

**BEFORE THE
ENVIRONMENTAL QUALITY COUNCIL
STATE OF WYOMING**

IN THE MATTER OF WATER)
QUALITY RULES AND)
REGULATIONS, CHAPTER 1,)
WYOMING SURFACE WATER)
QUALITY STANDARDS)

FILED

JUL 11 2013

Jim Ruby, Executive Secretary
Environmental Quality Council

STATEMENT OF PRINCIPAL REASONS

Background

The Environmental Quality Council, pursuant to the authority vested in it by Wyoming Statutes 35-11-112(a)(i), is adopting revisions to Chapter 1 of the Wyoming Water Quality Rules and Regulations. These changes are being proposed pursuant to Wyoming Statutes 35-11-302(a)(i). Chapter 1 contains the water quality standards for surface waters in the state and includes water classifications and designated uses.

Section 303(c) of the Clean Water Act provides states, tribes and territories with the primary authority and responsibility to establish water quality standards for waters of the U.S. within their respective jurisdictions. In Wyoming, the surface water quality standards are administered by the Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD) and are contained in Chapter 1 of the Wyoming Water Quality Rules and Regulations. Water quality standards must be reviewed at least once every three years, known as a triennial review, at which time existing standards can be modified and new standards adopted as necessary.

In addition to the standards, the *Implementation Policies for Antidegradation, Mixing Zones and Dilution Allowances, Turbidity and Use Attainability Analysis* are revised as necessary to accommodate changes in the rules. The policies are not in themselves rules or regulations, but have been developed to provide additional detail and guidance on the procedures used to interpret and implement Chapter 1. Following adoption by the state, the standards and *Implementation Policies* are submitted to the Environmental Protection Agency (EPA) for review to determine whether they meet the goals and requirements of the Clean Water Act.

Purpose and Intent of Proposed Revisions

The proposed revisions are intended to protect and maintain the designated uses of waters of the state and achieve the goals of the Environmental Quality and Clean Water Acts. These goals are accomplished by designating uses on waters, setting appropriate water quality criteria to protect designated uses, and implementing an antidegradation policy to maintain the quality of waters whose background quality is better than the criteria outlined in the standards.

Specifically, these rules are being revised to meet the triennial review requirements of the Clean Water Act, maintain Wyoming's primacy for delegated programs of the Clean Water Act, resolve Environmental Protection Agency (EPA) disapprovals from the last rule making, update numeric criteria for priority and non-priority pollutants, revise the duration of the *E. coli* criteria and correct a number of omissions, errors or inconsistencies that have been identified since the most recent revision.

Compliance with Federal Regulations (W.S. 16-3-103(a)(i)(F))

The rule revisions are proposed to comply with the federal regulations regarding the adoption of state water quality standards, specifically those contained in 40 CFR Part 131, which require the designation of water uses, the establishment of numeric and/or narrative water quality criteria sufficient to protect the water's designated uses and the implementation of antidegradation procedures. These rule changes are designed to meet the minimum requirements of federal laws and regulations.

Proposed Revisions to Chapter 1 of the Water Quality Rules and Regulations:

General

When referring to specific classes of Wyoming surface waters, "class" or "classes" of surface waters were changed to "Class" or "Classes" for consistency.

References to "Federal Clean Water Act", "federal Clean Water Act" and "Federal Act" in Sections 2(b), 3, 25(f), 33(b)(vi), 34(a) and 34(b) were changed to "Clean Water Act" for consistency.

In instances where the first letters of "Use Attainability Analysis" were capitalized, they were changed to lower case, as in "use attainability analysis", to be consistent with the definition in Section 2(b) and use of the term in the Code of Federal Regulations (CFRs). These are located in Sections 4(e), 33(b), 33(c) and 34.

The first mention of "administrator" in Section 8(b) was changed to "Water Quality Administrator (administrator)" and all subsequent references to the "Water Quality

Administrator” or “Water Quality administrator” in the document were changed to “administrator” for consistency with the Environmental Quality Act. These are located in Sections 33(b), 33(c), 34 and 36.

The first mention of “Department of Environmental Quality” in Section 2(b)(li) was followed by (department) and each subsequent reference to the “Department of Environmental Quality” was replaced with “department” for consistency with the Environmental Quality Act. These are located in Sections 4(e), 8(a), 21(f)(iv), 21(f)(v) and 21(f)(vi), Appendix A (b)(ii)(A), Appendix A (b)(ii)(B) and Appendix B footnote 14.

The first mention of “Environmental Quality Council” in Section 4(a) was followed by (council) and each subsequent reference to the “Environmental Quality Council” was replaced with “council” for consistency with the Environmental Quality Act. These are located in Sections 4(e), 33(a), 33(b), 33(c) and 34(b).

Section 1. Authority.

The acronym “W.S.” was defined as “Wyoming Statutes” in the text to provide clarification for readers unfamiliar with the statutes cited. W.S. 35-11-101 through 1507 was updated to W.S. 35-11-101 through 35-11-1803 to be consistent with the definition of the Environmental Quality Act in W.S. 35-11-103(a)(xiii). A reference to the definition of the Environmental Quality Act, W.S. 35-11-103(a)(xiii), was added to provide clarification for readers unfamiliar with the Environmental Quality Act.

Section 2. Definitions.

In (a) and (b), the word “section” was removed and replaced with “W.S.” to be consistent with other references to Wyoming Statutes within the document.

Definitions not used in the text were removed from Section 2(a) and Section 2(b). These include 2(a)(i), compensatory mitigation; 2(a)(vii), assimilative capacity; 2(b)(xiv), effluent dominated water; and 2(b)(xxxiii), nanograms per liter (ng/L). Numbering of the remaining definitions and references was adjusted accordingly.

The definitions of “aquatic life” was modified to include aquatic invasive species and now reads “means fish, invertebrates, amphibians and other flora and fauna which inhabit waters of the state at some stage in their life cycles. Aquatic life does not include human pathogen or insect pests, aquatic invasive species or other organisms which may be considered ‘undesirable’ by the Wyoming Game and Fish Department or U.S. Fish and Wildlife Service within their appropriate jurisdictions.”

In the definitions of “cold water game fish”, “*E. coli*”, “game fish” and “warm water game fish”, references to “Genus” and “Species” were changed from upper case to lower case to be consistent with convention. References to multiple genera were corrected from “genus” to “genera.” The genus for walleye and sauger was changed from “*Stizostedion*” to “*Sander*” to reflect changes in nomenclature. The genus “*Ptyodictis*” was removed from the definition of “game fish” and “warm water game fish” because flathead catfish do not occur in Wyoming.

The portion of the definition of “effluent dependent water” that read “that would be ephemeral without the presence of permitted effluent” was changed to “with insufficient natural flow to support aquatic life” because water bodies other than those that are “ephemeral” may lack sufficient natural hydrology to be classified as effluent dependent through the use attainability analysis process. The important concept for effluent dependent waters is that without the effluent, there would be insignificant aquatic life.

The additional parentheses present between (b)(xx) and b(xxi) was removed.

The date cited in the definition of “Federal Act” was updated from “June 21, 2001” to “November 27, 2002,” to reflect the most recent amendments to the Federal Water Pollution Control Act (Clean Water Act).

The abbreviation for micrograms per liter was revised from “mg/L” to “µg/L.”

The term “measurable effects” was removed from the definitions of “natural”, “natural biotic community” and “natural water quality” because the term is synonymous with “measurable influence” that is also included in each of the definitions.

Reference to “Chapter 18” within the definition of “storm water” was removed, as Chapter 18 is no longer in use.

The definition of “undesirable aquatic life” was updated to include “aquatic invasive species” and now reads “means organisms generally associated with degraded or eutrophic conditions. These may include the following organisms where they have replaced members of the natural biotic community: insect pests, aquatic invasive species or other organisms which may be considered ‘undesirable’ by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions”

Section 3. Water Uses.

Language in (a) was modified from “irrigation or stock watering” to “irrigation and/or livestock watering” to reflect situations where a water body is used for both irrigation and livestock uses.

The description of the fisheries designated use (Section 3(b)) was modified to include “cold water game fish,” “warm water game fish” and “aquatic invasive species”. The description now reads “The fisheries use includes water quality, habitat conditions, spawning and nursery areas, and food sources necessary to sustain populations of cold water game fish, warm water game fish and nongame fish. This use does not include the protection of aquatic invasive species or other fish which may be considered ‘undesirable’ by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.”

The sentence, “The recreation designated use includes primary contact recreation and secondary contact recreation subcategories” was added to 3(e) for clarification purposes.

The description of the aquatic life other than fish designated use (Section 3(g)) was modified to include aquatic invasive species and now reads “This use does not include the protection of human pathogens, insect pests, aquatic invasive species or other organisms which may be considered ‘undesirable’ by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.”

Section 4. Surface Water Classes and Uses.

The wording of Class 2, Fisheries and Drinking Water, in 4(b) was changed from “known to support fish or drinking water supplies” to “known to support fish and/or drinking water supplies” to reflect the fact that some categories of Class 2 waters are designated for both fish and drinking water uses, rather than one or the other.

The sentence, “New information made available to the department may be cause to amend the classifications,” found in 4(e) was removed because the sentence is redundant with information previously stated in the paragraph.

Section 5. Standards Enforcement.

The title of the implementation policies document was capitalized, italicized and revised to include “and Dilution Allowances.” Other references to documents or databases that were either underlined or in quotations were italicized for consistency.

Section 7. Class 1 Waters.

Language used in (a) was changed from “paragraph (b)” to “Section 7(b) of these regulations” for clarification.

Section 9. Mixing Zones.

“Acute aquatic life values” and “chronic aquatic life values” were changed to “aquatic life acute values” and “aquatic life chronic values” to be consistent with Appendix B.

The reference to the “Mixing Zone and Dilution Allowances Policy” was revised to “*Mixing Zones and Dilution Allowances Implementation Policy*” to be consistent with the title in the implementation policies document.

Section 10. Testing Procedures.

The sentence “The analytical technique for total uranium (as U) shall be the fluorometric method as referenced in Methods for Determination of Radioactive Substances in Water and Fluvial Sediments, Techniques of Water – Resource Investigations of the U.S. Geological Survey, Book 5, chapter A-5, pp. 83 – 92” was removed because additional methods for determining total uranium have been updated since this reference was first included in Chapter 1 in 1979.

The paragraph “Numeric criteria included in the standards represent levels necessary to protect designated uses and do not necessarily reflect detection limits that can be achieved using standard analytical techniques. Standard analytical techniques are considered during development of discharge permits and evaluation of water quality data. Sampling entities should consult with the department to determine reporting limit needs to ensure that adequate testing procedures and reporting limits are requested from the laboratory” was added for clarification purposes.

Section 11. Flow Conditions.

The sentence “Whatever method is selected for a specific situation, application of the standards will conform to the magnitude, frequency, and duration provisions as described in these regulations” was modified to “For all methods, application of the standards will conform to the magnitude, duration and frequency provisions described in these regulations” and moved below (a)(iii).

Section 18. Human Health.

The wording of this section was changed from “human health values for ‘Fish and Drinking Water’” and “human health values ‘Fish Only’” to “Human Health Consumption of Fish and Drinking Water values” and “Human Health Consumption of Fish values,” respectively, to be consistent with the revised headings in Appendix B.

The second sentence in the second paragraph was revised from “In such cases, human health values may be determined by use of the site-specific procedures outlined in the references listed in Appendix E of these regulations” to “In such cases, human health values may be established using the site-specific procedures outlined in the references listed in Appendix E or other scientifically defensible methods.” This revision was included to specify that site-specific criteria can be developed using methods other than those listed in Appendix E.

Section 20. Agricultural Water Supply.

The sentence “The procedures used to implement this section are described in the ‘Agricultural Use Implementation Policy’” was removed, as the *Agricultural Use Implementation Policy* was removed from the Implementation Policies document. This policy was never intended to serve as the final agricultural use policy.

Section 21. Protection of Aquatic Life.

The order of the Classes of water in (a)(i) were changed from “Class 1, 2A, 2B, 2AB and 2C” to “Class 1, 2AB, 2A, 2B and 2C” to be consistent with the order in which the classes of waters are typically listed.

“2D” was added to (a)(ii) to reflect the addition of effluent dependent waters during the last triennial review. The narrative ammonia criteria associated with Class 2D and 3D waters is intended to protect effluent dependent aquatic life from future discharges that may be permitted on the same drainage.

The sentence in (b), “These standards apply to all Class 1, 2A, 2B, 2AB, 2C, 3A, 3B and 3C waters,” was changed to “These standards apply to all Class 1, 2 and 3 waters,” to include effluent dependent waters, which are Classes 2D and 3D. Numeric acute and chronic values outlined in Appendix B for protection of aquatic life apply to effluent dependent waters except in situations where site-specific criteria has been developed through the process outlined in Section 36.

Section (d) was modified from “In such cases, acute and chronic values may be determined by use of the site-specific procedures outlined in sections 33 or 36 or in the references listed in Appendix E of these regulations” to “In such cases, acute and chronic values may be determined using the site-specific procedures outlined in the references listed in Appendix E or other scientifically defensible methods” to identify that site-specific criteria may be developed using methods other than those listed in Appendix E.

The wording of (e)(i), (e)(ii), (f)(i) and (f)(ii) was modified to be consistent with the policies of the Wyoming Department of Agriculture. The wording of (e)(i) and 21(f)(i) was revised to “The pesticide used is a product which has been registered with the EPA and the Wyoming Department of Agriculture for use in the state, in accordance with W.S. 35-7-356.” The term “such toxicants” was revised to “restricted use pesticides” in (e)(ii) and (f)(ii).

Section 22. Radioactive Material.

Section (a) was modified to specify the radiological criteria that apply to waters protected for drinking water uses, rather than incorporate the criteria by reference. Furthermore, the previously referenced 40 CFR 141.15 and 141.16, published July 1, 1998, was outdated, as these sections were removed from the Code of Federal Regulations (65 FR 76745, Dec. 7, 2000, 141.15 and 141.16 are removed).

The referenced limits are 5 pCi/L for combined radium-226 and radium-228, 15 pCi/L for gross alpha particle activity (excluding radon and uranium), 30 µg/L for uranium and 4 millirems per year (mrem/year) for beta particle and photon radioactivity in waters designated for drinking water uses (i.e. Class 1, 2AB and 2A waters). These numeric limits are the maximum contaminant levels for radionuclides published in 40 CFR 141.66.

Section 23. Turbidity.

Section (a) was changed from “cold water fisheries and drinking water supplies” to “cold water fisheries **and/or** drinking water supplies” to indicate that the turbidity criteria apply to both cold water fisheries and drinking water uses, whether or not these uses occur together on the same water body.

Section 24. Dissolved Oxygen.

In both paragraphs, the term “wastes attributable to or influenced by” was changed to “pollution attributable to” to be more inclusive of the types of anthropogenic conditions that can result in impacts to dissolved oxygen concentrations. The term “pollution,” defined in Section 2(a), includes “alteration of the physical, chemical or biological properties,” rather

than just “wastes,” defined in Section 2(a) as “sewage, industrial waste and all other liquid, gaseous, solid, radioactive, or other substances which may pollute any waters of the state.” The change from “wastes” to “pollution” is also more consistent with the purpose of the Environmental Quality Act, defined in W.S. 35-11-102.

Section 25. Temperature.

The statement “effluent attributable to or influenced by the activities of man shall not be discharged in amounts which” in (a) was changed to “pollution attributable to the activities of man shall not” to be more inclusive of the types of anthropogenic conditions that can result in changes to temperature. Similar changes were made in (b) and (c) and the statement “pollution attributable to the activities of man” was added to (d). The term “pollution,” defined in Section 2(a), includes “alteration of the physical, chemical or biological properties,” rather than just “wastes,” defined in Section 2(a) as “sewage, industrial waste and all other liquid, gaseous, solid, radioactive, or other substances which may pollute any waters of the state.” The change from “effluent” to “pollution” is also more consistent with the purpose of the Environmental Quality Act, defined in W.S. 35-11-102.

The abbreviation “F” was revised to “Fahrenheit” and the abbreviation “C” was revised to “Celsius” for clarification. The Celsius equivalent for 60 degrees Fahrenheit was included.

Section (e) was modified from “with the exception of the provisions of Sections 9 and 11 of these regulations” to “with the exception of the provisions of Sections 9 and 11 of these regulations and other natural conditions” to accommodate situations other than those related to mixing zones (Section 9) and flow (Section 11) that result in temperatures that exceed the temperature criteria in Section 25. An example of such a condition is the upper portion of a pool or lake when ambient air temperatures are high.

Section 26. pH.

Statements in (a) and (b) that include “wastes attributable to or influenced by” were changed to “pollution attributable to” to be more inclusive of the types of anthropogenic conditions that can result in changes to pH. The term “pollution,” defined in Section 2(a), includes “alteration of the physical, chemical or biological properties,” rather than just “wastes,” defined in Section 2(a) as “sewage, industrial waste and all other liquid, gaseous, solid, radioactive, or other substances which may pollute any waters of the state.” The change from “wastes” to “pollution” is also more consistent with the purpose of the Environmental Quality Act, defined in W.S. 35-11-102.

Section 27. *E. coli* Bacteria.

Section (a) was revised to: “In all waters designated for primary contact recreation, during the summer recreation season (May 1 through September 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60-day period. Primary contact waters are identified in the *Wyoming Surface Water Classification List*.”

The following was removed from (a): “All waters in Table A of the Wyoming Surface Water Classification List are designated for primary contact recreation unless identified as a secondary contact water by a “(s)” notation. Waters not specifically listed in Table A of the *Wyoming Surface Water Classification List* shall be designated as secondary contact waters” based on a disapproval by EPA in a September 2008 action letter. EPA disapproved removing primary contact recreation use from a large number of waters because a use attainability analysis (UAA) had not been conducted. EPA’s interpretation of Clean Water Act Section 101(a)(2) is that aquatic life and primary contact recreation are attainable on all waters, unless it can be demonstrated through a UAA that the uses are not attainable.

The sampling requirements for determining attainment will be included in *Wyoming’s Methods for Determining Surface Water Quality Condition and TMDL Prioritization*, as the number of samples required for determining attainment is beyond the scope of the magnitude, duration and frequency information included within Chapter 1. The period over which the geometric mean can be assessed was changed from 30 days to 60 days to be more consistent with the derivation of the *E. coli* criteria. The *E. coli* criteria were derived from *Ambient Water Quality Criteria for Bacteria - 1986. EPA 440/5-84-002. Office of Water, Regulations and Standards, Washington, D.C.*, which were based on sampling conducted over a “summer bathing season,” a period of at least eight weeks.

Section (b) was modified to read: “In all waters designated for secondary contact recreation, and in waters designated for primary contact recreation during the winter recreation season (October 1 through April 30), concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60-day period. Waters will be designated for secondary contact recreation through the reclassification and use attainability analysis process outlined in Sections 33 and 34 of these regulations. Secondary contact waters are identified in the *Wyoming Surface Water Classification List*.”

Sub-section (d), Variances, “Temporary and/or permanent variances to the *E. coli* values provided in (a) through (c) above may be granted in instances where the primary source of bacterial contamination is found to be natural in origin (wildlife), unavoidable (off-channel stock watering pits), or otherwise in the public interest,” was removed based on disapproval

by EPA in a September 2008 action letter. EPA's concern with 27(d) was that the variances could be established outside of the State's water quality standards rule making process and establishment of these criteria would be inconsistent with the Clean Water Act and the Code of Federal Regulations.

Section 33. Reclassifications and Site-Specific Criteria.

Section (b)(v) was revised to be consistent with the wording of factor (5) in 40 CFR (Code of Federal Regulations) 131.10(g) and now states: "Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of an aquatic life use." The six factors outlined in (b)(i) through (b)(vi) are taken directly from 40 CFR 131.10(g)(1) through 131.10(g)(6).

Section 36. Effluent Dependent Criteria.

The formatting of this section was changed to follow Section 6, Format for Final Rules Submitted for Filing, Chapter 1, Wyoming Secretary of State Rules on Rules. Specifically, the periods following lower case "a" and "b" were removed and replaced with parentheses and the numbers 1-4 under "a" and 1-3 under "b" were replaced with lower case roman numerals in parentheses.

Appendix A. Wyoming Surface Water Classifications.

The upper case letters of "Main Stem" in (a)(iv) was changed to lower case to be consistent with the remainder of the Class 1 waters.

The wording of (a)(x) was changed from "The main stem of the Tongue River, the main stem of the North Fork of the Tongue River, and the main stem of the South Fork of the Tongue River above the U.S. Forest Service Boundary" to "The main stem of the North Fork of the Tongue River, the main stem of the South Fork of the Tongue River and the main stem of the Tongue River above the U.S. Forest Service boundary" to avoid confusion. Both the North Fork Tongue River and South Fork Tongue River are entirely within the U.S. Forest Service boundary, while the main stem of the Tongue River flows across the U.S. Forest Service boundary.

The formatting of this section was changed to follow Section 6, Format for Final Rules Submitted for Filing, Chapter 1, Wyoming Secretary of State Rules on Rules. Specifically, the numbers (1), (2) and (3) were changed to (A), (B) and (C) and the letters (A), (B), (C) and (C) were changed to (I), (II), (III) and (IV).

Section (b) was modified to specify that “recreational use designations” can also be found in the *Wyoming Surface Water Classification List*. The sentence, “The list is published by the department and periodically revised and updated according to the provisions of Sections 4, 33, 34 and 35,” was added to make the language consistent with existing language in Section 4(e).

Appendix B. Water Quality Criteria.

The column headings for priority and non-priority pollutants were changed to distinguish aquatic life criteria from human health consumption criteria. Superscripts were moved from the pollutant name to the value to be more consistent with the *National Recommended Water Quality Criteria*. In instances where (HM) and (PAH) followed a particular pollutant in the priority pollutant list, they were removed. HM, referring to halomethane compounds, and PAH, referring to polycyclic aromatic hydrocarbons, were removed because the compounds that were labeled did not include all of the HM or PAH compounds in the list, nor were the abbreviations defined.

The water quality criteria for priority and non-priority pollutants were updated to conform to the most recent federal recommendations. The two sources for the criteria are the Clean Water Act, Section 304(a) recommended criteria (2009 revision), *National Recommended Water Quality Criteria 2009*¹, or the Safe Drinking Water Act (SDWA) *National Drinking Water Regulations, May 2009*² and last updated in 40 CFR 141 July 1, 2012³. When a lower organoleptic (i.e. taste and odor) value is presented within the *National Recommended Water Quality Criteria*, the organoleptic value is used as the human health consumption of fish and drinking water value. In general, where Section 304(a) and SDWA publish different values for the same pollutant, the more stringent value is included in Appendix B to ensure protection of drinking water supplies and minimize treatment costs.

(a) Priority Pollutants. Priority pollutants are listed in the order they are found on the EPA priority pollutants list that can be accessed here: [EPA's Priority Pollutants](#)⁴. The pollutants contained in EPA’s Priority Pollutants list that do not occur in the priority pollutants list in Appendix B are those for which no 304(a) criteria currently exist.

¹National Recommended Water Quality Criteria:

<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

²National Drinking Water Regulations: <http://water.epa.gov/drink/contaminants/upload/mcl-2.pdf>

³40 CFR 141 July 1, 2012: [http://www.ecfr.gov/cgi-bin/text-](http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=96352e3bfeab355ec940593ac9659d21&rgn=div5&view=text&node=40:24.0.1.1.3&idno=40)

[idx?c=ecfr&SID=96352e3bfeab355ec940593ac9659d21&rgn=div5&view=text&node=40:24.0.1.1.3&idno=40](http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=96352e3bfeab355ec940593ac9659d21&rgn=div5&view=text&node=40:24.0.1.1.3&idno=40)

⁴EPA Priority Pollutants: <http://water.epa.gov/scitech/methods/cwa/pollutants.cfm>

Specific Pollutants:

Acrolein. Aquatic life acute and chronic values of 3 µg/L were added. Human health consumption of fish and drinking water value was updated from 190 µg/L to 6 µg/L and human health consumption of fish value was revised from 290 µg/L to 9 µg/L based on the *National Recommended Water Quality Criteria*.

Chlorobenzene. The human health consumption of fish and drinking water value was updated from 100 µg/L to 20 µg/L to reflect the lower organoleptic effects value in the *National Recommended Water Quality Criteria*. The footnote was also changed from “9” to “7” to indicate that the new value is an organoleptic effects value.

1,1-Dichloroethylene. The human health consumption of fish and drinking water value was updated from 330 µg/L to 7 µg/L to reflect the lower maximum contaminant level (MCL) in the *National Primary Drinking Water Regulations*. The footnote “9” was added to indicate the source of the value.

Phenol. The human health consumption of fish value was revised from 1,700,000 µg/L to 860,000 µg/L to be consistent with the *National Recommended Water Quality Criteria*.

Endrin. The human health consumption of fish and drinking water value was revised from 0.59 µg/L to 0.059 µg/L to be consistent with the *National Recommended Water Quality Criteria*.

Polychlorinated Biphenyls (PCBs). The seven PCB compounds were consolidated to one entry to be consistent with the *National Recommended Water Quality Criteria*. The aquatic life chronic, human health consumption of fish and drinking water, and human health consumption of fish values apply to total PCBs, rather than individual PCB compounds. The footnote “13” was added to the aquatic life chronic value to indicate that the value applies to total PCBs.

Toxaphene. The human health consumption of fish and drinking water and human health consumption of fish values were updated from 0.0028 µg/L to 0.00028 µg/L to be consistent with the *National Recommended Water Quality Criteria*.

Cyanide. The human health values for cyanide were changed to 140 µg/L to be consistent with the *National Recommended Water Quality Criteria*. The previous human health consumption of fish and drinking water value, 200 µg/L, was the MCL from the National Primary Drinking Water Regulations. The previous human health consumption of fish value, 220,000 µg/L, was the value recommended in the *2002 National Recommended Water*

Quality Criteria. The superscript “6” was added to the human health values to indicate that the values reflect total cyanide, rather than free cyanide. The aquatic life values for cyanide represent free cyanide. Footnote six was revised to “Criterion expressed as total cyanide, even though the method used to derive the criterion is based on free cyanide. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g. $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$, this criterion may be overly conservative.”

Nickel. The human health consumption of fish and drinking water value for nickel was revised from 100 $\mu\text{g}/\text{L}$ to 610 $\mu\text{g}/\text{L}$ to be consistent with the *National Recommended Water Quality Criteria*. The previous value, 100 $\mu\text{g}/\text{L}$, was a MCL from the *National Drinking Water Regulations*, but the criterion was remanded in 1995. The *National Drinking Water Regulations May 2009* and July 1, 2011, 40 CFR 141.62, Maximum Contaminant Levels for Inorganic Compounds, does not include nickel.

Silver. The aquatic life acute value for silver was changed from 3.4 $\mu\text{g}/\text{L}$ to 1.7 $\mu\text{g}/\text{L}$ to be consistent with the *National Recommended Water Quality Criteria*. The *National Recommended Water Quality Criteria* describe that the aquatic life acute values for aldrin, chlordane, alpha-endosulfan, beta-endosulfan, heptachlor, heptachlor epoxide and silver should be divided by two to be comparable with acute values derived using an averaging period. The aquatic life acute criteria for each of the other parameters (aldrin, chlordane, alpha-endosulfan, beta-endosulfan, heptachlor and heptachlor epoxide) reflected this recommendation, while the silver criterion did not. A footnote was added to each of the parameters, including silver, to outline when the criterion should be used. Footnote 16 reads: “Criterion has been divided by two to be comparable with other acute values derived using an averaging period. Value can be multiplied by two if criterion is to be used as an instantaneous maximum or end of pipe value, as the original criterion was derived using EPA’s 1980 guidelines as a not to be exceeded instantaneous maximum.”

Further, because silver is a hardness dependent metal, the 1.7 $\mu\text{g}/\text{L}$ criterion is only applicable at a hardness of 100 mg/L (as CaCO_3); therefore, the recommendation to divide the criterion by two was also included in Appendix F, which details how to derive the criterion for hardness values other than 100 mg/L (as CaCO_3).

A human health consumption of fish and drinking water value, 100 $\mu\text{g}/\text{L}$, based on the *National Secondary Drinking Water Standards* for silver was added to be consistent with other parameters in Appendix B. Footnote 11 was also added to the 100 $\mu\text{g}/\text{L}$ value to identify it as a secondary drinking water criterion.

Thallium. The human health consumption of fish and drinking water value was changed from 2.4 $\mu\text{g}/\text{L}$ to 0.24 $\mu\text{g}/\text{L}$ and the human health consumption of fish value changed from

4.7 µg/L to 0.47 µg/L to be consistent with the *National Recommended Water Quality Criteria*.

(b) Non-Priority Pollutants. As with priority pollutants, the list of water quality criteria for non-priority pollutants was updated to conform to the most recent federal recommendations.

Specific Pollutants:

Bromate. Bromate was added to the list of non-priority pollutants with a human health consumption of fish and drinking water value of 10 µg/L. Bromate is a byproduct of drinking water disinfection and is included in the *National Primary Drinking Water Regulations* and listed in 40 CFR 141.64, Maximum Contaminant Levels for Disinfection Byproducts.

Chlorite. Chlorite was added to the list of non-priority pollutants with a human health consumption of fish and drinking water value of 1,000 µg/L. Chlorite is a byproduct of drinking water disinfection and is included in the *National Primary Drinking Water Regulations* and listed in 40 CFR 141.64, Maximum Contaminant Levels for Disinfection Byproducts.

Diazinon. Diazinon was added to the list of non-priority pollutants. Aquatic life acute and chronic values, both 0.17 µg/L, were inserted to be consistent with the *2009 National Recommended Water Quality Criteria*. Diazinon was added to the *National Recommended Water Quality Criteria* in 2006. The change is also noted at the following Federal Register Notice: <http://www.gpo.gov/fdsys/pkg/FR-2006-02-23/pdf/E6-2557.pdf>.

Haloacetic acids. Haloacetic acids were added to the list of non-priority pollutants with a human health consumption of fish and drinking water value of 60 µg/L. Haloacetic acids are a byproduct of drinking water disinfection and are included in the *National Primary Drinking Water Regulations* and listed in 40 CFR 141.64, Maximum Contaminant Levels for Disinfection Byproducts.

Hexachlorocyclo-hexane-technical. Hexachlorocyclo-hexane-technical was added to the list of non-priority pollutants with human health consumption of fish and drinking water value of 0.0123 µg/L and a human health fish value of 0.0414µg/L. Hexachlorocyclo-hexane-technical has been included in the list of *National Recommended Water Quality Criteria* since 1999.

Nonylphenol. Nonylphenol was added to the list of non-priority pollutants. Aquatic life acute and chronic values, 28 µg/L and 6.6 µg/L, respectively, were inserted to be consistent

with the *2009 National Recommended Water Quality Criteria*. Nonylphenol was added to the *National Recommended Water Quality Criteria* in 2006. The federal register notice can be found here: <http://www.epa.gov/fedrgstr/EPA-WATER/2006/February/Day-23/w2558.htm>.

Hydrogen Sulfide. The “Sulfide, S²⁻, and HS⁻” components of the name of the parameter were deleted. The parameter now reads, “Hydrogen Sulfide (H₂S; Undissociated).” The water quality criterion for hydrogen sulfide was included in the 1976 Quality Criteria for Water (The Red Book), which specified that 2 µg/L acute criterion as “undissociated H₂S.”

Tributyltin (TBT). The aquatic life chronic value was revised from 0.063 µg/L to 0.072 µg/L to be consistent with the *National Recommended Water Quality Criteria*. The value changed from 0.063 µg/L in the 2002 *National Recommended Water Quality Criteria* to 0.072 µg/L in the 2006 *National Recommended Water Quality Criteria*. The change is also noted at the following Federal Register Notice: <http://www.epa.gov/fedrgstr/EPA-WATER/2004/January/Day-05/w082.htm>.

Trichlorfluoromethane. This pollutant was removed from the list of non-priority pollutants, as it was not found in either the *National Recommended Water Quality Criteria* or the *National Drinking Water Regulations*.

Total trihalomethanes (TTHM). Total trihalomethanes (TTHM) were added to the list of non-priority pollutants with a human health consumption of fish and drinking water value of 80 µg/L. Total trihalomethanes are a byproduct of drinking water disinfection and are included in the *National Primary Drinking Water Regulations* and listed in 40 CFR 141.64, Maximum Contaminant Levels for Disinfection Byproducts.

Footnotes

The quantity of aquatic organisms consumed per day noted in footnotes 2 and 8 was updated from 6.5 to 17.5 grams per day to reflect changes made to EPA’s default consumption rate in 2000 when the Human Health Methodology was revised.

The previous footnote 6, “Chemicals which are not individually classified as carcinogens but which are contained within a class of chemicals with carcinogenicity as the basis for criteria derivation for that class of chemicals; an individual carcinogenicity assessment for these chemicals is pending,” was deleted because no values had this footnote in the *National Recommended Water Quality Criteria*. The revised footnote 6 applies to the human health values for cyanide and reads: “Criterion expressed as total cyanide, even though the method used to derive the criterion is based on free cyanide. If a substantial fraction of the cyanide

present in a water body is present in a complexed form (e.g. $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$), this criterion may be overly conservative.”

Footnote 10, “This value is expressed in terms of the total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor 0.922 to convert this to a value that is expressed in terms of dissolved metal. Using this conversion, the chronic aquatic life value for selenium is 4.61 $\mu\text{g}/\text{L}$ as dissolved metal” has been changed to include the conversion factor for the aquatic life acute value. The footnote now reads “This value is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use a conversion factor (0.996 for the acute and 0.922 for the chronic) to convert this number to a value that is expressed in terms of a dissolved metal. Using these conversion factors, the aquatic life acute value for selenium is 19.92 $\mu\text{g}/\text{L}$ as a dissolved metal and the aquatic life chronic value for selenium is 4.61 $\mu\text{g}/\text{L}$ as a dissolved metal.”

Footnote 11, “The iron and manganese criteria are based on Safe Drinking Water Act secondary standards and are intended to prevent undesirable aesthetic effects. These values represent the dissolved amount of each substance rather than the total amount,” was revised to refer to all values based on Safe Drinking Water Act secondary standards. Footnote 11 now reads: “Criterion is based on Safe Drinking Water Act secondary standards and is intended to prevent undesirable cosmetic or aesthetic effects. Value represents the dissolved amount of each substances rather than the total amount. Criterion only applies where drinking water is an actual use.” The last sentence allows WDEQ/WQD to protect drinking water uses using secondary drinking water criteria where they occur, but avoids being overly protective on waters that do not support drinking water uses. Because designation of Wyoming’s drinking water use is based not on an existing drinking water supply, but the presence of game fish, many waters of the state are protected for drinking water uses that are not in fact used as drinking water. Further, many geologic formations within the state contain high metal concentrations; this results in naturally high metal concentrations in surface waters where drinking water uses do not exist.

Footnote 13 was modified slightly to be consistent with the language used in the *National Recommended Water Quality Criteria*, “or homolog or Aroclor,” was added after “all isomer.”

A portion of footnote 14, “where the pH is equal to or greater than 7.0 and the hardness is equal to or greater than 50 ppm as CaCO_3 in the receiving water after mixing, the 87 $\mu\text{g}/\text{L}$ chronic criterion will not apply, and aluminum will be regulated based on compliance with the 750 $\mu\text{g}/\text{L}$ acute aluminum criterion,” was modified to read: “the 87 $\mu\text{g}/\text{L}$ chronic criterion will apply except where the receiving water after mixing has a pH greater than or equal to 7.0 and a hardness (as CaCO_3) greater than or equal to 50 mg/L. Where the

receiving stream after mixing has a pH greater than or equal to 7.0 and a hardness (as CaCO₃) greater than or equal to 50 mg/L, the 750 µg/L acute criterion will apply” to help clarify the conditions under which either the acute or chronic criterion apply.

Footnote 16 was added and reads: “Criterion has been divided by two to be comparable with other acute values derived using an averaging period. Value can be multiplied by two if criterion is to be used as an instantaneous maximum or end of pipe value, as the original criterion was derived using EPA’s 1980 guidelines as a not to be exceeded instantaneous maximum.”

(c) Site Specific Criteria.

The formatting of section (c) of Appendix B was modified to be consistent with the formatting used in the rest of the document. The formatting follows Chapter 1, Wyoming Secretary of State Rules on Rules, Section 6, Format for Final Rules Submitted for Filing.

Appendix D. Dissolved Oxygen Criteria.

The details provided by the asterisk (*) were moved above the footnotes and “2A” was changed to “2AB” to indicate that the dissolved oxygen criteria apply only to waters with fish as a designated use. The following reference was also added: “Criteria derived from: U.S. EPA. 1986. *Ambient Water Quality Criteria. EPA 440/5-86-003. National Technical Service. Springfield, VA*” to clarify the source of the dissolved oxygen criteria.

Appendix E. References to Develop Site-Specific Criteria and Bioassays.

The title of Appendix E was changed from “References for Use in Making Bioassays of Surface Waters” to “References to Develop Site-Specific Criteria and Bioassays” to identify that some of the references listed in Appendix E are used to develop site-specific criteria based on ambient conditions rather than toxicology tests. An additional reference was added: “U.S. Environmental Protection Agency: Aquatic Life Ambient Freshwater Quality Criteria-Copper. EPA-822-R-07-001. U.S. EPA, 2007” to identify the use of the Biotic Ligand Model to develop site-specific copper criteria.

Appendix F. Conversion Factors and Equation for Hardness Dependent Metals.

The title of Appendix F was changed from “Conversion Factors: Total Recoverable – Dissolved Values for Metals Equations for Parameters With Hardness Dependence” to “Conversion Factors to Change Total Recoverable Metal Values to Dissolved Values and

Equations For Hardness Dependent Metals” for clarification. The title is abbreviated in the Table of Contents as “Conversion Factors and Equations for Hardness Dependent Metals.”

The formatting was modified to break the conversion factors and equations into subsections, similar to the formatting within the rest of the document. Additional details were added to both subsections.

The subsection on conversion factors was modified based on footnotes in the *National Recommended Water Quality Criteria* and now reads: “Aquatic life values for the following metals are based on the dissolved amount of each substance. The recommended aquatic life value was calculated by using previous 304(a) aquatic life values expressed in terms of total recoverable metal and multiplying it by a conversion factor (CF). The conversion factors provided below are necessary to convert a metal value expressed as the total recoverable fraction in the water column to the dissolved fraction in the water column.”

Some detail and a footnote were added to the subsection describing the conversion factors for cadmium and lead. The subsection now reads: “The conversion factors (CF) for cadmium and lead are not constant but vary with hardness (mg/L of CaCO₃). Conversion factors can be calculated using the following equations, although should not exceed one^(a).” The footnote is defined on the following page and reads: “Based on Guidance on the Calculation of Hardness-Dependent Metals Criteria presented in: *U.S. EPA. 2002. National Recommended Water Quality Criteria. EPA-822-R-02-047.*”

Additional detail was also added to the equations for parameters with hardness dependence. The introduction now reads: “Equations for Hardness Dependent Metals. Aquatic life values at various hardness^(b) concentrations can be calculated using the formulas below. The formulas include the conversion factors to derive dissolved metal values:”

A 0.5 was added to the formula to derive the acute aquatic life value for silver, $e^{(1.72[\ln(\text{hardness})] - 6.52)}(0.85)(0.5)$, to be consistent with the other criteria derived from the 1980 guidelines, aldrin, chlordane, alpha-endosulfan, beta-endosulfan, heptachlor and heptachlor epoxide. The aquatic life acute values for each of these parameters was divided by two because the original criteria derived from the 1980 guidelines were not to be exceeded instantaneous maximum values, rather than values derived using an averaging period. Footnote “c” was added to the silver formula to clarify when and when not to multiply by 0.5 and reads: “Criterion multiplied by 0.5 to be comparable with other acute values derived using an averaging period. Value does not need to be multiplied by 0.5 if criterion is to be used as an instantaneous maximum or end of pipe value, as the original criterion was derived using EPA’s 1980 guidelines as a not to be exceeded maximum.”

Appendix G. Equations for pH Dependent Parameters.

The title of Appendix G was modified slightly to read “Equations For pH Dependent Parameters.” The words “Acute” and “Chronic” were added to the table and the order of the acute and chronic formulas was reversed to be consistent with other aquatic life values detailed in the Appendices.

Proposed Revisions to the Implementation Policies

The *Implementation Policies for Antidegradation, Mixing Zones and Dilution Allowances, Turbidity and Use Attainability Analysis* were also revised. The entire document was formatted to follow Section 6, Format for Final Rules Submitted for Filing, Chapter 1, Wyoming Secretary of State Rules on Rules. The *Antidegradation Implementation Policy* was modified to reflect changes to requirements for storm water permits and to clarify aspects of the 401 certification process. The *Turbidity Implementation Policy* was revised to specify that the notice of intent to authorize a temporary increase in turbidity will be published a minimum of fourteen days prior to authorizing the turbidity increase and that in certain circumstances (unforeseen acts of nature), the administrator may authorize a temporary increase without publishing a notice of intent. The *Use Attainability Analysis Implementation Policy* was modified to specify a 45-day public comment period for any classification changes made through the use attainability analysis process and to reflect changes to Chapter 1, Section 27, *E. coli* Bacteria. The Recreational Use Designations Use Attainability Analysis (UAA) Worksheet was also revised. As mentioned previously, under the revision of Section 20, the *Agricultural Use Implementation Policy* was removed.

Effect of the Rule Revision

The council anticipates that the result of these proposed revisions will provide a level of surface water protection sufficient to address public health and environmental concerns. The revised standards update the Wyoming surface water protection program to meet the most current federal requirements provided in 40 CFR Part 131.

Public Participation

WDEQ/WQD initiated the revision of Chapter 1 on September 12, 2011 with the release of a public notice and *Proposed Rule Revision Outreach Document*. The public was invited to submit written comments between September 12 and October 21, 2011 or submit oral comments during a public meeting held in Casper, Wyoming on October 13, 2011. Considering the initial public comment, and in anticipation of a fourth quarter Water and Waste Advisory Board (board) meeting, a second public notice was published on August 24, 2012 and drafts of Chapter 1, Implementation Policies, Statement of Principal Reasons and Response to Comments (October

21, 2011) were released. Comments were received until September 24, 2012. A Response to Comments (September 24, 2012) was prepared and changes made to the drafts of Chapter 1, Implementation Policies and Statement of Principal Reasons. These documents were included in a rule package released through a November 13, 2012 public notice and considered by the board at a public meeting in Casper, Wyoming on December 14, 2012.

During the December 14, 2012 meeting, the board extended the written public comment period until January 15, 2013. No additional comments were received during the extended public comment period. Considering comments from the board and the public, a revised rule package consisting of Chapter 1, Implementation Policies, Statement of Principal Reasons and Response to Comments (January 15, 2013) was prepared. These documents were included in a rule package released through a February 19, 2013 public notice and considered by the board at a public meeting held in Casper, Wyoming on March 21, 2013. During that meeting the board recommended advancing the rules to the Environmental Quality Council (council).

The formal rulemaking process began on May 13, 2013 with the release of the Notice of Intent to Adopt Rules and a public notice outlining that the council would hold a hearing regarding the proposed changes to Chapter 1 on July 11, 2013. Also released on May 13, 2013 were drafts of Chapter 1, the Implementation Policies and Statement of Principal Reasons. Written comments received by 5:00 PM MST June 27, 2013 were included in a Response to Comments (June 27, 2013) and were incorporated into Chapter 1 and the Implementations Policies that were considered by the council at the July 11, 2013 hearing.

Comments received as a result of each portion of the public outreach process were considered in drafting the proposed revisions. Consideration of factors listed in W.S. 35-11-302(a)(vi) is reflected in specific comments and responses to comments.

Conclusion

The council has determined that the adoption of these rules is necessary to update the Wyoming surface water standards to comply with federal regulations and carry out the responsibilities of the Department of Environmental Quality to protect surface water quality in the state.

EXECUTED THIS 11 DAY OF July, 2013.

FOR THE ENVIRONMENTAL QUALITY COUNCIL



Chairperson

LP/rm/13-0619

1. The first part of the paper is devoted to a review of the literature on the topic. The second part is devoted to a description of the experimental method used in the present study. The third part is devoted to a description of the results of the experiment. The fourth part is devoted to a discussion of the results and their implications. The fifth part is devoted to a conclusion.

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