CFR 122.45). Because the chemical conditions in ambient surface waters may differ substantially from those in the effluent, there is no assurance that effluent particulate metal would not dissolve after discharge. A common method of removing metals from wastewaters is to chemically precipitate the metal and settle the resulting particles. Expressing a metals limitation in terms of dissolved metal would imply little concern about the effectiveness of the settling process or the fate of the discharged particulate metal.

Determining the total recoverable effluent limitation corresponding to a dissolved criterion would involve specifying the fraction of effluent total recoverable metal that would exist as dissolved metal under the chemical conditions of the receiving water. In the absence of site information, any values assumed for this fraction should be environmentally conservative.

Where greater accuracy is desired, the dissolved fraction of total recoverable metal could be evaluated by direct measurement of dissolved and total recoverable metal in the affected ambient waters, or possibly by geochemical model calculations (as discussed in Appendix B). All of the techniques involve approximations.

Water-Effect Ratio Approach

Due to the complexity of metals speciation, and due to the varying degrees of bioavailability and toxicity of the many forms and complexes, there is no chemical method that can assure that a unit of concentration measured in the field would always be toxicologically equivalent to a unit of concentration employed in the laboratory toxicity tests underlying the criteria.

For metals criteria derived from laboratory toxicity tests, one approach is to use a biological method to compare bioavailability and toxicity in receiving waters versus laboratory test waters. This involves running toxicity tests with at least two species, measuring acute (and possibly chronic) toxicity values for the pollutant using (a) the local receiving water, and (b) laboratory toxicity testing water, as the sources of toxicity test dilution water. A water-effect ratio is the acute (or chronic) value in site water divided by the acute (or chronic) value in laboratory waters. An acute value is an LC50 or EC50 from a 48-96 hour test, as appropriate for the species. A chronic value is a concentration resulting from hypothesis testing or regression analysis of measurements of survival, growth, or reproduction in life cycle, partial life cycle, or early life stage tests with aquatic species.

Because the metal's toxicity in laboratory water is the basis for EPA's criterion, this water-effect ratio is used to adjust the national criterion (or corresponding state criterion) to a site-specific value. This adjustment may either increase or decrease the criterion. Because the water-effect ratio reflects differences in water chemistry, it is acceptable to assume that a ratio derived from acute LC50s or EC50s may be applied to both acute and chronic criteria, provided that the water-effect ratio is determined with an acutely sensitive species. Nevertheless, performing chronic tests is an option that could produce a different water-effect ratio, due to changes in water chemistry caused by the addition of food during chronic tests. While this may somewhat improve the accuracy of the resulting criteria, it will substantially increase the testing costs.

The principle of criteria adjustment using a water-effect ratio was set forth in previous guidance [8, 9]. The procedure applies to criteria derived from laboratory toxicity data. As such it does not apply to the residue-based mercury chronic criteria, or the field-based selenium freshwater criterion. The basic features of the procedure as recommended herein are described below. Dischargers or private entities wishing to perform such testing should consult with the appropriate regulatory agency before proceeding.

- (1) At least two sensitive species, including at least one invertebrate, should be tested through standard toxicity testing protocols, using site dilution water and using laboratory dilution water. Test organisms should be drawn from the same population and tested under identical conditions (except for water source). Test species should ordinarily be selected from those species that were used for national criteria development, in order to be able to ascertain whether the laboratory water results are comparable to the those in the criteria document.
- (2) Site water samples used for testing are to be representative of the receiving water to which the site-specific criteria value is to apply. For flowing waters, it is generally recommended that at least one sample correspond to a condition in which point or nonpoint pollutant contributions are reasonably well mixed with the flow of the receiving water. For other types of waters, it is generally recommended that a sample correspond to a dilution situation well outside any regulatory mixing zone. These recommendations are intended to yield a water-effect ratio appropriate for the affected receiving water as a whole. These recommendations supersede those of the previous site-specific guidance [8, 9], which recommended that pristine waters always be used.
- (3) The laboratory dilution water should be comparable to what was used in tests underlying the national criteria. For any pollutant with a national or state criterion calculated from site-specific hardness, laboratory-water and

site-water toxicity results should be computationally normalized to the same hardness, using the specified hardness slope.

- (4) The toxic metal should be added in the form of an inorganic salt having relatively high solubility. Nitrate salts are generally acceptable; chloride and sulfate salts of many metals are also acceptable. Results should be based on measured or nominal initial concentrations if static tests are performed, and on average measured concentrations if flow-through tests are performed.
- (5) Water quality characteristics affecting bioavailability and toxicity should be monitored. Measurements ordinarily should include both dissolved and total recoverable metal concentrations, hardness, pH, alkalinity, suspended solids, conductivity, dissolved solids or salinity, total organic carbon, dissolved organic carbon, temperature, and specific metal binding ligands (where known to be important).
- (6) The number of site water samples to be tested may vary with the size of the affected water body (or the size of the metal loading). Except in the smallest systems, a minimum of two site water samples should be collected in different seasons during times of relatively low flow or low dilution. In moderately sized and larger systems (e.g., multiple m^3/sec or double to triple digit cfs low flow), additional samples should be collected during other times in the year and possibly at additional locations appropriate for the segment under study.
- (7) In studies involving continuous discharges, samples ordinarily should not be taken from storm affected waters, which may contain particulate matter not present during design flow conditions. On the other hand, in effluent dominated situations, at least one sample should represent a higher dilution condition (less than 50 percent effluent), in order to portray ambient conditions. In all situations, it should be recognized that the water-effect ratio may be affected by constituents contributed by point and nonpoint sources. Consequently, new measurements should be undertaken if newly implemented controls or other changes substantially affect ambient levels of suspended solids, organic carbon, or pH.
- (8) Additional testing should be performed before accepting unusually or inexplicably high values for the water-effect ratio, based on experience with the particular pollutant, and based on the chemical characteristics of the water. Retesting should also be performed for ratios having wide uncertainty ranges. EPA intends to compile additional information to assist in judging water-effect ratios in this manner. These recommendations, which focus concern on large and uncertain water-effect ratios, supersede

the previous guidance [8, 9] recommendations that encourage retesting or rejection of small water-effect ratios.

- (9) Ordinarily, the acute and chronic criteria for the site are calculated by multiplying the national or state criteria by the geometric mean water-effect ratio for the two or more tested species. The previous site-specific guidance [8, 9] provides some additional suggestions for situations where the measured ratios differ significantly, and provides other alternatives for setting the chronic criterion.
- (10) As with other types of water-quality based control actions for toxic pollutants, it is recommended that the chemical-specific approach be implemented in conjunction with assessments of whole effluent toxicity and field ecology ("bioassessment") [1]. Nevertheless, in light of the stated limitations of these latter techniques, with regard to identifying causative agents and predicting future changes [1], considerable caution is warranted in using such information (particularly ecological data), to make inferences about the adequacy of particular numeric criteria.

The water-effect ratio is affected not only by speciation among the various dissolved and particulate forms, but also by additive, synergistic, and antagonistic effects of other materials in the affected site waters. As such, the water-effect ratio is a much more comprehensive measure than a ratio of total recoverable metal to dissolved metal. Because the basic technique involves adding soluble metal salts to site water samples, it is most accurate where rapid sorption or complexation processes are involved.

Because effluent limits are generally expressed as total recoverable metal, simplicity would suggest deriving water-effect ratios in terms of total recoverable measurements. Derivation in terms of dissolved measurements is also acceptable, and may be preferred in situations involving highly variable suspended solids concentrations.

Data available from a limited number of site-specific studies performed in rather clean fresh water suggest that copper, lead, and cadmium often have substantial water-effect ratios, while zinc, in situations where it is predominantly dissolved, often does not [10]. Much less information is available for such ratios in salt water.

Relationship with Sediment Criteria

For national or state-wide criteria expressed as dissolved or total recoverable metal, and for site-specific criteria derived from water-effect ratios, questions may be raised about the adequacy of water column criteria for protecting sediment.

The issue is whether particulate metal settling from the water column could contribute to sediment quality problems, even where no toxicity is manifested in the water column.

Because sediment toxicity is considered to be determined primarily by the concentrations of pollutant dissolved in the sediment interstitial water, the question becomes whether the pollutant would have a greater propensity to become dissolved or bioavailable in the sediment than in the water column. While available information does not suggest that this is ordinarily the case, the ongoing development of sediment criteria should resolve this issue. Nevertheless, in those cases where the beneficial uses of a receiving water are known to be impaired by the toxicity of metals in sediments, water quality-based control requirements should be designed to abate any sources that would continue to cause sediment toxicity.

Current Technical Support and Future Research

The Environmental Research Laboratories in Duluth and in Narragansett will continue to answer technical questions about the possible problems in applying the above methods to criteria for specific metals. The contact for fresh water is Charles Stephan (Duluth, Minnesota telephone (218) 720-5510). The contact for salt water is Gary Chapman (Newport, Oregon telephone (503) 867-4027).

EPA intends to undertake further work to facilitate the implementation of metals criteria in terms of dissolved measurements. For metals such as copper, silver, zinc, lead, and cadmium, the dependency of toxicity on factors other than hardness will be considered for inclusion. Where appropriate and feasible, EPA may develop equations relating dissolved metal criteria to hardness and organic matter concentration, and possibly pH and other water quality characteristics. EPA might also consider other biological or chemical techniques for ascertaining the effective concentration of bioavailable metals.

APPENDIX A

Case Study

Determination of the Water-Effect Ratio Using Indicator Species

Norwalk River Georgetown, Connecticut*

Introduction

Connecticut's Upper Norwalk watershed, where this study was conducted, covers an area of 18.5 square miles and includes the region extending from the headwaters of the Norwalk River to its confluence with Comstock Brook.

Two secondary treatment plants discharge a total of 0.44 mgd of municipal wastewater to a reach 9-14 stream miles upstream of the study site. An area of failed septic systems in the same upstream vicinity also contributes to the pollutant loading of the river.

Although water quality is degraded somewhat in the immediate vicinity of these municipal pollutant sources, as the river flows southward towards Long Island Sound, it recovers to support a valuable recreational trout fishery. There are no industrial point source discharges of metals upstream of the study area.

Within the study area itself, the Gilbert and Bennett Manufacturing Company discharges treated process water to the Norwalk River at a point below Factory Pond in Georgetown, Connecticut. Gilbert and Bennett cleans, draws, and coats metal wire. Wastewater is primarily generated during the wire cleaning process. The wastewater treatment system of the facility consists of pH neutralization and equalization followed by precipitation and clarification of the effluent before discharge to the river. The treated wastewater is discharged intermittently to the river.

The Connecticut Department of Environmental Protection undertook the study of the Norwalk River site because the Gilbert and Bennett metal loadings were calculated to result in excursions of national water quality criteria for lead and zinc under design flow conditions. In order to evaluate the effect of site water on

* Adapted from the 1983 Water Quality Standards Handbook [8] for purposes of illustrating an application.

the toxicity of lead and zinc, EPA and the State used the indicator species (water-effect ratio) protocol.

By testing a sensitive invertebrate and a fish in both site and reconstituted laboratory dilution water, the water-effect ratio procedure accounts for differences in bioavailability and effective toxicity of a pollutant in the two waters. The procedure responds to the summation of all synergistic and antagonistic effects of site water quality characteristics (including pH, hardness, particulate matter, dissolved organic matter, and other contaminants). The procedure does not, however, elucidate factors causing the difference in toxicity.

A water-effect ratio is the ratio of a species LC50 in site water versus its LC50 in laboratory dilution water. The 1983 Water Quality Standards Handbook recommends that two relatively sensitive indicator species be tested, and that the geometric mean of the two results be used. The site-specific criterion would be calculated as the product of the national criterion and the water-effect ratio.

Analyses Conducted

The results from the testing of metals toxicity in laboratory and site water forms the primary basis for the site-specific criteria. To provide additional information, the monitoring of ambient water chemistry, surveying of macro-invertebrates, and testing of whole effluent toxicity were also performed.

Chemical and Ecological Monitoring

Concentrations of several metals were measured in composite samples taken at each of four ambient stations and in grab samples of the Gilbert and Bennett main effluent. One ambient station was in the upstream control zone, two in the impact zone, and one in the recovery zone.

Benthic populations were sampled at five locations to assess the impact of the discharge on the stream community. One reference station was located in the upstream control zone. Three stations were in the Bennett and Gilbert impact zone, and one was in the recovery zone. Physical substrate, stream velocity, and water depth were similar at each location. Four Surber samples were collected at each of the five locations. Organisms were sorted in the field, preserved in 70% ethanol and returned to the laboratory for identification and enumeration.

Toxicity Testing

Norwalk River water was withdrawn from a station upstream of Gilbert and Bennett and transported (along with the effluent samples) back to the laboratory. Toxicity tests were conducted in the sampled river water and in reconstituted

water, with differing amounts of either lead or zinc added, in order to determine the LC50. Whole toxicity testing of one of the Gilbert and Bennett effluents was also performed, using both upstream Norwalk River water and reconstituted water for dilution.

Because the lead and zinc toxicity tests were run using upstream water, they do not indicate the effects of synergism, antagonism, or toxicant additivity with constituents of the Gilbert and Bennett effluent. Although this guidance recommends use of downstream water for at least one sample, the case study predates the guidance and does not follow this recommendation.

Ninety-six hour acute toxicity tests (static with measured concentrations of toxicant) were conducted with laboratory reared rainbow trout (*Oncorhynchus mykiss*, formerly *Salmo gairdneri*) and 48-hour acute toxicity tests (static with measured concentrations) were conducted with laboratory reared *Daphnia magna*.

Findings

Water Chemistry and Ecological Quality

Mean instream concentrations of lead, zinc, and cadmium were higher in the impact and recovery zones than in the control zone. Levels of cadmium and copper appeared to exceed national acute criteria at all sampling locations both upstream and downstream of Gilbert and Bennett.

It should be noted that the metals data were generated using the sample handling and analytical protocols of the early 1980s, rather than more recent protocols emphasizing ultra-clean techniques. While the link between chemical quality and ecological quality is of great interest, it is not clear that these ambient metals data are sufficiently reliable to be used in such comparisons. If the ambient metals concentrations were reliably known, such information would be most useful for comparing concentrations in the control, impact, and recovery zones with the criteria derived from the water-effect ratio.

At the upstream reference location, 889 organisms from 44 taxa were collected. Most of the species collected could be classified as sensitive or facultative with respect to pollution tolerance. Species diversity was high (Shannon Diversity index of 3.4) indicating acceptable water quality and aquatic habitat.

At the three near downstream locations, the number of organisms, number of taxa, and diversity were reduced significantly. At some of the impact zone stations the number of organisms was less than one-fourth, and number of taxa one-third that of the reference site. The Shannon index registered as low as 1.0.

At the recovery zone station (500 m downstream from the discharge), a larger number of organisms were found than at any of the other stations, including the upstream reference site. Diversity and numbers of taxa, however, remained at levels more characteristic of the impacted stations.

The ecological assessment demonstrated that the ecology of the Norwaik River was impaired, and strongly suggested that some type of pollutant release from Gilbert and Bennett was involved in the impairment. However, as noted in the Technical Support Document [1], ecological assessments cannot identify the causative agents, and generally do not predict the ecological quality as a function of chemical-specific concentrations. Consequently, these ecological data do not indicate the appropriateness of particular values for the water-effect ratio.

Toxicity Testing with Lead and Zinc

Table A-1 shows the results of static toxicity tests with daphnids and rainbow trout exposed to lead and zinc, in river water and in laboratory water.

Table A-1: Toxicity of lead and zinc in Norwaik River water and in laboratory water.

	Daphnia magna		Rainbow trout	
	48-hr LC50, $\mu\text{g/L}$ (95% confid lim)	Wtr-Efct Ratio	96-hr LC50, $\mu\text{g/L}$ (95% confid lim)	Wtr-Efct Ratio
Lead				
River Water	1300 (950-1900)	2.1	9600 (7500-12000)	3.7
Lab Water	320 (290-360)		2600 (1900-3600)	
Zinc				
River Water	900 (740-1100)	2.3	1500 (1200-1800)	1.5
Lab Water	400 (380-480)		1000 (850-1200)	

The toxicity of both lead and zinc was lower in Norwaik River water than in laboratory water. For both metals, the more sensitive species, *Daphnia magna*, had the higher water-effect ratio. This is consistent with general tendencies observed in other studies [10].

Whole Effluent Toxicity for One Effluent

In unspiked, static toxicity tests in which rainbow trout were exposed to one of the Gilbert and Bennett effluents, the effluent was rendered nontoxic by relatively little dilution of the effluent. As effluent constituted the bulk (60-68%) of the test water at dilutions toxic to half the organisms, it was not surprising that

the whole effluent toxicity tests could not discern differences between toxicity in laboratory and river water. That is, toxicity was much reduced before enough laboratory or river water could be added to the effluent to discern differences between the added water.

The monitored effluent was not sufficiently toxic to daphnids to allow calculation of the dilution lethal to half the organisms. However, to eliminate toxicity to all the tested individuals, significantly more dilution was required with laboratory water than with river water. This suggests that this effluent may be less toxic in Norwalk River water than in laboratory water.

If the lead and zinc concentrations had been measured during the whole effluent toxicity tests, it would be possible to compare effect concentrations with the lead and zinc LC50 values shown in the previous section. In making such comparisons, however, it must be recognized that the cause of toxicity of the effluent is not known.

Finally, it should be noted that the tested effluent is only one of Gilbert and Bennett's releases to the Norwalk River. There is no disparity between the observed significant instream impacts and the relatively low toxicity of the one monitored effluent. The ecological assessment suggested that the unmonitored release was more toxic than the monitored one.

Calculation of the Site-Specific Criteria

The water-effect ratios for lead and zinc differed relatively little between species. If the overall water-effect ratio for each metal were calculated from the geometric mean of the species water-effect ratios, then the water-effect ratio for lead would be 3.9, and that for zinc would be 1.9.

It is assumed that the water-effect ratio would apply to both the acute and the chronic criteria. As the national criteria for lead and zinc are hardness dependent, for purposes of determining the value of the site-specific criteria during the survey period, it is appropriate to calculate the national criteria at the hardness of the laboratory reconstituted water, if different from the site water. The site-specific acute and chronic criteria for each metal would equal the national (or state-wide) criteria multiplied by the water-effect ratio for each metal.

Because all of the above toxicity tests and water-effect ratios were based on total recoverable metal, the resulting site-specific criteria would also be expressed as total recoverable metal.

When the site-specific criteria were used to calculate effluent limits, it was found that large reductions in current metals loadings would be required. This result is not surprising, considering the ecological effects observed downstream.

APPENDIX B

Derivation of Effluent Limits from Ambient Metals Criteria

The determination of the waste loads and effluent limits that allow attainment of water quality criteria is described in other EPA guidance [1, 11, 12]. The Waste Load Allocation Guidance Manuals [11, 12] are particularly suited to predicting far-field dissolved and total recoverable concentrations, such as would be necessary for evaluating watersheds with multiple dischargers. The Technical Support Document (TSD) [1] has additional guidance on the evaluation of mixing zones and the derivation of permit limits. Nevertheless, some additional discussion is provided below. This guidance supersedes the second paragraph of Section 5.7.3 "Metals" of the TSD [1].

Total Recoverable Metal Criteria

Expressing state-wide or site-specific criteria as total recoverable metal has the advantage of providing a simple basis for calculating effluent limits. All of the effluent total recoverable metal would contribute to the ambient total recoverable concentration.

Dissolved Metal Criteria

If criteria are expressed as dissolved metal, then it is necessary to establish what fraction of the effluent total recoverable metal contributes to the ambient dissolved metal.

Three alternatives may be considered for relating the ambient dissolved criterion for a specific metal to the effluent total recoverable limits: (a) directly measure dissolved and total recoverable metal in the receiving water, (b) assign environmentally conservative default values for the assumed ratio between dissolved and total recoverable metal, and (c) predict the percentage dissolved metal from a geochemical model such as MINTEQ.

Regardless of which alternative is used, it must be recognized that the goal is to set the effluent limit at a value such that the ambient water quality standard will be attained. In addition, compliance with regulatory requirements for technology based limits, antidegradation, and antibacksliding is necessary.

Using Site-Specific Measurements

The concept is to measure the dissolved-total ratio for the particular metal in the receiving water affected by the discharger. Because the chemical properties of an effluent (particularly an industrial effluent) may be much different than the chemical properties of the receiving water below the discharger, it is appropriate to measure the ratio in the receiving water rather than in the effluent. As an approximation, it may be assumed that the measured dissolved-total metal ratio in the affected waters reflects the fraction of effluent total recoverable metal that remains or becomes dissolved in ambient water.

Samples on which measurements are made should be representative of the bulk of the receiving water. It is recommended that sampling be performed over a period of time, with samples representing the usual range of effluent and ambient quality, while emphasizing the season corresponding to the critical water quality conditions. Because the control strategy assumes that the dissolved concentration is related to the total recoverable concentration, it would be appropriate to verify that the dissolved and total recoverable concentrations are in fact correlated.

In fresh waters, an alternative approach to downstream sampling is to sample the effluent and the upstream waters and mix samples at an appropriate dilution. The dilution and the seasons for sampling should be related to the critical conditions, although it may be appropriate to reduce the dilution if necessary to detect and quantify the metal.

The most important constraint on the feasibility of carrying out site-specific measurements is the capability of analytical laboratories to detect and accurately quantify both the dissolved and total recoverable metal. Graphite furnace (flameless) atomic absorption AA techniques are usually needed. Furthermore, great care is needed to prevent external contamination of samples. The EPA and USGS recommended sample handling methods, commonly used, may produce inaccurate results when judged against newer techniques that emphasize highly purified reagents, Teflon and polyethylene labware, and clean laboratory environments [7, 13].

The high degree of imprecision of metals measurements tends to result in overstatement of the true variability of the dissolved-total ratio. As a result, unless a mean or median observed ratio is used, it may be necessary to compensate for the effect of measurement imprecision (by subtracting out the measurement imprecision variance).

In order to provide some sense of the general magnitude of typically observed dissolved-total metals ratios, data from several sources have been compiled in Table B-1. The ambient data underlying the tabulated values are considered to be reasonably reliable.

Table B-1: Observed average fractions of dissolved metals in ambient waters.

Metal	Fresh Water East Coast [7]	Salt Water NY-NJ Harbor Area [13]		Fresh and Salt Water STORET (a)
		Near Surface	Near Bottom	
Aluminum				0.07 (e)
Cadmium	0.40	0.81 (b)	0.56 (c)	
Copper	0.62	0.50 (c)	0.23 (d)	0.4 (f)
Lead	0.10	0.08 (c)	0.03 (d)	
Nickel		0.73 (c)	0.41 (d)	0.6
Silver		0.11 (c)	0.08 (c)	
Zinc	0.20	0.60 (d)	0.29 (d)	

- (a) For STORET data, means were estimated from cumulative distributions of concentrations, 1984-1990, in ambient streams, rivers, canals, lakes, reservoirs, and estuaries, for samples in which both dissolved and total recoverable metal were analyzed. The fraction dissolved for STORET data for cadmium, lead, silver, and zinc are not tabulated because most of these data are believed to be seriously compromised by external contamination of samples.
- (b) Dissolved and total recoverable concentrations well correlated.
- (c) Dissolved and total recoverable concentrations somewhat correlated.
- (d) Dissolved and total recoverable concentrations not correlated.
- (e) For any particular measurement of aluminum, the method of filtration may strongly affect the result.
- (f) For much of the STORET copper data, external contamination of samples is likely to somewhat affect the absolute values of the measured concentrations, and may somewhat affect the dissolved-total ratio.

Using Environmentally Conservative Default Values

This option is best applied as the first tier of a tiered approach, where the second tier involves site-specific measurements. In this type of framework the default (first-tier) percentage dissolved might be set at a reasonable worst-case value.

One possible worst-case assumption is that 100 percent of the effluent total recoverable metal will become dissolved in the receiving water. Such an assumption may be particularly appropriate for a metal such as mercury, for which there are substantial uncertainties regarding long term processes converting inorganic (including particulate) mercury into bioaccumulative methyl mercury. Where the background metal concentration is either negligible or entirely dissolved, and where the dissolved criterion is less than the corresponding total recoverable criterion, the assumption that all effluent total recoverable metal will become dissolved yields more restrictive limits than simply implementing a total recoverable criterion.

Other environmentally conservative default values may also be developed based on available information. Such values may differ in different parts of the country, due to variations in water quality characteristics.

Using a Geochemical Model

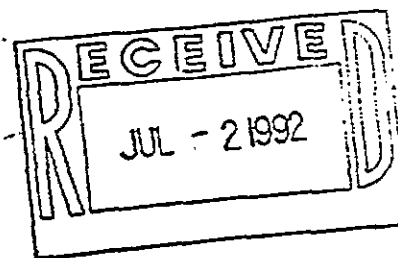
The equilibrium metal speciation model MINTEQ may offer assistance in understanding or predicting the fraction dissolved (14). Using MINTEQ without obtaining site-specific input data may not be feasible, however. As the effort in obtaining the appropriate input data would likely be equivalent to simply measuring the site-specific fraction dissolved, the model may be more useful for providing insight into the controlling factors and predicting the effects of different environmental conditions. MINTEQ may be particularly useful for predicting whether the dissolved concentration will respond to reductions in the total concentration or whether it is controlled by factors such as solubility.

REFERENCES

1. U.S. Environmental Protection Agency. 1991. Technical Support Document of Water Quality-based Toxics Control. Office of Water, Washington, DC. EPA/505/2-90-001. P891-127415.
2. Stephan, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman, and W.A. Brungs. 1985. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. U.S. EPA, Office of Research and Development. PB85-227049. NTIS, Springfield, VA.
3. U.S. Environmental Protection Agency. 1983. Methods for Chemical Analysis of Water and Wastes. Environmental Monitoring and Support Laboratory, Cincinnati, OH. EPA-600/4-79-020. Sections 4.1.1, 4.1.3, and 4.1.4.
4. Martin, T.D., J.W. O'Dell, E.R. Martin, and G.D. McKee. 1986. Evaluation of Method 200.1 Determination of Acid Soluble Metals. U.S. EPA, Env. Monitoring and Support Lab, Cincinnati, OH.
5. U.S. Environmental Protection Agency. 1991. Methods for the Determination of Metals in Environmental Samples. Environmental Monitoring Systems Laboratory, Cincinnati, OH 45268. EPA-600/4-91-010.
6. Puls, R.W., and M.J. Barcelona. 1989. Ground Water Sampling for Metals Analyses. EPA Superfund Ground Water Issue. U.S. EPA, Office of Research and Development. EPA/540/4-89/001.
7. Windom, H.L., J.T. Byrd, R.G. Smith, and F. Huan. 1991. Inadequacy of NASQAN Data for Assessing Metals Trends in the Nation's Rivers. *Environ. Sci. Technol.* 25, 1137. (Also see Comment and Response, Vol. 25, p. 1940.)
8. U.S. Environmental Protection Agency. 1983. Water Quality Standards Handbook. Office of Water Regulations and Standards. Washington, DC.
9. Carlson, A.R., W.A. Brungs, G.A. Chapman, and D.J. Hansen. 1984. Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria. U.S. EPA, Environmental Research Laboratory - Duluth. EPA-600/3-84-099. PB85-121101.
10. Brungs, W.A., T.S. Holderman, and M.T. Southerland. 1992. Synopsis of Water-Effect Ratios for Heavy Metals as Derived for Site-Specific Water Quality Criteria. Draft. U.S. EPA Contract 68-CO-3070.
11. Delos, C.G., W.L. Richardson, J.V. DePinto, R.B. Amorose, P.W. Rodgers, K. Rygwelski, J.P. St. John, W.J. Shaughnessy, T.A. Faha, and W.N. Christie. 1984. Technical Guidance Manual for Performing Waste Load Allocations. Book II Streams and Rivers. Chapter 3 Toxic Substances. U.S. EPA, OWRS, Washington, DC. EPA-440/4-84-022.
12. HydroQual, Inc. 1986. Technical Guidance Manual for Performing Waste Load Allocations. Book IV Lakes, Reservoirs, and Impoundments. Chapter 3 Toxic Substances. U.S. EPA, OWRS, Washington, DC. EPA-440/4-87-002.
13. Battelle Ocean Sciences. 1992. Evaluation of Trace-Metal Levels in Ambient Waters and Tributaries to New York/New Jersey Harbor for Waste Load Allocation. U.S. EPA, Office of Wetlands, Oceans, and Watersheds, and Region II. Contract No. 68-C8-0105.
14. Brown, D.S., and J.D. Allison. 1987. MINTEQA1, An Equilibrium Metal Speciation Model: User's Manual. U.S. EPA, Environmental Research Laboratory, Athens, GA. EPA/600/3-87-012.

MENZIE • CURA & ASSOCIATES, INC.

Environmental Consultants
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MASSACHUSETTS 01824
(508) 453-4300
FAX (508) 453-7260



June 19, 1992

Here, for your information, is a copy of the slide package used by EPA to describe the status of the new Sediment Strategy. The strategy is an important initiative within EPA and will be used as a framework for preventing sediment contamination (e.g., through modification of NPDES permits and non-point source controls), assessing contamination (through testing and development of criteria), and sediment management/remediation. An important element of the strategy is that it allows for natural restoration where it makes sense.

Certain classes of chemicals are likely to be most "affected" by the strategy. These include compounds that are persistent in aquatic environments and become associated with the sediment. Familiar examples include: polynuclear aromatic hydrocarbons (PAHs), PCBs, chlorinated pesticides, and many metals.

Please give me a call if you would like more information or would like to discuss how the strategy is likely to evolve.

Charlie

VR680-21-01.16 Standards for Surface Water

A. Instream water quality conditions shall not be acutely or chronically toxic except for toxicity as allowed for in VR680-21-01.2.C (mixing zones). The following are definitions of acute and chronic toxicity conditions.

Acute Toxicity means an adverse effect that usually occurs shortly after the introduction of a pollutant. Lethality to an organism is the usual measure of acute toxicity. Where death is not easily detected immobilization is considered equivalent to death.

Chronic Toxicity means an adverse effect that is irreversible or progressive or occurs because the rate of injury is greater than the rate of repair during prolonged exposure to a pollutant. This includes low level, long-term effects such as reduction in growth or reproduction.

B. The following table is a list of numerical water quality standards for specific parameters.

1. For those waters with multiple designated beneficial uses, the most stringent standards in the following table shall apply.
2. When information has become available from the Environmental Protection Agency to calculate additional aquatic life or human health standards not contained in the table the Board may employ these values in establishing effluent limitations or other limitations pursuant to the General Standard in VR680-21-01.2 necessary to protect the beneficial uses until the Board has completed the regulatory standards adoption process.

Table of Parameters

SUBSTANCE	AQUATIC LIFE			HUMAN HEALTH	
	ACUTE ² ug/l	FRESHWATER CHRONIC ³ ug/l	SALTWATER ACUTE ² ug/l	PUBLIC WATER SUPPLIES ⁴ ug/l	ALL OTHER SURFACE WATERS ⁵ ug/l
Aldrin c	3.0	0.3	1.3	0.013	0.0014
Keponin	See Table 1	See Table 2	See Tables 3 and 4		
Anthracene				9,600	110,000
Arsenic				50	
Arsenic III	360	190	69	36	2,000
Barium					
Benzene c				12	710

W6680-21-01-14-a continued...

SUBSTANCE	ACQUATIC LIFE		HUMAN HEALTH		ALL OTHER SURFACE WATERS
	ACQUATIC LIFE	ACQUATIC LIFE	PUBLIC WATER SUPPLIES	PUBLIC WATER SUPPLIES	
	1	2	3	3	5
	ug/l	ug/l	ug/l	ug/l	ug/l
Benzo(a)anthracene c				0.028	0.311
Benzo(b)fluoranthene c				0.028	0.311
Benzo(k)fluoranthene c				0.028	0.311
Benzo(a)pyrene c				0.028	0.311
Bromoform c				44	3,600
Cadmium		$(1.128[\ln(\text{hardness}^*)] - 3.828)$	$(0.7852[\ln(\text{hardness}^*)] - 3.490)$	16	170
Carbon tetrachloride c				2.5	45
Chlordane c		2.4	0.0043	.09	0.0058
Chloride		860,000	230,000		250,000**
Chlorine		See W6680-21-01.11			
Chlorodibromomethane				690	57,000
Chloroform c				57	4,700
Chloromethane c				57	4,700
Chlorpyrifos		0.083	0.041	0.011	0.0056
Chromium III		$(0.8150[\ln(\text{hardness}^*)] + 3.680)$	$(0.8190[\ln(\text{hardness}^*)] + 1.561)$	33,000	670,000
Chromium VI		16	11	1,100	170

WR600-21 16.8 continued...

SUBSTANCE	AQUATIC LIFE		HUMAN HEALTH		ALL OTHER SURFACE WATERS
	ACUTE ² WS/L	CHRONIC ³ WS/L	ACUTE ² WS/L	CHRONIC ³ WS/L	
Chrysene c			0.028	0.311	
Copper	(0.9422 [(in hardness ⁴)-1.445])	(0.8545 [(in hardness ⁴)-1.445])	2.9	1,300	
Cyanide	22	5.2	1.0	1.0	215,000
DNT c	1.1	0.0010	0.15	0.0010	0.0059
Demeton		0.1		0.1	
Dibenz(a,h)anthracene c			0.028	0.311	
Dichloromethane c			47	16,000	
1,2-Dichlorobenzene			2,700	17,000	
1,3-Dichlorobenzene			400	2,600	
1,4-Dichlorobenzene			400	2,600	
Dichlorobromomethane c			3.0	220	
1,2-Dichloroethane c			3.8	990	
(2,4-dichlorophenoxy) acetic acid (2,4-D)			71		
Dieldrin c	2.5	0.0019	0.71	0.0019	0.0014
Di-2-Ethylhexyl Phthalate c			18	59	
2,4-Dinitrotoluene c			1.1	91	

VR680-21-01-14.B continued...

SUBSTANCE	ACUTE		CHRONIC		ACUTE		CHRONIC		PUBLIC WATER SUPPLIES	ALL OTHER SURFACE WATERS
	1	2	1	3	1	3	1	3		
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Dioxin		See VR680-21-01.15								
Dissolved Oxygen		See VR680-21-01.5								
Endosulfan		0.22	0.056		0.034	0.0087	0.93		2.0	
Endrin		0.18	0.0023		0.037	0.0023	0.76		0.81	
Ethylbenzene							3,100		29,000	
Fluoranthene							300		370	
Fluorene							1,300		14,000	
foaming agents (measured as methylene blue active substances)										
Guthion			0.01			0.01				
Heptachlor c		0.52	0.0038		0.053	0.0036	0.0021		0.0021	
Hexachlorocyclohexane (lindane)		2.0	0.080		0.16	0.01	7		25	
Hydrogen Sulfide			2.0			2.0				
Indeno(1,2,3-cd)pyrene c							0.026		0.311	
Iron (soluble)							300**			
Isochlorone							6,900		400,000	
Kapone			zero			zero				

WR660-21-01-14, a continued...

SUBSTANCE	AQUATIC LIFE			HUMAN HEALTH			
	ACUTE ² ug/l	FRESHWATER	CHRONIC ³ ug/l	ACUTE ² ug/l	SALTWATER CHRONIC ³ ug/l	PUBLIC WATER SUPPLIES ⁴ ug/l	ALL OTHER SURFACE WATERS ⁵ ug/l
Lead		(1.273[ln(hardness*)]+1.450)	(1.273[ln(hardness*)]-4.705)	220	8.5	15	
Malachion		0.1			0.1		
Manganese (soluble)						50**	
Mercury d(7)	2.4		0.012	2.1	0.025	0.144	0.146
Methoxychlor			0.03		0.03	60	
Mirex			zero		zero		
Monochlorobenzene						690	21,000
Nickel		(0.8460[ln(hardness*)]+3.3612)	(0.8460[ln(hardness*)]+1.1645)	75	8.3	607	4,583
Nitrate (as N)						10,000	
Parathion	0.065		0.013				
PCB-1242 c			0.014		0.030	0.00044	0.00045
PCB-1254 c			0.014		0.030	0.00044	0.00045
PCB-1221 c			0.014		0.030	0.00044	0.00045
PCB-1232 c			0.014		0.030	0.00044	0.00045
PCB-1248 c			0.014		0.030	0.00044	0.00045
PCB-1260 c			0.014		0.030	0.00044	0.00045

SUBSTANCE ¹	ADULTIC LIFE		HUMAN HEALTH	
	ACUTE ² ug/l	CHRONIC ³ ug/l	ACUTE ² ug/l	CHRONIC ³ ug/l
PCB-1016 c		0.014		0.00044
Pentachlorophenol c	(1.005(pM)-4.830)	(1.005(pM)-5.290)	13	2.8
PM	See VR680-21-01.5			21,000
Phenol				4,600,000
Phosphorus (Elemental)			0.10	
Pyrene				960
Radioactivity	See VR680-21-01.12			11,000
Selenium	20 ³	5.0	300	71
Silver	(1.721(Inhardness))-6.52)		2.3	
Sulfate				250,000**
Temperature	See VR680-21-01.5			
Tetrachloroethylene				318
Toluene				6,800
Total dissolved solids				500,000**
Toxaphene ⁶ c	0.73	0.0002	0.21	0.0002
Trichloroethylene c				0.0073
				27
				807
				0.0075
				200,000
				3,519

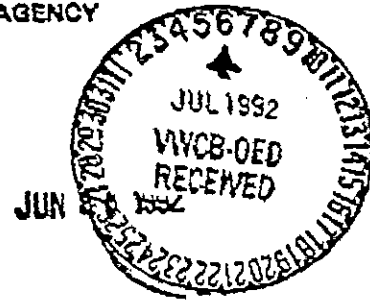
VA680-21-01-14.8 continued...

SUBSTANCE	AQUATIC LIFE		HUMAN HEALTH		ALL OTHER SURFACE WATERS
	ACUTE ² ug/l	CHRONIC ³ ug/l	ACUTE ² ug/l	CHRONIC ³ ug/l	
2,4,6-Trichlorophenol c			21	65	
2-(2,4,5-Trichlorophenoxy)propionic acid (silvex)			50		
Tributyltin			20		5,250
Vinyl chloride c			5,000**		
Zinc			(0.6473(ln(hardness*))+0.8664)	(0.6473(ln(hardness*))+0.7614)	

- 1 Unless specifically listed above, all metals shall be measured as dissolved.
- 2 One hour average concentration not to be exceeded more than once every three years.
- 3 Four day average concentration not to be exceeded more than once every three years.
- 4 Unless otherwise noted, these standards have been calculated to protect human health from toxic effects through drinking water and fish consumption.
- 5 Unless otherwise noted, these standards have been calculated to protect human health from toxic effects through fish consumption.
- 6 Unless otherwise noted, these standards have been calculated to protect wildlife from harmful effects through ingestion of contaminated tissue. However, the standard will also protect aquatic life from toxic effects.
- 7 * Chronic aquatic life standard applies to methyl mercury.
- 8 * Hardness as calcium carbonate mg/L CaCO₃. The minimum hardness allowed for use in this equation shall not be less than 25 mg/L, as calcium carbonate, even if the actual ambient hardness is less than 25 mg/L as calcium carbonate. The maximum hardness value for use in this equation shall not exceed 400 mg/L as calcium carbonate, even if the actual ambient hardness is greater than 400 mg/L as calcium carbonate.
- ** To maintain acceptable taste, odor or aesthetic quality of drinking water.
- c * Known or suspected carcinogen, human health standards are for a risk level of 10⁻⁵.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION III
 841 Chestnut Building
 Philadelphia, Pennsylvania 19107



Mr. Richard N. Burton
 Executive Director
 Virginia State Water Control Board
 4900 Cox Road
 Glen Allen, VA 23060

Dear Mr. Burton:

The Environmental Protection Agency (EPA) has completed its review of the revisions to Section VR-680-21-01.14.B Table of Parameters of Virginia's Water Quality Standards. These regulations were a part of the amendments adopted by the State Water Control Board (Board) on March 30, 1992 and which became effective on May 20, 1992.

EPA has conducted its review of this section of the water quality standards regulations pursuant to Sections 303(c)(1) and 303(c)(2)(B) of the Clean Water Act (CWA) in conjunction with supporting documentation from the Board including, but not limited to correspondence from the Board to Dr. Alvin Morris dated March 17, 1992, March 25, 1992 and May 8, 1992. This correspondence provided, among other things, the Board's decision criteria for selection of pollutants, the basis for the numeric standards and the choice of risk level for carcinogenic pollutants. On the basis of this documentation, EPA is approving Section VR-680-21-01.14.B of the amended regulations.

EPA reserves the right to continue its review of all other water quality standards and amendments adopted by the Board on March 30, 1992, pursuant to Section 303(c)(1) of the CWA.

If you have any questions please call me or have your staff contact Kathleen Stager at (215) 597-0414.

Sincerely,

Edwin B. Erickson
 Regional Administrator

Attachment 3

STATE WATER CONTROL BOARD

CHEMICAL TRANSLATOR

Summary

demonstrate that a specific ratio between total dissolved metals exists in their discharge by an effluent samples mixed with stream dilution procedures (please note that a proposed permit to the regional office of the State Water Control Board prior to undertaking the study):

1 suspended solids (TSS) and freshwater pH data. At least 20 data points for TSS and pH must be collected over at least one year and are evenly throughout the four seasons. To get this permittee should evaluate data contained in STORET. If STORET is utilized to access this data contained in STORET for at least the last 5 years searched. If there is no STORET information or STORET data from a similar area stream may be used. If there is no STORET data from that stream or a similar permittee may have to generate this data or other sources. Determine the concentration of the 10th percentile and the pH at the 10th percentile. Adjusted value at total % of data points (n) X .25 or more no data to determine the ambient pH level, sample (see #3 below) will be adjusted to 6.0 OR if a natural pH of the stream may be used. Marine or estuarine must be pH 8.0.

sample (composite or grab depending on permit location) upstream (grab) concurrently. Samples will be taken downstream of the discharge at the edge of the mixing area. Samples may be mixtures of effluent and stream water representative of those conditions. This is the design flow of a municipal plant or the design flow of an industrial plant and the appropriate critical flow to calculate the wasteload allocation. If the 7Q10 flow is used, only 100% effluent shall be sampled. Tidal samples taken outside of the mixing area after complete mixing must submit evidence that mixing is completed at the location.

pH of the mixed sample. At the time of sample collection ambient pH value allowed must be at or below the lower end of the range of ambient pH data as determined in the downstream samples or the effluent/upstream samples adjusted with HCl to match this level. If there is no data to determine the ambient pH level, the pH of the sample must be adjusted to 6.0 OR if any available data indicated the stream was lower than 6.0, the sample must be adjusted to that value. Ambient tidal dilution water. Divide the pH adjusted sample into two aliquots.

1. Aliquot with HNO₃ to filter the sample to a pH of <

2. Filtered for TSS. 3. Determine the metals concentration for total dissolved metals at the time of representative sample. The sample must be at or below ambient TSS level at the time to determine

4. Adjusted in accordance with 40 CFR 136.

5. Determine detection limits

6. Adjusted as preferred. The actual value depends on the method used to determine confidence level.

Chemical Translator

Page 3

8. All containers, filter apparatus and filters must be acid washed, rinsed first with deionized water and then sample water before use. The samples must be preserved in an opaque polypropylene or polyethylene bottle.

9. Proper sampling QA/QC must be adhered to; equipment blanks and container blanks must be incorporated into the sampling regime. At least 10-15% of the samples sent to the lab must be combination of QA/QC blanks.

10. All analytical and sampling QA/QC information must be submitted with the test results.

11. The final permit limit shall be multiplied by the final ratio (total recoverable/dissolved) and that value shall be the new translated permit limit. The permit limit shall be expressed as "total recoverable".

12. Any significant change in a production process or the characteristics of the discharge would necessitate a new chemical translator (total recoverable/dissolved ratio).

EXAMPLE:
 CHEMICAL TRANSLATOR
 CALCULATION OF A TOTAL RECOVERABLE/DISSOLVED RATIO

Sample	Total Recoverable	Dissolved
1	3.0	1.63
2	4.0	2.0
3	3.0	1.66
4	5.0	1.72
5	2.0	1.24
6	5.0	2.19
7	2.0	1.28
8	6.0	1.86
9	6.0	2.05
10	4.0	1.64

$n = 10$ \bar{x} (mean) = 4.0 $\bar{y} = 1.73$

sd (standard deviation) = 1.49 sd = .31

$\nu = n - 1 = 10 - 1 = 9$ (degrees of freedom)
 $\alpha = .05$ (rejection level)
 $t = 2.262$ (see attached t table using ν and α above)

Total Recoverable 95% interval around the population mean =

$$\bar{x} \pm (t) \left(\frac{sd}{\sqrt{n}} \right) =$$

$$4.0 \pm (2.262) \left(\frac{1.49}{\sqrt{10}} \right) = 4.0 \pm 1.07$$

Total Recoverable lower 95% limit = $4.0 - 1.07 = 2.93$ (2.93 is the numerator in the total recoverable/dissolved ratio).

Dissolved 95% interval around the population mean =

$$\bar{y} \pm (t) \left(\frac{sd}{\sqrt{n}} \right) =$$

$$1.73 \pm (2.262) \left(\frac{.31}{\sqrt{10}} \right) = 1.73 \pm .22$$

Dissolved lower 95% limit = $1.73 - .22 = 1.51$ (1.51 is the denominator in the total recoverable/dissolved ratio).

RATIO WITH 10 SAMPLES = $2.93/1.51 = 1.94$

If the permittee added 5 data points (5 more samples to improve variability and precision) then,

Sample	Total Recoverable	Dissolved
11	5.0	1.79
12	4.0	2.16
13	5.0	2.0
14	3.0	1.58
15	6.0	2.0

$n = 15$ \bar{x} (mean) = 4.2 $\bar{x} = 1.79$

sd (standard deviation) = 1.37 sd = .29

$\sqrt{\alpha}$
 t (degrees of freedom) = 15 - 1 = 14
 (rejection level) = .05
 (see attached t table) = 2.144

Total Recoverable 95% interval around the population mean =

$$4.2 \pm (2.144) \left(\frac{1.37}{\sqrt{15}} \right) = 4.2 \pm .76$$

Total Recoverable lower 95% limit = 4.2 - .76 = 3.44 (3.44 is the numerator in the total recoverable/dissolved ratio).

Dissolved 95% interval around the population mean =

$$1.79 \pm (2.144) \left(\frac{.29}{\sqrt{15}} \right) = 1.79 \pm .16$$

Dissolved lower 95% limit = 1.79 - .16 = 1.63 (1.63 is the denominator in the total recoverable/dissolved ratio).

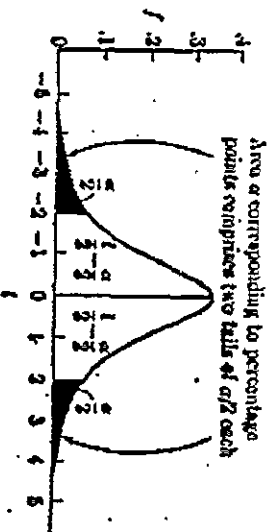
RATIO WITH 15 SAMPLES = 3.44/1.63 = 2.11

TABLE Q. Critical values of Student's *t*-distribution.

<i>n</i>	<i>p</i> α 0.9	0.5	0.4	0.2	0.1
1	.158	1.000	1.376	3.078	6.314
2	.142	.816	1.061	1.886	2.920
3	.137	.765	.978	1.638	2.353
4	.134	.741	.941	1.533	2.015
5	.132	.727	.920	1.447	1.801
6	.131	.718	.906	1.440	1.743
7	.130	.711	.896	1.415	1.699
8	.130	.706	.889	1.397	1.660
9	.129	.703	.883	1.383	1.633
10	.129	.700	.879	1.372	1.612
11	.129	.697	.876	1.363	1.596
12	.128	.695	.873	1.356	1.582
13	.128	.694	.870	1.350	1.571
14	.128	.692	.868	1.345	1.561
15	.128	.691	.866	1.341	1.553
16	.128	.690	.865	1.337	1.546
17	.128	.689	.863	1.333	1.540
18	.127	.688	.862	1.330	1.534
19	.127	.688	.861	1.328	1.529
20	.127	.687	.860	1.325	1.525
21	.127	.686	.859	1.323	1.521
22	.127	.686	.858	1.321	1.517
23	.127	.685	.858	1.319	1.514
24	.127	.685	.857	1.318	1.511
25	.127	.684	.856	1.316	1.508
26	.127	.684	.856	1.315	1.506
27	.127	.684	.855	1.314	1.503
28	.127	.683	.855	1.313	1.501
29	.127	.683	.854	1.311	1.499
30	.127	.683	.854	1.310	1.497
40	.126	.681	.851	1.303	1.484
60	.126	.679	.848	1.296	1.471
120	.126	.674	.845	1.289	1.458
∞	.126	.674	.842	1.282	1.445

From: Rohlf F.J. and Sokal R.R. Statistical Tables. 1969.

<i>n</i>	0.05	0.02	0.01	0.001	<i>p</i> α
1	12.706	31.821	63.657	636.619	1
2	4.303	6.965	9.925	31.598	2
3	2.182	4.541	5.841	12.924	3
4	2.076	4.177	4.604	8.610	4
5	2.057	3.965	4.032	6.859	5
6	2.047	3.843	3.707	5.959	6
7	2.036	3.765	3.499	5.408	7
8	2.030	3.706	3.355	5.041	8
9	2.026	3.652	3.250	4.781	9
10	2.022	3.604	3.169	4.587	10
11	2.020	3.561	3.106	4.437	11
12	2.017	3.521	3.055	4.318	12
13	2.016	3.482	3.012	4.221	13
14	2.014	3.446	2.977	4.140	14
15	2.013	3.413	2.947	4.073	15
16	2.012	3.383	2.921	4.015	16
17	2.011	3.356	2.898	3.965	17
18	2.010	3.332	2.878	3.922	18
19	2.009	3.310	2.861	3.883	19
20	2.008	3.289	2.845	3.850	20
21	2.008	3.270	2.831	3.819	21
22	2.007	3.252	2.819	3.792	22
23	2.006	3.236	2.807	3.767	23
24	2.006	3.221	2.797	3.745	24
25	2.005	3.207	2.787	3.725	25
26	2.005	3.194	2.779	3.707	26
27	2.005	3.182	2.771	3.690	27
28	2.004	3.171	2.765	3.674	28
29	2.004	3.161	2.756	3.659	29
30	2.004	3.152	2.750	3.646	30
40	2.021	3.023	2.704	3.591	40
60	2.000	2.890	2.660	3.460	60
120	1.980	2.818	2.617	3.373	120
∞	1.960	2.576	2.576	3.291	∞



Appalachian Power Co
PO Box 2021
Roanoke, VA 24022-2121
703 985 2300



Mr. David E. Samuel, Ph.D.
Chairman, West Virginia
Environmental Quality Board
1615 Washington Street, Suite 301
Charleston, West Virginia 25311-2126

RECEIVED

JUL 15 1994

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

July 13, 1994

Dear Dr. Samuel:

This letter is in response to the June 1, 1994 Public Notice issued by the Environmental Quality Board regarding the Board's interest in obtaining comment regarding proposed changes to the West Virginia Water Quality Standards (46 CSR Series 1). On behalf of Appalachian Power Company, I would like to express our appreciation for this opportunity. Attached to this letter are the comments of Appalachian Power Company regarding this proposal. We hope that these comments will aid the Board in its efforts.

Once again, we appreciate the opportunity to offer these comments and will be happy to expand on the issues raised or aid the Board in other ways in its endeavors.

Sincerely,

A handwritten signature in cursive script that reads 'Robert J. Robinson'.

Robert J. Robinson
Environmental Affairs Director

RJR:d
Attachment

(Faxed to the Environmental Quality Board on 7/13/94)

APPALACHIAN POWER COMPANY
COMMENTS ON THE PROPOSED REVISIONS
TO THE WEST VIRGINIA WATER QUALITY STANDARDS

RECEIVED

394

ENVIRONMENTAL QUALITY BOARD
CHARLESTON, WEST VIRGINIA

1. Comment: The proposed chronic criterion for aluminum of 87 ug/L is not appropriate for the B1, B3, and B4 uses. All of the aluminum criteria should be regulated in the dissolved form.

Rationale: In deriving the chronic criterion for aluminum, U.S. EPA, in "Ambient Water Quality Criteria for Aluminum - 1988" (EPA 440/5-86-008), made a decision to lower the calculated chronic criterion of 748 ug/L to 87 ug/L to protect brook trout and recently hatched striped bass, based on data contained in two separate studies. Based on this information, 87 ug/L may be appropriate for protection of the B2 use, but not for the remaining aquatic life uses. No special consideration is necessary for the protection of striped bass, since reproducing populations do not occur in West Virginia waters. The striped bass study mentioned above ("Influence of pH on the toxicity of aluminum and other inorganic contaminants to east coast striped bass", D. R. Buckler et al., Water, Air, and Soil Pollution, vol. 35, pages 97-106, 1987) demonstrated that older stripe bass were not affected by aluminum concentrations of 390 ug/L (the highest concentration tested). A more appropriate chronic criterion for warmwater aquatic life in West Virginia would be U.S. EPA's final chronic value, calculated using all available toxicity data, of 748ug/L (rounded to two significant digits = 750 ug/L).

In addition, Tables 1 and 2 show that the Ohio and Kanawha Rivers greatly exceed the proposed chronic and acute aluminum criteria on an almost continuous basis when measured as total recoverable metal. This is related to the fact that aluminum is less soluble at circumneutral pH than it is in either acidic or alkaline waters. Because of this, and the abundance of aluminum in nature, large amounts of aluminum are carried in natural surface waters that are not bioavailable to aquatic organisms. To address this situation, the criteria, to be useful, should be written as dissolved metal (see comment #4).

Recommendation: a) change the chronic aluminum criterion for the B1, B3, and B4 uses to 750 ug/L; and b) specify that the aluminum criteria refer to the dissolved form of the metal.

2. Comment: The human health criteria for arsenic of 0.018 ug/L (Category C) and 0.14 ug/L (Category A) are not scientifically sound.

Rationale: U.S. EPA is currently engaged in revising its methodology for deriving human health criteria. In August 1993, U.S. EPA's Science Advisory Board (SAB) submitted a review of this ongoing revision, and pointed out numerous deficiencies in the existing approach. Of particular concern with respect to arsenic is U.S. EPA's assumption of a "non-threshold" dose-response relationship in its purported carcinogenic activity, which results in extremely low criteria levels. The SAB recommended in 1989 that U.S. EPA revise its risk assessment for arsenic based on an identified detoxification mechanism at low doses (letter from SAB to William Reilly, September 29, 1989). U.S. EPA has not acted upon this recommendation because it is not yet able to calculate the required revision. However, U.S. EPA certainly recognizes that significant technical deficiencies exist in its human health criteria, as indicated by its withdrawal of criteria for silver, cadmium, chromium, selenium, beryllium, lead, methyl chloride, and 1,1,1-trichloroethane (Fed. Reg. 57: 60848, December 22, 1992). Until valid data are available to support criteria that are 1-2 orders of magnitude below typical surface water concentrations of arsenic, the existing criterion of 50 ug/L should be retained.

As an additional note, the proposed criteria of 0.018 and 0.14 ug/L appear to have been switched: 0.14 ug/L is U.S. EPA's organism-only human health criterion.

Recommendation: Retain the 50 ug/L criterion, to be applied to both use categories A and C.

3. Comment: The human health criterion for beryllium of 0.0076 ug/L should be withdrawn.

Rationale: U.S. EPA has acknowledged that the beryllium criterion of 0.0076 ug/L is not scientifically defensible, and has withdrawn this number while additional consideration is given to whether beryllium in water represents a carcinogenic risk to humans (Fed. Reg. 57: 60886, December 22, 1992). Until valid data are available to support human health criteria for beryllium, the drinking water MCL of 4 ug/L should be used.

Recommendation: Withdraw the 0.0076 ug/L human health criterion for beryllium, and replace it with 4 ug/L.

4. Comment: All trace element criteria should be expressed in the dissolved form.

Rationale: It is now the policy of U.S. EPA to use the dissolved metal form to set and measure compliance with water quality standards (October 1, 1993 memorandum from M. G. Prothro to Water Management and Environmental Services Division Directors). This policy was adopted so that U.S. EPA's aquatic life criteria for metals would more closely approximate the bioavailable fraction of these metals in surface waters, thereby, resulting in much more realistic criteria. In order to translate dissolved criteria into NPDES permit limits, which must be written as total recoverable metal, U.S. EPA states that a dissolved to total recoverable correction factor must be used, and has provided guidance for using either chemical measurements of total and dissolved forms (chemical translator) or effluent and receiving water bioassays (biological translator) to accomplish this correction. Several states have adopted dissolved water quality criteria, along with regulations or guidance establishing the use of translator mechanisms for calculating permit limits.

Recommendation: Specify that metal criteria in the water quality standards pertain to the dissolved form. Guidance for NPDES permit implementation of the dissolved criteria could then specify available U.S. EPA guidance documents or available alternative translator methods, and have the permittees develop the necessary data to establish a correction factor.

5. Comment: The definition of Outstanding National Resource Waters in Section 2.68 is broader in coverage than the corresponding federal definition.

Discussion: The proposed definition includes in this category those waters which constitute "... a valuable national or state resource." (Emphasis added). The federal definition of ONRW at 40 CFR 131.12(a)(3) specifies that those waters that are of national importance are included in this category. The definition does include waters of state parks as probable candidates

for this category, however, the sense of the definition is that state park waters are of national significance. We suggest to the Board that, due to the extremely stringent restrictions that can be applied to ONRWs, it would be more supportive of the Board's ability to maintain flexibility if this category would be limited to only those waters exhibiting some form of national significance.

Recommendation: Delete the word "state" from the definition of Outstanding National Resource Waters.

6. Comment: The restriction imposed on "waters of special concern" in Section 4.1.c. is more stringent than federal requirements for Outstanding National Resource Waters, even though this category is supposed to be somewhat less stringent.

Discussion: Section 4.1.c. requires that no activity which may "...result in the reduction of ambient water quality shall be allowed ..." in waters of special concern. Waters listed in this category (Section 7.3.d) are those waters of special significance in West Virginia that do not quite meet the criteria for designation as ONRWs. However, even the federal guidance for the administration of ONRWs allows for activities that would potentially have only a temporary and limited impact on water quality. As the protection status for ONRWs is supposed to be the most stringent of any category, the Company questions why this restriction is applied to the lesser category. If Section 4.1.c were to be interpreted strictly, no construction activity of any kind that could result in a temporary and limited discharge could be allowed in any area adjacent to a water of special concern. As the State of West Virginia recognizes construction projects involving areas comprising more than 3 acres as requiring NPDES permits, this would prevent any construction project of this size from ever being allowed adjacent to any of the waters so listed. The Company believes that it is not the intention of the Board to establish an absolute and irrevocable ban against all development in areas adjacent to those streams that have been included in this category.

Recommendation: Insert the word "permanent" before the phrase "reduction of ambient water quality" in Section 4.1.c.

7. Comment: Section 4.1.d should clearly state that the designation of new Outstanding Natural Resource Waters to be included in section 7.3.e shall be the subject of a formal change to the Series 1 Regulations requiring full administrative process.

Discussion: The designation of a waterbody as an Outstanding National Resource Water is an extremely impacting action on the area drained by the stream in question. It should be clearly indicated in the Series 1 Regulation that each individual stream to be designated must be the subject of a separate rulemaking procedure, including public notice and opportunity for comment. Failure to consider this process as a formal amendment to the Water Quality Standard Regulation could result in impacted parties not being informed of a state action having the potential to impact negatively on property values and the ability of property owners to realize the full use of their holdings.

Recommendations: Add the following at the end of Section 4.1.d: "The nominated water shall be designated as an Outstanding National Resource Water following a finding by the Board that the water meets the criteria established for such designation, subject to a formal rulemaking. Any such action by the Board shall consist of an amendment to these regulations."

8. Comment: Thermal mixing zones should be the subject of a separate subsection in the regulation.

Discussion: Thermal mixing zones are substantially different from those mixing zones contemplated in Section 5 of the proposed regulation. While it is true that the establishment of mixing zones for chemical parameters may be a complicated process, the definition of the extent and behavior of a thermal mixing zones must consider a number of factors not involved in chemical mixing zone determination. The persistence of a thermal plume and its potential impact on the aquatic ecosystem varies seasonally, is dependent on the ambient water temperatures, the life cycles of the aquatic receptors, and the overall geometry and hydraulics of the receiving water body in a manner that is much more sensitive than for chemical constituents. The thermal component of a discharge is clearly non-persistent and obviously non-bioaccumulative.

The proposed regulation, in Section 5.2.h), would establish that any demonstration performed under Section 316(a) of the Clean Water Act, would constitute compliance with all requirements of Section 5. The Company agrees that in the absence of other considerations, such a statement is needed to clarify the status of those projects for which a 316(a) demonstration has been made. However, the Company feels that since a thermal discharge is vastly different from a discharge comprised of other components, there should be separate treatment under the regulation. The Company also notes that there is no provision in the proposed regulation for dealing with mixing zones for relatively small discharges containing a thermal component. A 316(a) demonstration is a significant, complicated, and expensive undertaking, usually reserved for large thermal discharges. Such a demonstration involves extensive modeling analysis, stream geometry determination, and aquatic population study. A study of this magnitude usually costs in excess of several hundred thousand dollars. However, for discharges with a relatively small thermal component, a simple mass balance calculation can often suffice to show the lack of impact on the receiving stream. In such cases, the DEQ needs the flexibility to allow such a discharge to occur.

Recommendation: The Water Quality Standards Regulation which has been adopted by the Commonwealth of Virginia (VR 680-21-00) contains a special section dealing with the determination of thermal mixing zones (Section 01.2.C.5). The Company suggests that the Board consider adoption of the language contained in that regulation as listed below.

"The size of a thermal mixing zone shall be determined on case by case basis. The determination shall be based upon a sound rationale and be supported by substantial biological, chemical, physical, and engineering evidence and analysis. Any such determination shall show to the Board's satisfaction that no adverse changes in the protection and propagation of balanced indigenous populations of fish, aquatic life, and wildlife may reasonably be expected to occur. A satisfactory showing made in conformance with Section 316(a) of the Clean Water Act shall be deemed as compliance with the requirements of this paragraph."

TABLE 1
Total Recoverable Aluminum in the Ohio River

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
76.6	08/26/80	750.
	11/12/80	400.
	12/12/80	<500.
	01/09/81	700.
	02/05/81	1700.
	05/13/81	575.
	08/05/81	760.
	10/22/81	290.
	02/04/82	7270.
	05/06/82	360.
	08/11/82	1180.
	11/02/82	555.
	02/02/83	420.
	05/19/83	375.
	08/03/83	<180.
	11/02/83	<420.
	02/08/84	<400.
	05/24/84	800.
	08/22/84	400.
	11/07/84	400.
	02/27/85	6000.
	08/08/85	500.
	03/05/86	530.
09/10/86	<400.	
04/08/87	2100.	
11/10/88	670.	
06/22/89	2600.	
05/05/93	820.	
10/14/93	230.	
	Mean =	1080.
111	06/10/80	2750.
	09/15/80	2200.
	12/17/80	800.
	01/21/81	200.
	03/05/81	1425.
	06/17/81	2000.
	09/16/81	100.
	12/16/81	890.
	03/25/82	7640.
	06/15/82	510.
	09/15/82	4010.
	12/08/82	490.
	03/16/83	450.
	06/15/83	1590.
	09/21/83	1340.
12/14/83	750.	
03/15/84	<500.	

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
111 (continued)	06/21/84	1100.
	09/20/84	500.
	12/06/84	500.
	06/06/85	600.
	01/16/86	630.
	07/09/86	600.
	02/11/87	<400.
	03/10/88	1800.
	09/14/88	340.
	04/27/89	720.
	05/10/90	1600.
	11/08/90	300.
	06/20/91	200.
	01/08/92	150.
	07/16/92	400.
	02/11/93	220.
	08/26/93	230.
	03/17/94	<u>1410.</u>
	Mean =	1110.
114	06/10/80	3550.
	09/15/80	1900.
	12/17/80	1050.
	01/21/81	700.
	03/05/81	1650.
	06/17/81	3200.
	09/16/81	530.
	12/15/81	630.
	03/24/82	1470.
	06/15/82	1370.
	09/15/82	730.
	12/08/82	610.
	03/15/83	680.
	06/15/83	500.
	09/21/83	720.
	12/14/83	1260.
	03/14/84	500.
	06/21/84	900.
	09/19/84	400.
	12/05/84	<300.
	06/06/85	1100.
	01/16/86	<400.
	07/09/86	500.
	02/11/87	<400.
	03/10/88	1300.
	09/14/88	470.
	04/27/89	810.
	10/19/89	<300.
	05/10/90	500.
	11/08/90	500.
	06/20/91	300.
	01/18/92	200.

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
114 (continued)	07/16/92	350.
	02/11/93	310.
	08/26/93	120.
	03/17/94	<u>2370.</u>
	Mean =	885.
241	07/30/80	6750.
	10/27/80	1550.
	01/13/81	400.
	01/28/81	850.
	04/15/81	500.
	08/17/81	440.
	10/27/81	300.
	01/26/82	8230.
	04/07/82	2150.
	07/21/82	625.
	01/18/83	555.
	04/19/83	8330.
	07/21/83	<180.
	10/25/83	1510.
	01/24/84	500.
	04/17/84	<500.
	07/23/84	<400.
	10/16/84	<300.
	02/20/85	600.
	08/07/85	500.
	03/19/86	2500.
	09/16/86	<400.
	04/21/87	660.
	10/21/87	<500.
	11/17/88	430.
	06/21/89	1890.
	01/10/90	1370.
07/17/90	4600.	
02/20/91	400.	
08/15/91	400.	
03/04/92	1200.	
04/20/93	1340.	
09/15/93	<u>250.</u>	
Mean =	1510.	
243	07/30/80	4730.
	10/22/80	600.
	01/29/81	930.
	04/29/81	1750.
	07/29/81	1100.
	10/28/81	460.
	01/26/82	5890.
	07/22/82	625.
	10/20/82	540.
	01/19/83	420.
	04/20/83	2700.

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
243 (continued)	07/22/83	<180.
	01/25/84	625.
	04/18/84	1570.
	07/24/84	400.
	10/16/84	<300.
	02/21/85	500.
	08/21/85	<400.
	03/20/86	2500.
	09/16/86	<400.
	04/08/87	3900.
	11/16/88	420.
	06/21/89	3310.
	09/07/89	480.
	01/17/90	310.
	07/25/90	1900.
	08/14/91	140.
	03/12/92	2950.
	09/17/92	300.
	04/29/93	3050.
10/07/93	<u>330.</u>	
	Mean =	1390.
258	08/13/80	15000.
	11/05/80	400.
	12/10/80	<500.
	02/18/81	4200.
	03/21/81	650.
	03/22/81	600.
	03/23/81	450.
	03/24/81	1100.
	03/25/81	900.
	03/26/81	850.
	03/27/81	1700.
	03/28/81	1200.
	05/07/81	410.
	06/12/81	9200.
	06/14/81	7300.
	06/15/81	22000.
	06/16/81	22500.
	06/17/81	12300.
	06/18/81	4850.
	06/19/81	4250.
	06/20/81	3500.
	08/04/81	500.
	11/11/81	660.
	02/11/82	1945.
05/11/82	640.	
08/17/82	2640.	
11/04/82	230.	
02/17/83	2370.	
05/25/83	6700.	
08/11/83	695.	

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
258 (continued)	11/08/83	830.
	02/09/84	700.
	05/08/84	600.
	08/07/84	400.
	11/06/84	400.
	02/12/85	1300.
	08/06/85	700.
	03/26/86	1200.
	09/09/86	<400.
	04/14/87	1700.
	05/11/88	1900.
	11/09/88	580.
	06/07/89	2360.
	01/16/90	890.
	07/23/90	900.
	02/05/91	1000.
	08/20/91	320.
	03/24/92	3050.
	09/17/92	210.
	04/20/93	1200.
	10/13/93	<u>210.</u>
	Mean =	2950.

TABLE 2
Total Recoverable Aluminum in the Kanawha River

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
40	08/26/80	2500.
	10/27/80	550.
	10/29/80	450.
	01/14/81	625.
	04/08/81	850.
	07/09/81	1730.
	10/01/81	1125.
	01/05/82	3990.
	04/06/82	330.
	07/08/82	1285.
	10/06/82	1110.
	01/04/83	250.
	04/12/83	4160.
	07/12/83	310.
	01/12/84	<500.
	04/03/84	<500.
	07/18/84	400.
	10/12/84	700.
	01/08/85	400.
	07/10/85	<400.
	02/06/86	910.
	08/06/86	430.
	03/03/87	3980.
	04/04/88	<300.
	05/08/89	2320.
	11/01/89	400.
	06/13/90	1400.
01/09/91	1300.	
07/10/91	300.	
08/19/92	6140.	
09/09/93	290.	
04/13/94	<u>330.</u>	
	Mean =	1230.
80	07/16/80	975.
	10/06/80	400.
	10/21/80	500.
	01/27/81	175.
	04/07/81	250.
	07/15/81	280.
	10/20/81	350.
	01/20/82	<100.
	04/20/82	280.
	07/27/82	375.
	10/20/82	660.
	01/25/83	280.
	04/21/83	940.

<u>River Mile</u>	<u>Date</u>	<u>Concentration (ug/L)</u>
80 (continued)	07/20/83	<180.
	10/19/83	840.
	01/15/84	300.
	01/25/84	<500.
	04/24/84	700.
	07/10/84	400.
	10/23/84	<300.
	07/17/85	<400.
	02/18/86	840.
	10/20/86	<400.
	03/17/87	<400.
	04/21/88	<300.
	10/12/88	<300.
	10/18/88	<300.
	05/17/89	320.
	11/29/89	500.
	06/13/90	500.
	01/16/91	800.
	02/20/92	450.
	03/24/93	1740.
	04/22/93	650.
	10/20/93	<u>130.</u>
	Mean =	435.