STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

In the Matter of:	)	
PROPOSED AMENDMENTS TO *STANDARDS FOR INTERSTATE AND INTRASTATE WATERS*, 20.6.4 NMAC	)	**No. WQCC 14-05 (R)**

NEW MEXICO ENVIRONMENT DEPARTMENT SURFACE WATER QUALITY BUREAU'S REBUTTAL TECHNICAL TESTIMONY

The New Mexico Environment Department ("Department") Resource Protection Division Surface Water Quality Bureau ("Bureau" or "SWQB") hereby submits, pursuant to the *Guidelines for Water Quality Control Commission Regulation Hearings* ("Guidelines"), and in accordance with the Procedural Order for WQCC No. 14-05 (R), its rebuttal technical testimony in support of the application to amend portions of Title 20, Chapter 6, Part 4 of the New Mexico Administrative Code ("NMAC").

The rebuttal technical testimony of the following Bureau witnesses is filed in complete and narrative form in the attached exhibits to this filing. To highlight the author and nature of rebuttal testimony, the following description is provided:

James Hogan, Ph.D. Dr. Hogan's testimony is presented to clarify issues raised by the San Juan Water Commission ("SJWC") about Sections 20.6.4.97 to -99 NMAC. His testimony addresses the SJWC's issues on the SWQB's proposed amendments to certain waters in Sections 20.6.4.101 to -899 NMAC. His testimony also responds to Amigos Bravos' proposal to change

the aquatic life use in Section 20.6.4.128 NMAC. Dr. Hogan's written rebuttal testimony is provided as SWQB Rebuttal Exhibit 1.

Kristine Pintado, M.S. Ms. Pintado's rebuttal testimony focuses on the temporary standard provision proposed by the SWQB as a new Subsection 20.6.4.10.F NMAC, as well as changes to the review of piscicide applications in Section 20.6.4.16 NMAC. Ms. Pintado's written rebuttal testimony is provided as SWQB Rebuttal Exhibit 7.

Jodey Kougioulis, B.S. Mr. Kougioulis's rebuttal testimony addresses two proposed revisions filed by Peabody Energy. The first proposed revision is to the selenium criteria for wildlife habitat use in Subsection 20.6.4.900.J NMAC. The second proposed revision is to Subsections 20.6.4.900.D and E NMAC to exempt artificial ponds and man-made wetlands from primary and secondary contact recreation criteria. His written rebuttal testimony is provided as SWQB Rebuttal Exhibit 11.

Bryan Dail, Ph.D. Dr. Dail's rebuttal testimony addresses two proposed revisions to amend water quality standards criteria. The first proposed revision is Amigos Bravos' proposal to replace the hardness-based water quality standard for aluminum with the U.S. Environmental Protection Agency's ("EPA") nationally recommended §304(a) criteria. The second proposed revision is for site-specific copper criteria based on a report conducted by Freeport-McMoRan Chino Mines. Dr. Dail's written testimony is provided as SWQB Rebuttal Exhibit 14.

The Bureau hereby reserves the right to call any other person, including the witness(es) of other parties, to present surrebuttal testimony and to support or oppose the admission of any testimony, evidence, or exhibit.

The following exhibits, attached hereto, will be offered by the SWQB and witnesses at the hearing in addition to those listed in the Bureau's Notice of Intent to Present Technical

Testimony filed on December 12, 2014. In conformity with the Procedural Order, Section 201A, the Bureau will make a copy of the following exhibits available in its offices in Santa Fe, New Mexico as well as make an electronic copy available via its website. Additionally, each attached exhibit is marked sequentially as "SWQB Rebuttal Exhibit #."

EXHIBIT NUMBER	**TITLE OF EXHIBIT**
1.	James Hogan Rebuttal Testimony.
2.	Review of Clean Water Act ("CWA") §101(a) Uses - Contact Recreation Uses for Selected Segments.
3.	2008-09 Triennial Review, Statement of Reasons, pp. 1, 81-83, and 143, Water Quality Control Commission ("WQCC"); October 14, 2010.
4.	EPA Approval of Revisions to New Mexico's Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC; December 29, 2006.
5.	Record of Decision ("ROD") EPA Approval of Revisions to New Mexico's Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC; December 29, 2006.
6.	Record of Decision ("ROD") EPA Approval of Revisions to New Mexico's Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC; April 18, 2011.
7.	Kristine Pintado Rebuttal Testimony.
8.	EPA Region 8 Action on Multiple Sets of Temporary Modifications for Arsenic, letter dated June 20, 2013.
9.	Decision of the General Counsel on Matters of Law Pursuant to 40 CFR Section 125.36(m), No. 58.
10.	Technical Guidance Manual for Application and Review of Section 301(c) Variance Requests, p. 3; in EPA memo (M. Prothro), August 21, 1984.

11. Jodey Kougioulis Rebuttal Testimony.

12. Ambient Water Quality Criterion For Selenium – Freshwater 2014; Factsheet EPA Office of Water 820-F-14-005, May 2014.

13. Email Correspondence; Peabody Exhibit 8 (Cochran Testimony) 2009 Triennial Review, WQCC 08-13 (R).

14. Bryan Dail Rebuttal Testimony.

15. Prehearing Testimony of Steven P. Canton, GEI Consultants, Inc. on Behalf of Colorado Mining Association in the Matter of the Adoption of Revisions to the Basic Standards and Methodologies for Surface Water, Regulation #31 (5 CCR 1002-31).

16. EPA Region 6 Review of Metals Criteria. EPA comments on Derivation of the Equation-based Aluminum Criteria, letter dated December 6, 2011.

17. Comments on Freeport-McMoRan Chino Mines Company's Draft Petition to Amend Surface Water Quality Standards (20.6.4 NMAC) and Request for Hearing (letter); K. Pintado (SWQB) to G. Chappelle (Gallagher & Kennedy), September 15, 2013.

The Bureau hereby reserves the right to introduce and to move for admission of or opposition to any other competent evidence or exhibit in support of its proposed amendments or that of opposing parties or the public.

The Bureau will present and make available its staff and all exhibits at the June 9, 2015 Water Quality Control Commission meeting that is currently scheduled to begin at 9:00 a.m. at the New Mexico State Capitol Building, 490 Old Santa Fe Trail, Santa Fe, New Mexico. No other hearing locations have been provided.

Respectfully submitted, this the 13th day of February, 2015.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing *New Mexico Environment Department Surface Water Quality Bureau's Rebuttal Technical Testimony* was served on the following parties on this the 13th day of February, 2015, via the stated delivery methods below:

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STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

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New Mexico Environment Department,	
Petitioner.	

REBUTTAL TESTIMONY OF JAMES HOGAN

I. INTRODUCTION

My name is James Hogan and I am currently bureau chief of the New Mexico Environment Department ("NMED") Surface Water Quality Bureau ("SWQB"). A copy of my resume is marked as SWQB Exhibit 3, in the Notice of Intent ("NOI") direct testimony filed on December 12, 2014. It is accurate and up-to-date.

I am presenting this written rebuttal testimony on behalf of the SWQB to first clarify issues raised by the San Juan Water Commission ("SJWC") about Sections 20.6.4.97 through .99 New Mexico Administrative Code ("NMAC"). I will then present rebuttal testimony in response to the SJWC regarding SWQB's proposed amendments to certain waters in Sections 20.6.4.101 through .899 NMAC. Finally, I will present rebuttal testimony to the Amigos Bravos ("AB") proposal to change the aquatic life use in Section 20.6.4.128 NMAC.

II. PROPOSALS AND REBUTTAL

A. Overview of Designated Uses

The issues I will address in my rebuttal testimony all center on designated uses - in particular the rebuttable presumption for §101(a)(2) "fishable/swimmable" uses, the process by which to set/change these designated uses for ephemeral or effluent dependent waters, and the requirements to review those waters that do not meet the §101(a)(2) uses. For this reason I will start with an overview of designated uses to set the framework within which the responses to specific issues can be properly addressed.

Designated Uses are an Integral Part of the Water Quality Standards

Section 74-6-4.D of the New Mexico Water Quality Act ("WQA") provides that the Water Quality Control Commission ("WQCC") *"shall adopt water quality standards for surface and ground water of the state subject to the Water Quality Act. The standards shall include narrative standards and as appropriate, the designated uses of the waters and the water quality criteria necessary to protect such uses. The standards shall at a minimum protect the public health or welfare, enhance the quality of water and serve the purposes of the Water Quality Act."* The federal Water Pollution Control Act (i.e. the Clean Water Act ("CWA")) regulations provide similar direction:

"States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act." 40 CFR §131.2.

Rebuttable Presumption for 101(a)(2) "Fishable/Swimmable" Uses

Section 101(a)(2) of the CWA states *"it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."* Federal regulations specify that the requirement to adopt standards that "serve the purposes of the Clean Water Act" means that *"(as defined in Sections 101(a)(2) and 303(c) of the Act) water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation."* 40 CFR §131.2. Finally, in accordance with 40 CFR §131.10(j):

"(j) A State must conduct a use attainability analysis as described in § 131.3(g) whenever:

(1) The State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act, or

(2) The State wishes to remove a designated use that is specified in section 101(a)(2) of the Act or to adopt subcategories of uses specified in section 101(a)(2) of the Act which require less stringent criteria."

Where a use attainability analysis (UAA) is defined as *"a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in §131.10(g)."* 40 CFR §131.3(g).

Taken together, these federal regulations for Water Quality Standards ("WQS") regulations establish the "rebuttable presumption" that the CWA §101(a)(2) uses are attainable and therefore must be assigned to a water body, unless a State demonstrates, with appropriate documentation, that such uses are not attainable.

The New Mexico WQS have similar requirements:

"The commission may remove a designated use specified in Section 101(a)(2) of the federal Clean Water Act or adopt subcategories of a Section 101(a)(2) use requiring less stringent criteria only if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR 131.10(g). Section 101(a)(2) uses, which refer to the protection and propagation of fish, shellfish and wildlife and recreation in and on the water, are also specified in Subsection B of 20.6.4.6 NMAC." Section 20.6.4.15(A)(1) NMAC.

Secondary Contact and Limited Aquatic Life are not 101(a)(2) uses

In the 2005 Triennial Review, the SWQB argued that the limited aquatic life and secondary contact uses proposed for ephemeral waters under Section 20.6.4.97 NMAC were consistent with §101(a)(2) uses. However in its review of the 2005 Triennial Review, the U.S. Environmental Protection Agency ("EPA") determined these uses are not consistent with §101(a)(2) goals and rejected assigning the ephemeral designation by default because a UAA is required in order to do so. The EPA Record of Decision ("ROD") at p. 36[1] states:

> *In designating a limited aquatic life use subcategory for ephemeral waters, the WQCC explained in its SoR (paragraph 188), that:*
>
> > *"...the limited aquatic life subcategory "fits" the type of aquatic communities likely to be found in nonperennial waters. Finally, the limited aquatic life subcategory is appropriate because it satisfies the CWA and EPA regulations while avoiding the substantial burden on the state of preparing UAAs to justify not designating another subcategory of the aquatic life use for nonperennial waters."*
>
> *EPA supports the concept, but disagrees with the Commission's interpretation that adopting a limited aquatic life use subcategory satisfies the CWA and EPA regulations. Although ephemeral waters may only be capable of supporting a limited aquatic community selectively adapted to the conditions typical of these waters, this limited use does not serve the purposes*

[1] http://www.nmenv.state.nm.us/swqb/documents/swqbdocs/Standards/TriennialReview/2005/ROD-EPAReviewDRAFT11-16-06.pdf

of the Act as defined in CWA sections 101(a)(2) and 303(c). These statutes require water quality standards to provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water – functions commonly referred to as fishable/swimmable uses. EPA's current water quality regulation effectively establishes a rebuttable presumption that fishable/swimmable uses are attainable and therefore should apply to a water body unless it can be demonstrated that such uses are not attainable. EPA does not expect the State to adopt uses for ephemeral waters that cannot be attained, but in those instances, the State must submit a UAA to support an aquatic life designation that does not meet the CWA 101(a)(2) objective as required by 40 CFR131.10(j)(1).

Likewise the ROD at p. 38 states:

"Designating a secondary contact use is likely to be appropriate for ephemeral waters. However, following the same logic explained in the discussion of the limited aquatic life use, EPA's current water quality regulation effectively establishes a rebuttable presumption that "fishable/swimmable" uses are attainable unless it can be demonstrated that such uses are not attainable. As noted in that earlier discussion, 40 CFR 131.10(j)(1) requires that a UAA be submitted supporting designated uses for waters that are lower than the goal uses described in CWA Section 101(a)(2)."

Required Review of Waters that do not Include 101(a)(2) uses

In accordance with the water quality standards in Section 20.6.4.10 NMAC and the federal water quality regulations require that:

"...the state shall from time to time, but at least once every three years, review applicable water quality standards and, as appropriate, modify and adopt standards. Any water body segment with water quality standards that do not include the uses specified in Section 101(a) of the Clean Water Act ("CWA") shall be re-examined to determine if any new information has become available. If such new information indicates that the uses specified in the CWA Section 101(a)(2) are attainable, the State shall revise its standards accordingly." 40 CFR §131.20(a).

B. Ephemeral waters proposed in Subsection C of 20.6.4.97 NMAC

In their NOI, the SJWC requests that the WQCC reflect on the transactional costs associated with the underlying WQCC-approved water quality standards for ephemeral waters designations and encourages the SWQB and the WQCC to approach the EPA to determine the most efficient way to undo the damage caused by changes adopted in the 2009 triennial standards review. While the SWQB is always willing to engage with interested parties to find ways to improve the clarity and efficiency of the WQS and ensure that waters are neither under- nor over-protected, it is not clear that the SJWC's proposal is tenable.

The SWQB disagrees with the SJWC's request to simply revoke the §101(a)(2) rebuttable presumption for several reasons. First, as noted in previous testimony, the EPA considers limited aquatic life and secondary contact to not meet §101(a)(2) goals of the CWA, as clearly documented in their disapproval of the default ephemeral designations approved by the WQCC in the 2005 triennial review. For this reason the SJWC is incorrect in their assertion that the rebuttable presumption adopted by the WQCC in 2009 could easily be reverted back to the pre-2009 designated uses and criteria for secondary contact recreation and limited aquatic life uses without the performance of a UAA.

Likewise the SJWC has provided no evidence supporting their statement of "damage caused by the 2009 action". I present testimony below to demonstrate that the SWQB currently has an expeditious and cost-effective approach that will meet relevant State and federal regulations.

SJWC: All unclassified waters are now assigned the designated use of wildlife habitat, primary contact and marginal warmwater aquatic life, and those uses can be downgraded only through

the performance of a UAA. The SJWC believes this requirement places an unreasonable transactional cost burden on the state and its citizens that is simply unnecessary.

Rebuttal Response: The SWQB does not agree that UAAs place an unreasonable transactional cost burden on the state and its citizens. For example, during 2008-2009, the SWQB conducted 18 Hydrology Protocol ("HP") UAAs for a total of $25,000 in contractor expenses, plus SWQB staff time. In the SWQB's opinion, a cost of less than $1,500 per UAA plus staff time does not seem an unreasonable financial burden given that this work supports a WQS rulemaking change, avoids the costs associated with development of individual Total Maximum Daily Loads ("TMDLs"), and also avoids unnecessary investments in point and non-point source pollution reduction technologies within these stream segments. Most importantly, the appropriate attainable and scientifically defensible uses and criteria have been identified for these streams for CWA use in §303(d) assessments, NPDES permits, and TMDLs.

SJWC: The SJWC claims that the Hydrology Protocol, cited in Subsection 20.6.4.15.C NMAC, elevates this guidance document to the status of an enforceable regulation, thus circumventing the due process rights of those against whom the guidance documents are applied.

Rebuttal Response: The SWQB disagrees with the SJWC's assessment of the Hydrology Protocol. The HP is not merely a guidance document - it is part of the State's Water Quality Management Plan ("WQMP") and was adopted by the WQCC following two rounds of public comment. As a part of the WQMP, the HP does not set enforceable regulations; rather it is a WQCC-approved policy document that sets the procedure by which the regulations, as

documented in Subsection 20.6.4.15.C NMAC, can be implemented. Under this protocol, data are collected to demonstrate that a waterbody cannot achieve the presumed primary contact or aquatic life uses, which are assigned by default. As such, any WQS change adopted following a HP UAA will only lead to a designated use with less stringent criteria. However, adopting such a change must follow the administrative hearing process, which does not circumvent due process.

While the approval process in Subsection 20.6.4.15.C NMAC provides for an expedited process to revise the designated use of a water body, it does not circumvent due process, as the public notice and comment period is still required prior to the SWQB approval and submission to the EPA. Once approved by the SWQB and the EPA, HP UAAs are also subject to public hearing and approval by the WQCC through the Triennial Review process.

SJWC: The SJWC argues that the EPA should be receptive to a proposal allowing New Mexico to return to the WQS that were in place for ephemeral streams prior to 2009, given recent public comments on EPA's proposed "waters of the United States" rule. *See* Definition of "Waters of the United States."[2] Numerous submitted comments demonstrate that ephemeral waters may not be classified as waters of the United States and thus federal jurisdiction for water quality protection purposes does not apply to such waters.

Rebuttal Response: The SWQB recognizes that many parties, including the NMED, have raised concerns about the federal jurisdictional authority over ephemeral waters. Until a final rule is promulgated, however, it is premature to interpret the impact of EPA's waters of the United States rule, or to determine if a state level designation of ephemeral waters could be made.

[2] SJWC cites the proposed rule published by the EPA on April 21, 2014. 79 FR 76, p. 22188 (Definition of ''Waters of the United States'' Under the Clean Water Act; Proposed Rule).

Regardless, per Subsection 20.6.4.15(A)(1) NMAC, designated uses may only be removed or made less stringent if a UAA demonstrates that attaining the existing use is not feasible because of a factor listed in 40 CFR §131.10(g).

SJWC: Arizona has a reasonable approach to unclassified waters; New Mexico should adopt their concept of effluent dependent waters.

Rebuttal Response: The SJWC provides no suggestions as to how Arizona's regulations on effluent dependent waters ("EDWs") could be incorporated into New Mexico's WQS. While Arizona's approach may appear reasonable, in the opinion of the SWQB it would be fraught with implementation challenges if adopted for New Mexico. First, as defined in Arizona's WQS, *"an effluent-dependent water is a surface water that, without the point source discharge of wastewater, would be an ephemeral water."* (R18-11-101) This would require an extensive, statewide study of all waters with point source discharges to determine if, without the point source, the water would be ephemeral. Second, Arizona's WQS define a special designated use and associated standards for EDWs. As such the term "EDW" describes the source of the water, rather than the uses supported by the water and the criteria to protect these uses, as in New Mexico's WQS. It is likely that EDWs in New Mexico support a wide variety of uses, thus defining a single use for all EDWs would be difficult. Likewise, effluent quality, and thus the resulting in-stream water quality, would likely be variable in EDWs, thus establishing one set of standards to protect the source of the water would be difficult. Therefore, adopting standards similar to Arizona's would require careful consideration of the overall impact to all of New Mexico's WQS. Finally, it is unclear whether having a designated use of EDW would imply that

the stream has a designated use for waste transport and assimilation. This is a significant issue because waste transport and assimilation is not considered an acceptable designated water body use. The federal regulations at 40 CFR §131.10(a) states:

> *"§131.10 Designation of uses.*
>
> ***(a)** Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State 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.* ***In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.*** *[Emphasis added]*

Therefore, as for other discharges, the effluent quality must be maintained at treatment levels sufficient enough that degradation does not occur, and also consistent enough to ensure that all attainable uses are met. Furthermore, as the Department already has several regulatory tools, such as the HP, to determine what uses and criteria should apply for receiving streams, such a broad category as an EDW designated use is not necessary.

C. Proposal for Certain Segments in Section 20.6.4.100-899 NMAC to Change to Primary Contact Recreation

The SJWC argues that the WQCC should not adopt the SWQB's proposed revisions for upgrading recreational use in nine waterbody segments because such a use already meets §101(a)(2) goals and therefore there is no need to make this change, and because the SWQB provides no information and data proving the use is attainable. As detailed previously, secondary contact does not meet the §101(a)(2) goal and as such, per 40 CFR §131.20(a), the State is required to review these waters during the Triennial Review to determine if the

§101(a)(2) goal remains unattainable. In conducting this review, the SWQB found no evidence of a UAA to support the designation of a secondary contact use or evidence that primary contact use is unattainable in these waters. To the contrary, all evidence found indicated that the primary contact recreation was an existing use, or at the very least attainable given the significant amount of other water-based recreation occurring. For these reasons, the SWQB argues that the WQCC should reject the SJWC recommendation and adopt the changes as proposed by the SWQB.

SJWC: Because the current designated use of secondary contact recreation, previously approved by EPA, meets CWA §101(a)(2) goal for recreation in and on the water there is no need to impose this change.

Rebuttal Response: In previous Triennial Reviews, the SWQB made the same argument presented by the SJWC when the ephemeral standards under Section 20.6.4.97 NMAC were first adopted. As noted above in its review of the 2005 Triennial Review, the EPA determined that secondary contact is not consistent with §101(a)(2) goals and rejected assigning the ephemeral designation by default because a UAA is required in order to do so.

SJWC: The SWQB does not offer any data, documentation, or evidence that primary contact is occurring and is attainable.

Rebuttal Response: This is not correct; in the SWQB petition and testimony, evidence of primary contact recreation as an existing or an attainable use is provided. As discussed above, the State is required to periodically review waters that do not meet §101(a)(2) goals; in

conducting this review, the SWQB found no evidence to support that primary contact in these waters is not attainable. This information is summarized in SWQB Rebuttal Exhibit 2 (memo) and hereby added to the rationale already presented in the petition and testimony.

For example, in Segment 20.6.4.219 NMAC, for Avalon Reservoir, the petition Basis for Change states the following:

"In this case, kayaking and scuba for game fishing are activities allowed and described on the reservoir park website. The Department has no evidence that this use is not attainable and information indicates that primary contact use may be existing and is likely attainable."

(Pintado Testimony, SWQB Exhibit 13, p. 81)

Also, in testimony the SWQB stated that primary contact recreation was observed in Segment 20.6.4.103 NMAC. Additionally, it has been noted by field staff that the Rio Grande is accessible for swimming, and there is a commercial hot springs park located in this segment, which features access to the river. It was stated in testimony that Segment 20.6.4.116 NMAC includes the Rio Ojo Caliente, which has swimming at the hot springs located in it. Rafting and float trips have been observed by SWQB staff, and the United States Bureau of Land Management ("BLM") offers rafting activities on the lower and upper segments of the Rio Chama.[3]

While nominally accessible to park scientists and guided tours, the SWQB also has anecdotal information from the National Park Service (Valles Caldera National Park) that Segment 20.6.4.124 NMAC has an existing use (as defined under Subsection 20.6.4.7 (E)(3) NMAC) of primary contact recreation in hot springs in this segment with features named

[3] SWQB staff has observed rafting and float trips on this segment. The Bureau of Land Management offers rafting activities on lower and upper segments of the Rio Chama: http://www.blm.gov/nm/st/en/prog/recreation/taos/rio_chama_wsr.html

"footbath springs", and "Ladies' and Men's bathhouses". Evidence of primary contact recreation has been observed by SWQB staff in Segments 20.6.4.204 and 206 NMAC, particularly upstream and downstream of Brantley Reservoir. Segment 20.6.4.207 NMAC is the main stem of the Pecos River and includes over 100 miles including the Salt Creek wilderness used by hikers and backpackers. While some of this area is very remote, contact recreation is possible. There is easy access just below Sumner Dam, there are daytime recreational-use sites on both sides of the river, and fishing activities are common.

Segments 20.6.4.213, 219 and 308 NMAC are all lakes on state parks with activities noted in the testimony, which includes scuba, fishing (includes scuba game fishing and fly fishing), wading, kayaking, canoeing and paddlecraft, and use of small trolling boats. The SWQB considers such water-based recreation to indicate a significant potential for primary contact, either on purpose or by accident.

SJWC: The SWQB also states in their Basis for Change "to be consistent with the latest EPA recommendations for recreational contact… the designated use…is upgraded." However, the EPA announcement published in the Nov 29, 2012 Federal Register applies to the availability of the 2012 Recreational Water Quality Criteria, a document that contains EPA's recreational water quality criteria recommendations for protection human health in ambient waters that already are designated for primary contact recreation- not secondary contact. EPA's recommendation does not apply unless or until the waters have a designated use of primary contact.

Rebuttal Response: The SWQB disagrees with the SJWC's comment. The relevant requirement is in 40 CFR §131.20(a), which requires states to review WQS that do not meet §101(a)(2) uses.

The SWQB reference to 77 FR71191, November 29, 2012 is merely to note that the primary contact standards meet the latest EPA recommendations for recreational contact and CWA §101(a) goals (77 FR71191, November 29, 2012).

D. Section 20.6.4.128 NMAC – LANL Waters in Segment 128

Amigos Bravos submitted a proposal to change the limited aquatic life use to the marginal warmwater aquatic life use in Segment 20.6.4.128 NMAC ("Segment 128") for the following reasons: 1) non-perennial waters are important; 2) the current uses and criteria (e.g., acute) in this segment are not based on sound science, do not meet the review required under 40 CFR §131.20(a) and should be revised; 3) intermittent streams on LANL property should have the same protections as for other intermittent waters in New Mexico; and 4) Segment 128 uses and criteria are based on a "fatally flawed" UAA. (Amigos Bravos NOI Testimony, Pleading Log Item 19) Los Alamos National Lab ("LANL") has filed a notice of intent to present direct technical testimony in opposition to Amigos Bravos' proposal. (LANL NOI Testimony, Pleading Log Item 22)

The SWQB's rebuttal testimony is in opposition to Amigos Bravos' proposal, and is presented below. In summary, the WQCC and EPA have previously determined that limited aquatic life is the highest attainable use for the intermittent and ephemeral waters in Segment 128. Amigos Bravos presents no new information to indicate that the marginal warmwater aquatic life use is an existing or attainable use, in fact the arguments they provide was considered, and rejected, by the WQCC during the last Triennial Review. Likewise the argument that these criteria are based on a "fatally flawed" UAA is not supported by the record supporting

the WQCC's adoption and the EPA's review and approval. For these reasons, as detailed below, the SWQB recommends that the Commission not adopt Amigos Bravos' proposal.

AB: Amigos Bravos proposes to change Segment 128 from a limited aquatic life use to a marginal warm water aquatic life use because intermittent waters on LANL are given weaker protections than all other intermittent waters in New Mexico. Amigos Bravos' testimony provides an account of the importance of non-perennial streams and includes an inventory of birds, mammals and aquatic species documented in Los Alamos County and in the Jemez Mountains region.

Rebuttal Response: The SWQB agrees that non-perennial streams are important. However, Amigos Bravos' most recent proposal for Segment 128 relies upon, and reinterprets, the same information considered by the WQCC when the limited aquatic life use was first assigned to ephemeral and intermittent streams in Segment 128.[4] This same information was presented again by Amigos Bravos in a proposal to change the limited aquatic life use in Segment 128 during the 2008-2009 Triennial Review. At that time, the WQCC did not approve Amigos Bravos' proposed change to the limited aquatic life use, noting four main reasons:

1. The WQCC does not adopt Amigos Bravos' proposal to replace limited aquatic life use with aquatic life use because this segment was created and designated uses were assigned in the last triennial review; Amigos Bravos presented no new evidence regarding current water quality conditions that would support a change in the standards.

[4] Discussion is in the 2003-2005 Triennial Review Hearing Officer's Report, Attachment A, pp. 189-199.

2. A UAA was completed and approved by the EPA for this segment. The UAA noted that the 2002 study referenced by Amigos Bravos "provide[s] information from numerous sources indicating that ephemeral and intermittent streams in the Jemez Mountains support aquatic life that includes aquatic invertebrates and perhaps amphibians, but not fish." Amigos Bravos relies on information that the WQCC already considered in assigning the limited aquatic life use.
3. The EPA approved this provision based on the hearing record and the UAA submitted by the SWQB, and has not indicated any problem with that decision.
4. The UAA for this segment acknowledges the presence of aquatic invertebrates, and even amphibians, but not fish, and therefore concludes that the waters cannot attain the CWA §101(a)(2) goal of water quality providing for the "protection and propagation of fish, shellfish and wildlife."

(SWQB Rebuttal Exhibit 3)

AB: The LANL UAA is fatally flawed because it was improperly drafted as an after-the-fact rationalization for the 2004 decision by the WQCC to change 20.6.4.128 NMAC.

Rebuttal Response: During the time the 2003-2005 Triennial Review was conducted, the SWQB and the WQCC considered the 2002 report (Lusk and McRae) to provide the necessary documentation to support of uses assigned to Segments 126-128. In accordance with CWA §303(c) and 40 CFR §131.20(c), amendments to the WQS, including for Segments 126-128, were submitted to the EPA for review on July 1, 2005. The WQCC's Statement of Reasons for Amendment of Standards, the hearing record, all transcripts and exhibits, and the 2002 U.S. Fish

and Wildlife study were provided to support the changes, pursuant to 40 CFR §131.6(b) and (f). The EPA approved the majority of the amendments (SWQB Rebuttal Exhibit 4). However, for Segment 128, the EPA took no action and requested further documentation, citing 40 CFR §131.6(b) and (f), and stating:

> *"...In today's action, EPA is approving the majority of these amendments. However, based on a review of the record, EPA was unable to take action on a few provisions because they did not meet the minimum requirements for a water quality standards submission. See 40 CFR 13 1.6(b) and (f). Specifically, EPA was unable to take action on the limited aquatic life, aquatic life and or secondary contact recreation use designations for Sections 20.6.4.97, 20.6.4.98 and 20.6.4.99. EPA strongly supports the concept the State has used in developing standards for unclassified ephemeral, intermittent and perennial surface waters; however, adequate supporting documentation (such as a use attainability analysis) was not available which would allow us to take action on all portions of these provisions. Similarly, EPA was unable to take action on the new and for revised use designations and modifications for six classified segments because adequate supporting documentation (such as a use attainability analysis) was not available to support the modifications. See segments 20.6.4.126, 128, 221, 310, 701 and 702.*
>
> *The enclosed detailed Record of Decision ["ROD"] explains EPA's basis for the approval action taken and* ***provides an explanation of the type of documentation that is necessary for EPA to be able to approve the remaining provisions. We would be glad to work with you and provide technical assistance regarding the needed supporting documentation." [Emphasis added]***
>
> (SWQB Rebuttal Exhibit 4)

The EPA also made specific comments on Segment 128 in the ROD accompanying its letter:

> *"...As with the two previous Sections, New Mexico has established this segment, classifying waters within LANL property. The State based use designations for this segment on the same intensive study by the Service (Lusk and MacRae 2002) mentioned in the previous sections. This segment has been designated for limited aquatic life and secondary contact based on likelihood of exposure by ingestion and a light frequency of use, as well as the State's default livestock watering and wildlife habitat uses that have been applied.*
>
> *The limited aquatic life and secondary contact uses may be the highest uses that can be attained in this segment. However, as discussed in Section 20.6.4.126, such designations are not compatible with the uses specified in section 101(a)(2) of the Act and must be supported by a UAA based on one of the factors listed in 40 CFR 131.10(g). Again, the most logical factor is 131.10(g)(2) - natural, ephemeral, intermittent, or low-flow conditions or water levels prevent attainment of the use. The supporting UAA for waters in this segment and Section 20.6.4.126 may be combined.*

Action: EPA takes no action on this Section."

(SWQB Rebuttal Exhibit 5)

To suggest that the UAA was completed "after the fact" and is therefore "fatally flawed" is without merit. The UAA report was requested under 40 CFR §131.6 to support the uses adopted in 2005 by the WQCC for the ephemeral and intermittent waters in Segments 126 and 128. The EPA worked with the SWQB on the UAA, which was submitted to the EPA on August 17, 2007, and approved on August 31, 2007.

The allegation that the UAA is "fatally flawed" based on a predetermination decision is not applicable in the context of WQS revisions, especially when the federal regulations allow for additional information to be submitted before final CWA §303(c) approval by EPA. The federal regulations at 40 CFR §131.21(a)(1)-(2) require the EPA to review and either approve or disapprove a state's WQS only after they have been adopted and certified by the state.[5] Therefore, to comply with the federal regulations all WQS revisions could be considered "after the fact." AB cites *Davis v. Mineta*, 302 F.3d 1104 (10th Cir. 2002) for the proposition that the UAA was "fatally flawed" as a result of some "predetermination." That case is not relevant as it dealt with the National Environmental Policy Act ("NEPA") process, a procedural statute requiring federal agencies to evaluate the impact of their actions upon the environment before engaging in that action. That process is very different than the EPA approval of a UAA submitted by a state agency, where the EPA would almost certainly consider the same evidence as the state agency did in evaluating how to classify these waters.

[5] According to 40 CFR 131.21, those WQS revisions submitted after May 30, 2000, are applicable for CWA purposes only after EPA's final approval.

Furthermore, in the 2011 ROD for the EPA's review of the 2008-2009 Triennial Review, the EPA reiterated its approval of the uses and criteria for ephemeral and intermittent streams in Segment 128:

> *"In its 2005 action, New Mexico designated limited aquatic life and secondary contact uses for this segment. In 2006, EPA took no action on this new segment, noting that the State had not provided adequate support justifying the limited aquatic life or the secondary contact use designation. EPA noted that 40 CFR 131.6(b) and (f) requires the submission of supporting analyses and other general information that would assist EPA in determining the adequacy of standards that don't include uses specified in §101(a)(2)of the Act. EPA noted that to comply with the regulation, New Mexico must submit a UAA to demonstrate why attaining the limited aquatic life and secondary contact recreation uses are not feasible based on one of the factors listed in 40 CFR 131.10(g).*
>
> *Following that recommendation, NMED developed a UAA in August 2007, to support the limited aquatic life and secondary contact use designations for this segment. The State's UAA identified the streams included in this segment as ephemeral and intermittent. Given that these streams do not flow for varying periods throughout the year and the lack of upstream source populations, it is unlikely that this segment could support a higher use. EPA approved the limited aquatic life and secondary contact use designations for this segment on August 31, 2007."*
>
> (SWQB Rebuttal Exhibit 6)

AB: The UAA also does not take into account the well-documented presence of shellfish and macroinvertebrates that are indicators of a 101(a)(2) use.

Rebuttal Response: As noted in the testimony above, the WQCC found that the UAA does acknowledge the presence of aquatic invertebrates, and even amphibians, however it concluded that that the waters cannot attain the CWA §101(a)(2) goal. It is important to note that designation of limited aquatic life use for the ephemeral and intermittent streams in Segment 128 does not ignore the presence of macroinvertebrates, including shellfish and clams. In fact, the definition for limited aquatic life states that the subcategory *"includes surface waters that support aquatic species selectively adapted to take advantage of naturally occurring rapid*

environmental changes, ephemeral or intermittent water, high turbidity, fluctuating temperature, low dissolved oxygen or unique chemical characteristics." Subparagraph 20.6.4.7.L (2) NMAC

AB: Amigos Bravos suggests that in accordance with the federal regulations in 40 CFR §131.20(a), the SWQB should reevaluate the waters in Segment 128 by applying use of the HP.

Rebuttal Response: The SWQB does not agree. The federal regulations in 40 CFR §131.20(a) do not require states to revisit every UAA, or to generate new data. Rather, the SWQB is required to consider if new data are available for segments without CWA §101(a)(2) uses, and whether those data indicate that a higher use is attainable. The SWQB is not aware of, nor has Amigos Bravos presented, new and credible data demonstrating that the marginal warmwater aquatic life use is existing or attainable in Segment 128.

AB: Segment 128 should be assigned the warmwater aquatic life use consistent with the default uses and criteria (e.g., acute and chronic) consistent with intermittent streams in Section 20.6.4.98 NMAC.

Rebuttal Response: It is not required, nor is it necessarily appropriate, to always assign default uses and criteria (e.g., under Sections 20.6.4.97 through .99 NMAC) to certain types of water bodies when using the UAA methodology. Instead, the WQS require that UAA methods must be scientifically defensible, and provides examples of such methods (Subsection 20.6.4.15.B NMAC). In the case of Segment 128, the UAA for this segment acknowledges the presence of aquatic invertebrates, wildlife, amphibians, but not fish, and therefore concludes that the waters

cannot attain the CWA §101(a)(2) goal of water quality providing for the "protection and propagation of fish, shellfish and wildlife." (SWQB Rebuttal Exhibit 3) The UAA also acknowledges that the ephemeral and intermittent streams in this segment experience a low-flow regime subject to high variability, which limits the aquatic species to those well adapted to those conditions, such as for the limited aquatic life use defined in Subparagraph 20.6.4.7.L (2) NMAC.

AB: Amigos Bravos points to the HP as new guidance, which was in development during the 2008-2009 Triennial Review process[6] that provides better and clearer guidance on how to complete UAAs in ephemeral and intermittent streams. They assert that if this new protocol had been used, many of the waters in these segments would merit the protections of a marginal warmwater aquatic life use designation rather than a limited aquatic life use designation.

Rebuttal Response: Amigos Bravos states in testimony that according to the HP, "…the presence of macroinvertebrates signal that the water is in fact intermittent, not ephemeral, and therefor merits CWA §101(a)(2)…" [Conn Testimony, Amigos Bravos NOI, Pleading Log Item 19 p. 3] While this is correct, it is important to understand that the HP UAA is designed to be an expedited process to demonstrate that attainment of CWA §101(a)(2) aquatic life and recreational uses are not feasible due to the factor identified in 40 CFR §131.10(g)(2): *natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the use*. Due to the expedited nature of the HP the presence of macroinvertebrates requires additional data

[6] The HP was approved by the WQCC on May 10, 2011 and by the EPA on December 23, 2011 as Appendix C of the state's Water Quality Management Plan (WQMP) / Continuing Planning Process (CPP) document.

collection, beyond the basic Level 1 Evaluation, to demonstrate that limited aquatic life is the highest attainable use.

As such, the HP notes that for the Level 1 Evaluation, ephemeral streams with scores below 9 but in which aquatic macroinvertebrates and/or fish have been observed, the stream is at least intermittent. [HP Table 5, p.33] However, the HP further states that:

> *"...In most instances, the use of a Level 1 Evaluation should be sufficient to make a final hydrological determination.* ***If after conducting Level 1 Evaluation, a hydrological determination cannot be made because more information is required, then a Level 2 Evaluation which uses more intensive data collection can be conducted."***

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Monitoring, Assessment and Standards Section
Surface Water Quality Bureau

From: Bryan Dail, Environmental Scientist
Jodey Kougioulis, Environmental Scientist
Surface Water Quality Bureau

Subject: Review of Clean Water Act ("CWA") §101 (a) Uses - Contact Recreation Uses for Selected Segments

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The Water Quality Standards ("WQS") in Subsection B of 20.6.4.6 NMAC require the state to establish WQS consistent with the New Mexico Water Quality Act and the federal CWA to protect public health or welfare, and enhance water quality:

> *"...**B.** The state of New Mexico is required under the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal Clean Water Act, as amended (33 U.S.C. Section 1251 et seq.) to adopt **water quality standards that protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act. It is the objective of the federal Clean Water Act to restore and maintain the chemical, physical and biological integrity of the nation's waters, including those in New Mexico. This part is consistent with Section 101(a)(2) of the federal Clean Water Act, which declares that it is the national goal that wherever attainable, an interim goal of water quality that provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983.** Agricultural, municipal, domestic and industrial water supply are other essential uses of New Mexico's surface water; however, water contaminants resulting from these activities will not be permitted to lower the quality of surface waters of the state below that required for protection and propagation of fish, shellfish and wildlife and recreation in and on the water, where practicable" [emphasis added].*

Accordingly, the state has adopted designated uses in the WQS that are consistent with the CWA §101(a)(2) for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water.

Section 20.6.4.10 NMAC also requires a review of the WQS consistent with the federal CWA requirements, and as needed, to revise the WQS:

> ***"20.6.4.10 REVIEW OF STANDARDS; NEED FOR ADDITIONAL STUDIES:***
>
> ***A.*** *Section 303(c)(1) of the federal Clean Water Act requires that the state hold public hearings* ***at least once every three years for the purpose of reviewing water quality standards and proposing, as appropriate, necessary revisions to water quality standards****...."[Emphasis added]*

And as required in the federal water quality regulations in 40 CFR §131.20:

> *"The State shall from time to time, but at least once every three years, review applicable water quality standards and, as appropriate, modify and adopt standards.* ***Any water body segment with water quality standards that do not include the uses specified in Section 101(a) of the Clean Water Act ("CWA") shall be re-examined to determine if any new information has become available.*** *If such new information indicates that the uses specified in the CWA Section 101(a)(2) are attainable, the State shall revise its standards accordingly." [Emphasis added]*

The water quality standards contain nine water bodies designated with secondary contact uses and criteria. Criteria levels currently assigned to these nine segments are based on the EPA's 1986 guidance (EPA440/5-84-002, January 1986). This guidance allowed for criteria based on different levels of water contact other than swimming, such as expected to occur during wading, fly fishing or boating. As these secondary contact criteria are not sufficient to protect for swimming uses they are not considered a CWA §101(a)(2) use.

In the time since the State's review conducted for the 2009 Triennial Revisions, the EPA's 1986 guidance has been superseded by new EPA recommendations for recreational use and criteria based on updated epidemiological and other scientific data, which were finalized on November 28, 2012. The latest recommended recreation criteria levels for *E. coli* include a 30-day geometric mean ("GM") of 126 cfu/100 mL and a maximum Statistical Threshold Value ("STV") of 410 cfu/100 mL for primary contact recreation uses. These criteria levels are the same as those currently assigned in the WQS to the primary contact use in Subsection D of 20.6.4.900 NMAC. However, the new EPA recommendations do not include a secondary contact recreation use or criteria, and do not include criteria based on different levels of water contact as provided under the previous EPA guidance.

Segment-specific uses with associated criteria that are not protective of the primary contact use may be proposed only through a Use Attainability Analysis ("UAA"). A UAA must demonstrate that the use is not attainable and that the use is not an existing use as defined in Subparagraph 20.6.4.10.E (3) NMAC and 40 CFR §131.3. Uses that are shown to be existing uses shall not be removed, whether they have been designated in the water quality standards or not, unless they are replaced by more stringent uses (20.6.4.15.A (2) NMAC and 40 CFR §131.10 (h) (1)). Therefore, in accordance with the three-year evaluations of CWA §101(a) uses necessary under the WQS, and as part of the 2013 Triennial Revision process, these segments are

being evaluated to determine if new information exists that indicates that primary contact uses and criteria may exist or be attainable.

Table 1 below summarizes information on the nine segments evaluated in accordance with the federal water quality regulations in 40 CFR §131.20. To prepare this summary, the Surface Water Quality Bureau ("SWQB") first completed a review of WQS records and did not locate any UAAs conducted for the nine segments that had been approved and adopted by the Water Quality Control Commission ("WQCC") and approved by the U.S. Environmental Protection Agency ("EPA"). Second, the SWQB did not receive any UAAs for these segments during the public comment period. Nor is the SWQB aware of new information or supporting analyses that primary contact recreation uses on these segments are not attainable due to a factor listed under 40 CFR 131.10(g). Finally, and most importantly, as shown in Table 1, SWQB found significant information to indicate that primary contact recreation as defined in Subparagraph 20.6.4.7.P (5) NMAC may be an existing use for water bodies in most of these segments and is likely an attainable use. Of particular note is documentation of boating access and recreation. Based on SWQB's experience where boating occurs primary contact recreations is almost always an existing use and is almost certainly an attainable use. To collect this information, SWQB reviewed surface water quality monitoring data records, conducted website reviews, and consulted with SWQB permits staff. SWQB also reviewed field observations with SWQB monitoring staff and with the New Mexico Department of Game and Fish. Therefore, the consideration to assign primary contact use and criteria to the nine segments is appropriate in context of the information on recreation contact uses in these segments and the new EPA guidance on criteria.

Table1. Segment, name (brief waterbody description), NPDES permit information, WQS history and notes on the existing or highest attainable CWA 101(a)(2) recreational uses for nine segments in the WQS.

Segment in 20.6.4 NMAC	**Name**	**Permits**	**WQS History**	**Use Notes**
.103 Rio Grande Basin	Rio Grande (RG) Caballo to Elephant Butte Dam; perennial tribs to RG in Sierra and Socorro Counties	NPDES Permit: NM0020681 (T or C WWTP) Permit limits: 548 cfu/30-Day Avg; 2507 cfu/ Daily Max (E. coli)	1988-2005: Secondary use and criteria Fecal coliform 1000 (GM); 2000 (SSM) 2005-Present: Secondary use and criteria E. coli 548 (GM); 2507 (SSM)	SWQB Survey 2011-2012. *Riverbend Hot Springs* park is located in this segment.[1] Website describes the public pools where the "…cold and clear Rio Grande is also accessible for swimming at your own risk..."[2]
.116 Rio Grande Basin	Rio Chama upstream to Abiquiu, Rio	NPDES Permit: NM0024830 (Abiquiu WWTP)	1988-2005: Secondary use and criteria	SWQB Survey 2012. Includes Ojo

[1] http://www.riverbendhotsprings.com/
[2] http://www.riverbendhotsprings.com/springs.html

Segment in 20.6.4 NMAC	Name	Permits	WQS History	Use Notes
	Tusas, Rio Ojo Caliente, Abiquiu Creek, and El Rito Creek (to below El Rito)	Permit limits: 47 cfu/30-Day Avg 88 cfu Daily Max	Fecal coliform 1000 col/mL (GM); 2000 col/mL(SSM) 2005-Present: Secondary use and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	Caliente hot springs. Rafting and float trips observed.[3] Ohkey Owingeh (San Juan) is downstream with Primary/Ceremonial Use.[4] Rio Grande at the confluence is primary contact.
.124 Rio Grande River Basin	Sulphur Creek from confluence with Redondo Creek and upstream to its headwaters	NONE	2005: Segment created from .108 which had Primary use. 2005-Present: Secondary use and criteria E. coli 548 col/mL (GM); 2507 col/mL (SSM)	SWQB Surveys in 2003; 2013-14. Valles Caldera National Park is accessible via guided tours. Privately owned hot springs includes evidence of existing contact recreation use.
.204 Pecos River Basin	Pecos River from Avalon Reservoir to Brantley Dam	NONE	1988- 2010: Secondary use and criteria E. coli 548 (GM); 2880 (SSM); SSM lowered to 2507 in last TR (2010).	SWQB Surveys in 2004; 2013. Swimming occurring in segment reported June 2014[5] Information regarding access suggests use likely existing and attainable.
.206 Pecos River	Pecos River from Brantley reservoir	NPDES Permit: NM0022268	1988 – 2005: Secondary use	SWQB Surveys in 2004; 2013.

[3] SWQB staff has observed rafting and float trips on this segment. The Bureau of Land Management offers rafting activities on lower and upper segments of the Rio Chama: http://www.blm.gov/nm/st/en/prog/recreation/taos/rio_chama_wsr.html

[4] Apr 1- Sept 30 (100/200 col/mL) and Secondary (200/400 col/mL) Oct 1- March 31.

[5] Primary contact use (swimming) noted by the New Mexico Department of Game and Fish (June 2014).

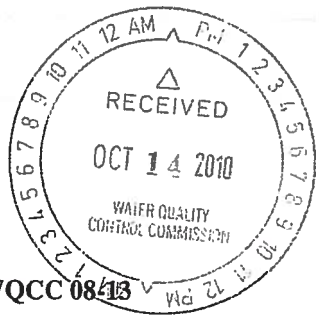
Segment in 20.6.4 NMAC	Name	Permits	WQS History	Use Notes
Basin	to Salt Creek near Acme and several tributaries	(Artesia WWTP) Permit limits: 548 cfu/30-Day Avg; 2507 cfu/ Daily Max (E. coli)	and criteria Fecal coliform 1000 col/mL (GM); 2000 col/mL(SSM) 2005-Present: Secondary use and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	Brantley Reservoir (downstream) is Primary contact use.
.207 Pecos River Basin	Pecos River main stem from Salt Creek (near Acme) to Sumner Dam	NPDES Permit: NM0023477 (Fort Sumner WWTP) Permit limits: 548 cfu/30-Day Avg 2507 cfu/ Daily Max (E. coli)	1988 – 2005: Secondary use and criteria Fecal coliform 1000 col/mL (GM); 2000 col/mL(SSM) 2005-Present: Secondary use and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	SWQB Surveys in 2005; 2012. Remote in places, but accessible. Primary contact use observed by SWQB staff.
.213 Pecos River Basin	McAllister Lake	NONE	1988 – 2005: Secondary use and criteria Fecal coliform 1000 col/mL (GM); 2000 col/mL(SSM) 2005-Present: Secondary use and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	SWQB Survey in 2001. McAllister Lake is publicly accessible; camping, boating and fishing when open (fall, spring and summer). [6]
.219 Pecos River Basin	Avalon Reservoir (Lake Avalon)		2005-Present: Secondary use	Primary contact use existing - kayaking,

[6] Accidental water alteration, algal bloom and salinity caused fish kill in 2007 which has limited fishing in the lake since.

Segment in 20.6.4 NMAC	Name	Permits	WQS History	Use Notes
		NONE	and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	scuba game fishing according to EMRD park website.[7]
.308 Canadian River Basin	Charette Lakes	NONE	1988 – 2005: Secondary use and criteria Fecal coliform 1000 col/mL (GM); 2000 col/mL(SSM) 2005-Present: Secondary use and criteria E. coli 548 col/mL(GM); 2507 col/mL (SSM)	SWQB Survey in 2006. Upper lake is shallow, but accessible for wading. Lower lake is much deeper. Fishing, paddle craft and primitive camping allowed Mar 1 – Oct 31.

In previous Triennial and interim revisions, and in the current proposal for the 2013 Triennial Review, the SWQB has clarified the presumption of CWA §101(a)(2) uses for all surface water of the state, including those not "classified" or described in segments under Sections 20.6.4.101-899 NMAC. In the review of the nine classified surface water segments with secondary contact uses assigned, one segment, 20.6.4.116, is currently listed for *E. coli* impairment. Within this segment, 20.6.4.116 NMAC, two Assessment Units, NM-2113_50 "Abiquiu creek" and NM-2113-40, "El Rito creek", are impaired for secondary contact use and neither is impacted by a NPDES permittees. Finally, as summarized in Table 1, the segments reviewed include either demonstrated primary contact recreation as an existing use, or significant likelihood as an attainable use, as defined in the state's WQS and the federal WQS regulations.

[7] Avalon Reservoir promotes paddle craft, kayaking and game fishing (scuba) activities: http://www.emnrd.state.nm.us/SPD/BOATINGWeb/AvalonReservoir.html http://www.ohranger.com/avalon-reservoir http://www.recreation.gov/recreationalAreaDetails.do;jsessionid=97AF31D4403D68DBDBA54248E67B013A.web05-ny?contractCode=NRSO&recAreaId=87



STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE PETITION TO AMEND 20.6.4 NMAC - STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, THE TRIENNIAL REVIEW

WQCC 08-13

ORDER AND STATEMENT OF REASONS FOR AMENDMENT OF STANDARDS

I. INTRODUCTION

A. Clean Water Act

1. The federal Clean Water Act (CWA), 42 U.S.C. Section 1251(a), states its objective as the restoration and maintenance of the chemical, physical and biological integrity of the Nation's waters.
2. The CWA achieves this objective by ensuring "wherever attainable, water quality which provides for the protection and propagation of fish, shellfish and wildlife, and provides for recreation in and on the water be achieved."
3. CWA Section 1313(c) establishes the purpose of water quality standards ("WQS" or "standards") as "serv[ing] the purposes of the Clean Water Act." The WQS should fulfill the objectives, goals and policies of the CWA.
4. The Environmental Protection Agency's (EPA's) *Water Quality Standards Handbook* (Handbook) provides more specific guidance. To "serve the purposes of the Clean Water Act", WQS must (a) include provisions for restoring and maintaining chemical, physical, and biological integrity of state waters; (b) wherever attainable, achieve a level of water quality that provides for the protection and propagation of fish, shellfish and wildlife, and recreation in and on the water; and (c) consider the use and value of state waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation.
5. WQS serve two important purposes: (a) to "define the goals for a water body, or portion, thereof, by designating the use or uses to be made of the water, by setting criteria necessary to protect the uses"; and (b) to "serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond

SWQB Rebuttal Exhibit 3

B. Criteria:

[~~(1) In any single sample: pH within the range of 6.6 to 8.8 and temperature 20°C (68°F) or less.~~] The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses [~~listed above in Subsection A of this section.~~

~~(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC)~~].

[20.6.4.127 NMAC - N, 05-23-05, A, XX-XX-XX]

367. The Commission adopts the Department's proposal to restructure subsection B for the reasons given in section 101.

20.6.4.128 RIO GRANDE BASIN - Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated Uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria:

[~~(1)~~] The use-specific criteria in 20.6.4.900 NMAC[~~, except the chronic criteria for aquatic life~~] are applicable [~~for~~] to the designated uses [~~listed above in Subsection A of this section~~], except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent).

[~~(2) The monthly geometric mean of E. coli bacteria 548 cfu/100 mL or less; single sample 2507 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).~~

~~(3) The acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent) are applicable to this use.~~]

368. The Commission adopts the Department's proposal to strike the phrase "except the chronic criteria for aquatic life" because chronic criteria are not applicable to the limited aquatic life use in section 900.H.

369. The Commission adopts the Department's proposal to revise the first sentence in subsection B to read "applicable to the designated uses" for consistency with other sections and to restructure subsection B for the reasons given in section 101.

370. The Commission does not adopt Amigos Bravos' proposal to replace limited aquatic life use with aquatic life use because this segment was created and designated uses were assigned in the last triennial review; Amigos Bravos presented no new evidence regarding current water quality conditions that would support a change in the standards.

371. A UAA was completed and approved by EPA for this segment. The UAA noted that the 2002 study referenced by Amigos Bravos "provide[s] information from numerous sources indicating that ephemeral and intermittent streams in the Jemez Mountains

support aquatic life that includes aquatic invertebrates and perhaps amphibians, but not fish." Amigos Bravos relies on information that the Commission already considered in assigning the limited aquatic life use.

372. EPA approved this provision based on the hearing record and the UAA submitted by the Department, and has not indicated any problem with that decision.

373. The UAA for this segment acknowledges the presence of aquatic invertebrates, and even amphibians, but not fish, and therefore concludes that the waters cannot attain the CWA section 101(a)(2) goal of water quality providing for the "protection and propagation of fish, shellfish and wildlife."

20.6.4.129 RIO GRANDE BASIN - Perennial reaches of the Rio Hondo.

A. Designated Uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and [~~secondary~~] primary contact.

B. Criteria:

[~~(1) In any single sample: specific conductance 400 µmhos/cm or less, pH within the range of 6.6 to 8.8, total phosphorous (as P) less than 0.1 mg/L and temperature 20°C (68°F) or less.~~] The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses [~~listed above in Subsection A of this section~~], except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less and phosphorus (unfiltered sample) less than 0.1 mg/L.

[~~(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).~~]

[20.6.4.129 NMAC - N, 05-23-05; A, XX-XX-XX]

374. The Commission adopts the Department's proposal to change secondary contact to primary contact for consistency with the assigned criteria for the reasons explained in section 101, change µmhos/cm to µS/cm for the reasons given in section 7.A, replace "total" preceding phosphorus and delete the parenthetical "(as P)" for the reasons given in section 109, and restructure subsection B for the reasons given in section 101.

20.6.4.130 RIO GRANDE BASIN – The Rio Puerco from the Rio Grande upstream to Arroyo Chijuilla, excluding the reaches on Isleta, Laguna and Cañoncito Navajo pueblos. Some waters in this segment are under the joint jurisdiction of the state and Isleta, Laguna or Cañoncito Navajo pueblos.

A. Designated Uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

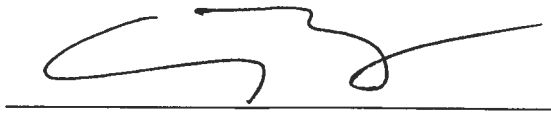
(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 1,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.130 NMAC – N, XX-XX-XX]

J. United States environmental protection agency. [~~1989~~] 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Environmental monitoring systems laboratory, Cincinnati, Ohio. ([~~2nd~~] 4th Ed., EPA [~~600/4-89/001~~] 821-R-02-01). [~~250~~] 335 p.

566. The Commission adopts the Department's proposal to correct the edition because a later edition has been issued.

567. The Commission directs the Department to prepare the amended surface water standards in a format acceptable to Records and Archives for filing as part of the New Mexico Administrative Code. This preparation may include re-numbering and re-lettering of existing sections of the standards and the correction of errata consistent with the findings above.



CHAIR, WATER QUALITY CONTROL COMMISSION

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

DEC 29 2006

Mr. Ron Curry
Chairman
Water Quality Control Commission
Harold Runnels Building
1190 Saint Francis Drive
Santa Fe, NM 87502

Subject: EPA Approval of Revisions to New Mexico's Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC

Dear Mr. Curry:

I am pleased to inform you that we have completed our review of the State's triennial revisions. As always, I thank you for the efforts of the New Mexico Water Quality Control Commission and particularly the New Mexico Environment Department in the development of these revisions.

The new and revised water quality standards include a number of important amendments. These include the development of standards for non-classified ephemeral, intermittent and perennial waters; revisions to the State's bacteriological criteria, specifying *E. coli* as the indicator organism consistent with the Environmental Protection Agency's (EPA) recommendation; revision of rules for the applicability of criteria to prevent inappropriate attainment decisions; revisions to use attainability analyses procedures; and revised classified segments. The Commission and the Environment Department should be commended for making these important revisions to New Mexico's water quality standards.

EPA's review was of amendments to the *Standards for Interstate and Intrastate Surface Waters* 20.6.4. NMAC. These revisions where adopted by the Commission and became effective as State law on May 23, 2005, with revisions effective on July 17, 2005. The amendments were certified by the Assistant Attorney General by letter dated July 1, 2005, and were submitted to EPA as required under federal regulations at 40 CFR 131.20(c). EPA received the documents on July 7, 2005.

In today's action, EPA is approving the majority of these amendments. However, based on a review of the record, EPA was unable to take action on a few provisions because they did not meet the minimum requirements for a water quality standards submission. See 40 CFR 131.6(b) and (f). Specifically, EPA was unable to take action on the limited aquatic life, aquatic life and/or secondary contact recreation use designations for Sections 20.6.4.97, 20.6.4.98 and

SWQB Rebuttal Exhibit 4

20.6.4.99. EPA strongly supports the concept the State has used in developing standards for unclassified ephemeral, intermittent and perennial surface waters; however, adequate supporting documentation (such as a use attainability analysis) was not available which would allow us to take action on all portions of these provisions. Similarly, EPA was unable to take action on the new and/or revised use designations and modifications for six classified segments because adequate supporting documentation (such as a use attainability analysis) was not available to support the modifications. See segments 20.6.4.126, 128, 221, 310, 701 and 702.

The enclosed detailed Record of Decision explains EPA's basis for the approval action taken and provides an explanation of the type of documentation that is necessary for EPA to be able to approve the remaining provisions. We would be glad to work with you and provide technical assistance regarding the needed supporting documentation.

It is important to note that EPA's approval of the State's water quality standards is considered a federal action which may be subject to the Section 7(a)(2) consultation requirements of the Endangered Species Act (ESA).[1] Section 7(a)(2) of the ESA states that "each federal agency ... shall ... insure that any action authorized, funded or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical..."

EPA's approval of the water quality standards revisions, therefore, may be subject to the results of consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the ESA. Nevertheless, EPA also has a Clean Water Act obligation, as a separate matter, to complete its water quality standards action. Therefore, in approving New Mexico's water quality standards revisions today, EPA is completing its CWA Section 303(c) responsibilities. However, should the consultation process with the U.S. Fish and Wildlife Service identify information that supports a conclusion that one or more of these revisions is likely to jeopardize the continued existence of any endangered or threatened species, EPA will revisit and amend its approval decision for those revised or new water quality standards.

Pursuant to the *Memorandum of Agreement Between the Environmental Protection Agency, Fish and Wildlife Service and National Marine Fisheries Service Regarding Enhanced Coordination Under the Clean Water Act and Endangered Species Act* (66FR11202, February 22, 2001), EPA Headquarters and the Services have initiated a national consultation on all of EPA's published water quality criteria for the protection of aquatic organisms. As explained in the MOA, the national consultation provides Endangered Species Act Section 7 consultation coverage for any water quality criteria included in State water quality standards, approved by EPA, that are identical to or more stringent than EPA's recommended CWA Section 304(a) criteria. EPA Region 6, therefore, will defer to the national consultation on questions of

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[1] Where EPA concludes that its approval action will have "no effect" on listed endangered or threatened species, or is otherwise not subject to ESA consultation, EPA can issue an unconditional approval.

protectiveness for aquatic life criteria. In the unlikely event that the national consultation discovers EPA's published CWA Section 304(a) criteria (and by extension, the State standards) are likely to cause jeopardy to listed species or the adverse modification or destruction of designated critical habitat, EPA has retained its authority to revise its approval decision.

As mentioned earlier, I appreciate both the Commission's and the Environment Department's efforts in the development of these important revisions to New Mexico's water quality standards, and commend the Commission for its action. I also appreciate the cooperative and constructive way in which the Environment Department staff has worked with my staff as it developed its proposal for this triennial review of the State's water quality standards.

If you need additional detail and if you would like to schedule a meeting to work through the issues outlined in this letter, please call me at (214) 665-7101, or have the Environment Department staff contact Russell Nelson, my Regional Water Quality Standards Coordinator, at (214) 665-6646.

Sincerely,

Miguel I. Flores, Director
Water Quality Protection Division

Enclosure

cc: Denise Keehner, Director, SHPD
Amy Newman, Chief, RSTSSB
Lee Schroer, Office of General Counsel

Marcy Leavitt, Chief,
Surface Water Quality Bureau
New Mexico Environment Dept.

Lynn Wellman
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2105 Osuna Road NE
Albuquerque, NM 87113-1001

20.6.4.125 RIO GRANDE BASIN - Perennial reaches of San Pedro creek.

A. Designated Uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and secondary contact.

B. Criteria:

(1) In any single sample: pH within the range of 6.6 to 8.8 and temperature 25°C (77°F) or less. The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).

[20.6.4.125 NMAC - N, 05-23-05]

*This new segment for the perennial reaches of San Pedro Creek was broken out of Rio Grande Section **20.6.4.111**, which previously contained the perennial reaches of both Las Huertas and San Pedro Creeks. As seen in that discussion, Las Huertas Creek has been shown to be capable of supporting a high quality coldwater aquatic life designation. The Commission indicates in its SoR (paragraph 217), that no evidence was presented to indicate that San Pedro Creek is capable of supporting that high quality coldwater use. Since this segment simply breaks San Pedro Creek out from segment **111**, retaining its coldwater aquatic life and secondary contact uses and associated criteria, no supporting documentation is necessary.*

Action: *EPA approves this new Section.*

20.6.4.126 RIO GRANDE BASIN - Perennial portions of Cañon deValle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501.

A. Designated Uses: coldwater aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria:

(1) In any single sample: pH within the range of 6.6 to 8.8 and temperature 24°C (75.2°F) or less. The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of E. coli bacteria 548 cfu/100 mL or less; single sample 2507 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).

[20.6.4.126 NMAC - N, 05-23-05]

This new segment was established to classify perennial waters within or near Los Alamos National Labs (LANL) property. The State based use designations for these segments on an intensive study by US Fish and Wildlife Service (Lusk and MacRae 2002). The US Fish and Wildlife Service's (Service) study demonstrated the presence of shellfish, which is indicative of a coldwater aquatic community although fish are not present in these segments. The Service's

study documented existing macroinvertebrate communities in all of the streams in this segment with the exception of Water Canyon. The study also indicated that these macroinvertebrate communities generally compare favorably to the coldwater aquatic community in the upper reaches of Los Alamos Canyon, further supporting the coldwater designation.

Although a waterbody may not support a reproducing fishery, it does not mean that it may not be supporting an aquatic life protection function. EPA agrees that an existing cold water aquatic community composed of invertebrates like that found in this stream should be protected whether or not the stream supports a fishery. The coldwater aquatic life designation is consistent with the 101(a)(2) interim goal of the Act, providing for protection of aquatic life uses. See 40 CFR 131.10(k). The State also established default uses of livestock watering and wildlife habitat. The use designations for these segments are consistent with the use in adjacent tributaries of the Rio Grande in Bandelier National Monument.

The basis for designating a secondary contact recreation use is unclear given that the Service's study indicates that there is evidence of pools of sufficient size for primary contact in the Sandia canyon stream. As discussed previously, EPA's current water quality regulation effectively establishes a rebuttable presumption that "fishable/swimmable" uses are attainable unless it can be demonstrated that such uses are not attainable. A secondary contact use does not meet that presumption.

Based on a review of the 2005 Triennial Submission record supplied by the State, the secondary contact use is not adequately supported. 40 CFR 131.6(b) and (f) requires the submission of supporting analyses and other general information that will assist EPA in determining the adequacy of standards that don't include uses specified in Sec. 101(a)(2) of the Act. To comply with the regulation, New Mexico must submit a UAA to demonstrate why attaining the secondary contact recreation uses are not feasible based on one of the factors listed in 40 CFR 131.10(g). The most logical factor is 40 CFR 131.10(g)(2) - natural, ephemeral, intermittent, or low-flow conditions or water levels prevent attainment of the use. Although the Service's intensive study is not a UAA in itself, the State could draw on information in that and other related intensive studies or information to support the secondary contact recreation use designation.

Action: *EPA takes no action on this Section.*

20.6.4.127 RIO GRANDE BASIN - Perennial portions of Los Alamos canyon upstream from Los Alamos reservoir and Los Alamos reservoir.

A. Designated Uses: coldwater aquatic life, livestock watering, wildlife habitat, irrigation and primary contact.

B. Criteria:

(1) In any single sample: pH within the range of 6.6 to 8.8 and temperature 20°C (68°F) or less. The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).

[20.6.4.127 NMAC - N, 05-23-05]

As with the previous segment, this new segment was also established to classify perennial waters within or near LANL property. The use designations for this segment were also based on the Service's study of these waters. (Lusk and MacRae 2002). The reaches in this segment have been designated for coldwater aquatic life and primary contact recreation uses. The historical livestock watering and that wildlife habitat have been designated for this segment. The coldwater aquatic life designation and primary contact designations are consistent with the 101(a)(2) interim goals of the Act.

Action: *EPA approves this new Section.*

20.6.4.128 RIO GRANDE BASIN - Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated Uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria:

(1) The use-specific criteria in 20.6.4.900 NMAC, except the chronic criteria for aquatic life are applicable for the designated uses listed in Subsection A of this section.

(2) The monthly geometric mean of E. coli bacteria 548 cfu/100 mL or less; single sample 2507 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).

(3) The acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent) are applicable to this use.

[20.6.4.128 NMAC - N, 05-23-05]

As with the two previous Sections, New Mexico has established this segment, classifying waters within LANL property. The State based use designations for this segment on the same intensive study by the Service (Lusk and MacRae 2002) mentioned in the previous sections. This segment has been designated for limited aquatic life and secondary contact based on likelihood of exposure by ingestion and a light frequency of use, as well as the State's default livestock watering and wildlife habitat uses that have been applied.

*The limited aquatic life and secondary contact uses may be the highest uses that can be attained in this segment. However, as discussed in Section **20.6.4.126**, such designations are not compatible with the uses specified in section 101(a)(2) of the Act and must be supported by a UAA based on one of the factors listed in 40 CFR 131.10(g). Again, the most logical factor is 131.10(g)(2) - natural, ephemeral, intermittent, or low-flow conditions or water levels prevent attainment of the use. The supporting UAA for waters in this segment and Section **20.6.4.126** may be combined.*

***Action:** EPA takes no action on this Section.*

20.6.4.129 RIO GRANDE BASIN - Perennial reaches of the Rio Hondo.

A. Designated Uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and secondary contact.

B. Criteria:

(1) In any single sample: specific conductance 400 µmhos/cm or less, pH within the range of 6.6 to 8.8, total phosphorous (as P) less than 0.1 mg/L and temperature 20°C (68°F) or less. The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).

[20.6.4.129 NMAC - N, 05-23-05]

*The State has established a new segment for the Rio Hondo in the Rio Grande Basin, breaking this tributary out of Section **20.6.4.123**. The total phosphorus 0.1 mg/L total phosphorus criterion that was re-established for segment **123** is being carried over to this new segment. The coldwater aquatic life designation and secondary contact designations are also being carried over from the original segment designation.*

The secondary contact designation is supported by revised bacteriological criteria sufficient to support primary contact recreation based on a light frequency of use. EPA recognizes that primary contact recreation may not be attainable or appropriate in all waters and that States may designate secondary contact recreation, but set bacteriological criteria sufficient to support primary contact based on frequency of use as New Mexico has done here.

***Action:** EPA approves this new Section.*

20.6.4.130 - 20.6.4.200: [RESERVED]

No response is required for this reserved section.

20.6.4.127 RIO GRANDE BASIN - Perennial portions of Los Alamos canyon upstream from Los Alamos reservoir and Los Alamos reservoir.

A. Designated Uses: coldwater aquatic life, livestock watering, wildlife habitat, irrigation and primary contact.

B. Criteria:

[~~(1) In any single sample: pH within the range of 6.6 to 8.8 and temperature 20°C (68°F) or less.~~] The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses [~~listed above in Subsection A of this section.~~

(2) ~~The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC)~~].

*See section **20.6.4.101 NMAC** for a discussion of the restructuring of section **B. Criteria (1)** and **(2)**.*

***EPA Action:** EPA approves the modifications to this segment.*

20.6.4.128 RIO GRANDE BASIN - Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated Uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria:

[~~(1) The~~] the use-specific criteria in 20.6.4.900 NMAC[~~, except the chronic criteria for aquatic life~~] are applicable [~~for~~] to the designated uses [~~listed in Subsection A of this section~~], except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent).

[~~(2) The monthly geometric mean of E. coli bacteria 548 cfu/100 mL or less; single sample 2507 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).~~

~~(3) The acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent) are applicable to this use.~~]

In its 2005 action, New Mexico designated limited aquatic life and secondary contact uses for this segment. In 2006, EPA took no action on this new segment, noting that the State had not provided adequate support justifying the limited aquatic life or the secondary contact use designation. EPA noted that 40 CFR 131.6(b) and (f) requires the submission of supporting analyses and other general information that would assist EPA in determining the adequacy of standards that don't include uses specified in §101(a)(2)

of the Act. EPA noted that to comply with the regulation, New Mexico must submit a UAA to demonstrate why attaining the limited aquatic life and secondary contact recreation uses are not feasible based on one of the factors listed in 40 CFR 131.10(g).

Following that recommendation, NMED developed a UAA in August 2007, to support the limited aquatic life and secondary contact use designations for this segment. The State's UAA identified the streams included in this segment as ephemeral and intermittent. Given that these streams do not flow for varying periods throughout the year and the lack of upstream source populations, it is unlikely that this segment could support a higher use. EPA approved the limited aquatic life and secondary contact use designations for this segment on August 31, 2007.

*See section **20.6.4.101 NMAC** for a discussion of the restructuring of section **B. Criteria (1)** and **(2)**.*

***EPA Action:** EPA approves the modifications to this segment.*

As required by 40 CFR 131.20(a), any segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act must be re-examined every three years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State must revise its standards accordingly.

20.6.4.129 RIO GRANDE BASIN - Perennial reaches of the Rio Hondo.

A. Designated Uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and [~~secondary~~] primary contact.

B. Criteria:

[~~(1) In any single sample: specific conductance 400 µmhos/cm or less, pH within the range of 6.6 to 8.8, total phosphorous (as P) less than 0.1 mg/L and temperature 20°C (68°F) or less. The~~] the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses [~~listed above in Subsection A of this section~~], except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less and phosphorus (unfiltered sample) less than 0.1 mg/L.

[~~(2) The monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less; single sample 410 cfu/100 mL or less (see Subsection B of 20.6.4.14 NMAC).~~]

*See section **20.6.4.7 A NMAC** for a discussion of abbreviations specific to conductance. See section **20.6.4.101 NMAC** for a discussion of the restructuring of section **B. Criteria (1)** and **(2)**.*

***EPA Action:** EPA approves the modifications to this segment.*

20.6.4.130 RIO GRANDE BASIN - The Rio Puerco from the Rio Grande upstream to Arroyo Chijuilla, excluding the reaches on Isleta, Laguna and

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

In the Matter of:	
PROPOSED AMENDMENTS TO *STANDARDS FOR INTERSTATE AND INTRASTATE WATERS*, 20.6.4 NMAC	**No. WQCC 14-05 (R)**

New Mexico Environment Department,

Petitioner.

REBUTTAL TESTIMONY OF KRISTINE PINTADO

I. INTRODUCTION

My name is Kristine Pintado and I am currently employed as the Water Quality Standards Coordinator with the New Mexico Environment Department ("NMED"), Water Protection Division ("WPD") Surface Water Quality Bureau ("SWQB"). My professional resume is included as SWQB Exhibit 14, in the Notice of Intent ("NOI") direct testimony filed on December 12, 2014.

My rebuttal testimony focuses on the Temporary Standards provision proposed by the SWQB as a new Subsection 20.6.4.10.F NMAC, and changes to the review of piscicide applications under Section 20.6.4.16 NMAC. Freeport-MacMoRan Chino Mines ("Chino Mines"), Peabody Energy ("Peabody") and the San Juan Water Commission ("SJWC") commented in their respective NOI testimonies that they generally support SWQB's Temporary Standards proposal, and the SWQB appreciates the support. My rebuttal testimony will first respond to Peabody's recommendation to add language to the SWQB's Temporary Standard

proposal. Second, I will respond to Amigos Bravos' ("AB") proposal to strike completely SWQB's Temporary Standard provision, as well as the language allowing a Temporary Standard be placed into a compliance schedule. Third, I will address specific comments from the SJWC on the SWQB's Temporary Standard proposal. Finally, AB proposes to maintain the requirement that the Water Quality Control Commission ("WQCC") must hold public hearings to review piscicide applications under Section 20.6.4.16 NMAC that are not covered by the federal permit program. My rebuttal testimony will support the SWQB and the New Mexico Department of Game and Fish ("NMDGF") proposal that the review of piscicide applications outside the federal permit should be determined by the WQCC, and that a public hearing for these applications should not be mandatory as proposed by AB.

Each issue related to the SWQB's proposals for the Temporary Standards under Section 20.6.4.10 NMAC and for the review of piscicide applications under Section 20.6.4.16 NMAC will be addressed in the rebuttal testimony below, point by point.

II. PROPOSALS AND REBUTTAL

A. Proposed Subsection F of 20.6.4.10 NMAC – Temporary Standards

Summary of Peabody Testimony and SWQB Rebuttal

Peabody recommended in their NOI testimony that the WQCC should consider extending the Temporary Standards to include language where "significant uncertainties" exist with respect to the underlying water quality standards ("WQS") that can be resolved by additional study. However, Peabody did not include specific language to add to the SWQB proposal. The SWQB does not agree that such language is necessary as such situations can be addressed with the

language currently proposed by SWQB proposal. The SWQB's rebuttal response is presented below.

SWQB Rebuttal Response: The SWQB appreciates Peabody's support for the Temporary Standards provision. If there are uncertainties about the underlying WQS, then the use of the Temporary Standards provision may be one of several possible approaches. In situations where the Temporary Standards provision is appropriate, then the petitioner should anticipate and account for WQS uncertainties in their workplan and timetable, including the need for studies related to evaluating the underlying WQS. Also, if there are uncertainties that arise due to unanticipated or extraordinary circumstances, a Temporary Standard may be extended to allow resolution of the uncertainties, if the requirements in Subsection 20.6.4.10.F(10) NMAC are met.

The SWQB considered the Peabody-suggested temporary modification provision allowed in Colorado ("CO") for *"significant uncertainty regarding the appropriate long-term underlying standard"* (Peabody NOI), however Peabody did not include specific language to add to the SWQB proposal. The CO provision is for existing permitted dischargers with a demonstrated or predicted water quality based effluent limit compliance problem, and where one of two situations exists: (1) significant uncertainty about the WQS needed to protect current and future uses; or (2) significant uncertainty regarding the extent to which existing quality is the result of natural or irreversible human caused conditions. CO Section 31.7(3). Adequate supporting information includes a justification for the interim narrative or numeric standard, any data describing effluent and ambient quality, a plan for eliminating the need for the temporary modification and a justification for the proposed expiration date. The U.S. Environmental Protection Agency ("EPA") has approved temporary modifications in Colorado authorized by Section 31.7(3) based

on their review of evidence in support of the WQS revisions for the temporary modifications. (SWQB Rebuttal Exhibit 8)

First, as pointed out above, if there is uncertainty about the underlying WQS, then the Temporary Standard may be one of several possible approaches. There are several other tools in the WQS to address the uncertainties in such situations (Sections 20.6.4.10 and .15 NMAC). Second, the CO provision limits the uncertainty to one of the 40 CFR §131.10(g) factors, whereas the SWQB's proposal does not impose such limitations. Third, the SWQB proposal does not exclude uncertainties with respect to the underlying WQS. Much of the same information required in support of a temporary modification in CO under Section 31.7(3) would be expected to support a petition under the SWQB's proposal. Therefore, the SWQB considers that language to specifically address WQS uncertainty is unnecessary, and recommends that the WQCC not support the addition of specific language as recommended by Peabody.

Summary of Amigos Bravos Testimony and SWQB Rebuttal

AB rejects SWQB's Temporary Standard and would delete proposed Subsections 20.6.4.10.F and H NMAC entirely. AB alleges Temporary Standards: 1) weaken standards for waters that are already impaired; 2) increase discharges of pollution; 3) are not necessary; 4) prohibit new or increased discharges; 5) exacerbate impairment making attainment more difficult; and 6) reward polluters who cannot obtain a compliance schedule.

The SWQB does not agree: 1) WQS goals are not weakened, WQS stay in place and controls tighten over time to meet the WQS; 2) pollutant loads are reduced over time and progress is demonstrated toward meeting WQS; 3) new and more stringent WQS goals are anticipated and WQS must be met; 4) EPA cannot issue a water discharge permit inconsistent

with the federal Water Pollution Control Act (aka, the Clean Water Act ("CWA")) for any discharger, including new and increased dischargers; 5) Temporary Standards tighten over time to reduce pollutant loads; and 6) the Temporary Standard proposal does not allow for non-compliance with the CWA.

SWQB's rebuttal testimony addresses each of AB's objections in detail below, point by point.

AB: The Temporary Standard would allow polluters to petition the WQCC for weaker standards for receiving waters that are already impaired and not meeting water quality standards. The Temporary Standard is aimed at already impaired waters, and condones the increased concentrations of parameters that are causing impairment, thus exacerbating impairment and making attainment of standards even more difficult.

SWQB Rebuttal Response: The SWQB disagrees with AB's characterization that a Temporary Standard would allow increased concentrations and exacerbating impairment. A Temporary Standard would require the original WQS goals to remain in place and not be weakened, as opposed to permanently downgrading designated uses of a water body. A successful Temporary Standard petition would contain controls with limitations tightening over time and ultimately achieving the original WQS. In cases where a newly established WQS is not yet achievable because of technology-based, or other limitations, but the waterbody has not yet been specifically identified as impaired by the SWQB, the proposed Temporary Standard would proactively lay the groundwork for decreasing pollutant concentrations and potentially prevent future impairment. In all cases, however, the Temporary Standard does not allow additional

pollution that may worsen impairment and the petition must demonstrate continued progress toward reducing pollutant loads and achieving the original WQS.

The proposal is also consistent with guidance in the preamble to the EPA's Advanced Notice of Proposed Rulemaking ("ANPRM") (1998), and the recently proposed federal revisions to 40 CFR §131, which require that Temporary Standards be developed as close to the underlying standard (e.g., numerical criterion) as is possible. The temporary criterion reflects the "highest degree of protection feasible in the short term" and will not cause further impairment or loss of an existing use (40 CFR §131.14 (proposed); 78 FR 171 p. 54545, Sept. 4, 2013).

AB: Allowing a Temporary Standard would result in increased discharges of pollution.

SWQB Rebuttal Response: The SWQB disagrees with this statement. As discussed previously, a Temporary Standard must reduce pollutant loads over time and further must demonstrate continued progress toward achieving the original WQS.

AB: AB claims there is no need for the provision as no facility has ever been denied a National Pollutant Discharge Elimination System ("NPDES") permit because it could not meet effluent limits and compliance schedules can be included in a facility's permit to allow time for compliance.

SWQB Rebuttal Response: Since the EPA cannot issue a NPDES permit that does not comply with the CWA (40 CFR §122.4) and federal regulations require the permittee to comply with all conditions of a permit (40 CFR §122.41(a)), it follows that a facility would not be denied a NPDES permit on the basis that it cannot meet effluent limits upon initial permit issuance.

Where applicable, compliance schedules may be included in the permit and must be adhered to as NPDES permit requirements.

However, the SWQB disagrees there is no need for this provision, as stated in its previous testimony (Pintado NOI Testimony, pp. 18-20). Temporary Standards and compliance schedules serve two distinctly different purposes. A Temporary Standard provision is needed where the criterion supporting a designated use is not attainable today but may be attainable in the future, or to work towards achieving new or revised WQS which are more stringent. In contrast, compliance schedules may be appropriate when the WQS criterion is attainable, but the permittee only needs additional time to modify or upgrade treatment facilities to meet the water quality based effluent limit ("WQBEL").

AB: AB also claims that the CWA regulations and case law prohibit the issuance of discharge permits for new or increased discharges where the imposition of conditions in the permit cannot ensure compliance with water quality standards. See 40 CFR §122.4; Friends of Pint[o] Creek V. EPA, 504 F.3d 1007, 1012 (9th Cir. 2007).

SWQB Rebuttal Response: It is true that as the NPDES permitting authority, the EPA cannot issue a permit which does not comply with the CWA. (40 CFR §122.4). Any permit allowances or conditions made for additional or new dischargers must be consistent with the CWA, including compliance with the underlying WQS. The Temporary Standard provision does not change the EPA's regulations, policies or guidance for writing NPDES permits; it would provide for a Temporary WQS to be adopted that the permit is based on for a limited time. Further, the Temporary Standard requires the discharger to maintain and improve water quality towards compliance with the underlying, original WQS.

AB: AB alleges that the proposal rewards polluters that have been illegally discharging or who have failed or been unable to obtain a compliance schedule.

SWQB Rebuttal Response: As stated above, the EPA cannot issue a permit that does not comply with the CWA (40 CFR §122.4) and a permittee must comply with all conditions of the permit (40 CFR §122.41(a)). Allowances, such as compliance schedules, are assigned under certain conditions by EPA and must be consistent with the CWA. Violations of a NPDES permit and illegal discharges are grounds for enforcement action, permit termination, or denial of a permit renewal. In short, this proposal does not allow for non-compliance with the CWA, and does not reward polluters.

Summary of SJWC Testimony and SWQB Rebuttal

The SJWC[1] has also stated support for the SWQB's Temporary Standard, and rejects Amigos Bravos' proposal that would delete it, but has some concerns about the proposal and suggests several proposals, which are not supported by the SWQB. The SJWC suggests the Temporary Standard: 1) costs more than downgrading the WQS and provides no significant benefit; 2) is not necessary if Use Attainability Analysis ("UAA")-like demonstration must be conducted and UAA-like information should not be required; 3) mimics the EPA's variance procedures and guidance; 4) the WQCC should adopt a Temporary Standards concept through a variance under NMSA 1978, Section 76-6-4. The SWQB finds that these statements do not have merit, and should not be adopted by the WQCC because: 1) cost-benefit analyses or supporting

[1] The San Juan Water Commission (SJWC) member entities include the City of Aztec, City of Bloomfield, City of Farmington, San Juan County, and San Juan County Rural Water Users Association, all of which receive their municipal and industrial water from surface water supplies.

information that shows transactional costs was not provided, nor was it demonstrated why it is more beneficial to downgrade the WQS; 2) the 40 CFR §131.10(g) factor demonstration is necessary to show why the WQS are not achievable; 3) the EPA WQS variance procedures are included in SWQB's proposal; 4) variances under the authority of the WQCC are currently available but apply to pollution abatement for a person as an individual exemption from the state's pollution regulation and do not apply to the WQS; and 5) the factor demonstration is required by the EPA and is consistent with the 1977 EPA general counsel opinion on WQS variances.

The SJWC's statements and proposals are presented below, along with the SWQB's rebuttal testimony for each.

SJWC: The SJWC has stated in testimony that the transactional cost associated with the SWQB proposal counsel against its adoption because it provides no significant benefit to point and non-point source discharges in New Mexico (Nylander Testimony, SJWC NOI). The SJWC points out that the transactional cost of obtaining a Temporary Standard is likely significantly higher than simply downgrading the designated use of a water body.

SWQB Rebuttal Response: First, the SJWC has not provided any cost analyses, examples, or comparisons of transactional costs to support their statements. However, the costs of preparing the required analyses for a successful petition and the costs of those efforts required to achieve compliance with the WQS are obviously not the same, and are not comparable. For example, compliance cost estimates to achieve WQS may include capital costs, operating and maintenance

expenditures, and costs of administration.[2] Second, except where provided for in a Temporary Standard provision such as proposed by the SWQB, the WQS are the required targets, regardless of cost. Third, the removal or downgrade of a designated use such as allowed under the UAA process is not always the appropriate path and is not always allowable; in these cases the WQS must still be met. The SJWC offers no alternative for the Temporary Standard, except to suggest the adoption of a provision under NMSA 1978, Section 76-6-4(H). Finally, the CWA does not allow for downgrading a use based solely on a cost comparison between obtaining a Temporary Standard and performing a UAA.

SJWC: The SJWC maintains that the SWQB proposal is unnecessary and makes little sense from a transactional cost standpoint if a petitioner must first demonstrate that attainment of the associated designated use is not feasible because of one or more of the factors listed in 40 CFR §131.10(g). If that is the case the designated use should be revised because it is unattainable.

SWQB Rebuttal Response: The SWQB maintains that the proposal is necessary. The SWQB agrees that if a use is not appropriate and is unattainable, and this can be demonstrated through a UAA, then the UAA is the appropriate path an affected party should take.

The following 40 CFR §131.10(g) factors will most likely apply exclusively to a UAA proposal:

> *"1. Naturally occurring pollutant concentrations prevent the attainment of the use; or*
>
> *2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of*

[2] Guidelines for Preparing Economic Analyses December 2010 (Updated May 2014). National Center for Environmental Economics, Office of Policy, U.S. Environmental Protection Agency. http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0568-50.pdf/$file/EE-0568-50.pdf

sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or...

5. 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;..."
(40 CFR §131.10(g)(1), (2) and (5))

However, the Temporary Standard provision provides a path when the use is appropriate and attainable, but the petitioner can demonstrate that it is not achievable in the near-term due to one or more of the factors listed in 40 CFR §131.10(g).

The most likely factors under 40 CFR §131.10(g) that would apply to a Temporary Standards proposal are:

"*3. 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*

4. 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

6. Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact."
(40 CFR §131.10(g)(3), (4) and (6))

If the WQS can be achieved within the five-year NPDES permit cycle with modified or updated treatment facilities, then a permit compliance schedule may be the most appropriate tool. However, there may be cases where a new or more stringent WQS for a pollutant (e.g., ammonia) is adopted and must be incorporated into renewed NPDES permits (i.e., WQBELs). The permittee is required to comply upon permit issuance, or within the life of the permit, regardless of their current treatment facilities (40 CFR §131.41(a)). For these situations, and especially where the required treatment removal process is beyond the current limits of technology or will take more than one permit cycle to construct, a Temporary Standard is

appropriate. It is for these situations, where other regulatory tools in the water quality standards are not appropriate, that the SWQB anticipates the Temporary Standard proposal could be applied.

SJWC: The SJWC points out that the SWQB's proposal mimics, in certain respects, the EPA variance procedure utilized since 1977.

SWQB Rebuttal Response: The SWQB appreciates the comment and notes that the SJWC is likely also aware of the 1977 EPA Office of General Counsel legal opinion that a Temporary Standard or variance in the WQS, rather than permanently downgrading a use, is allowable as long as it is consistent with the substantive requirements as a designated use downgrade or removal. (SWQB Rebuttal Exhibit 9) The Temporary Standard provision proposed in this Triennial Review was developed in close consultation with EPA Region 6 and incorporates the most recent EPA guidance, suggestions from multiple stakeholders, and WQS variance procedures and Temporary Standards provisions from other states. The requirements in the current proposal are consistent with those required by the EPA for states to adopt and implement a temporary WQS.

SJWC: The SJWC suggests that the WQCC should adopt a Temporary Standards concept via its statutory authority to grant variances (*see* NMSA 1978, Section 76-6-4(H)).

SWQB Rebuttal Response: As noted in NMED's petition, while EPA's guidance document refers to temporary or interim WQS as a type of "variance", the New Mexico Water Quality Act ("WQA"), NMSA 1978, Sections 74-6-1 to -17 (1967, as amended through 2013), and ensuing regulations, already describe "variance" as an individual discharge permit-specific exclusion

from regulation. Specifically, NMSA 1978, Section 74-6-4(H) states that the WQCC *"may grant an individual variance from any regulation of the commission whenever* ***it is found that compliance with the regulation will impose an unreasonable burden upon any lawful business, occupation or activity. The commission may only grant a variance conditioned upon a person effecting a particular abatement of water pollution within a reasonable period of time*** *[emphasis added]. Any variance shall be granted for the period of time specified by the commission. The commission shall adopt regulations specifying the procedure under which variances may be sought, which regulations shall provide for the holding of a public hearing before any variance may be granted; ..."*

Further, the implementing regulations for a variance are found in 20.6.2.1210 NMAC:

20.6.2.1210 VARIANCE PETITIONS:

A. Any ***person seeking a variance*** *[emphasis added] pursuant to Section 74-6-4 (G) NMSA 1978, shall do so by filing a written petition with the commission. The petitioner may submit with his petition any relevant documents or material which the petitioner believes would support his petition. Petitions shall:*

(1) state the petitioner's name and address;
(2) state the date of the petition;
(3) ***describe the facility or activity for which the variance is sought****; [emphasis added]*
(4) state the address or description of the property upon which the facility is located;
(5) ***describe the water body or watercourse affected by the discharge****; [emphasis added]*
(6) identify the regulation of the commission from which the variance is sought;
(7) state in detail the extent to which the petitioner wishes to vary from the regulation;
(8) state why the petitioner believes that compliance with the regulation will impose an unreasonable burden upon his activity; and
(9) state the period of time for which the variance is desired.

B. The variance petition shall be reviewed in accordance with the adjudicatory procedures of 20 NMAC 1.3.

C. The commission may grant the requested variance, in whole or in part, may grant the variance subject to conditions, or may deny the variance. The commission shall not grant a variance for a period of time in excess of five years.

D. An order of the commission is final and bars the petitioner from petitioning for the same variance without special permission from the commission. The commission may consider, among other things, the development of new information and techniques to be sufficient justification for a second petition. If the petitioner, or his authorized representative, fails to appear at the public hearing on the variance petition, the commission shall proceed with the hearing on the basis of the petition. A variance may not be extended or renewed unless a new petition is filed and processed in accordance with the procedures established by this Section.

As such, variance procedures have already been adopted for "*a person effecting a particular abatement of water pollution*" where person is defined in Subsection JJ under 20.6.2.7 NMAC as *"an individual or any other entity including partnerships, corporation, associations, responsible business or association agents or officers, the state or a political subdivision of the state or any agency, department or instrumentality of the United States and any of its officers, agents or employees"*.

The authorities granted in the New Mexico WQA and regulations provide for variances of any particular abatement of water pollution, where abatement activities are generally defined in NMSA 1978, Section 74-6-4(E) and include discharge permits "other than facilities … for which a permit … has been issued pursuant to the federal act". This authority, however, only applies to *"an unreasonable burden upon a person" effecting "abatement"* and therefore cannot be used to adopt a water body specific Temporary Standard. Consistent with this interpretation, all variances for permits issued by the Groundwater Quality Bureau ("GWQB") and approved by the WQCC have been related to the permitting regulations for a specific permit issued to a person. Further, New Mexico lacks delegated authority to implement the CWA NPDES program, thus these permits are federally issued and, therefore, are not subject to the variance authority provided under the New Mexico WQA. Finally, the EPA, as the permitting authority, may

consider a variance from the technology-based requirements in a NPDES permit under CWA §301(c), but not from the requirement for compliance with WQS. (SWQB Rebuttal Exhibit 10)

The SWQB's proposal rests on the WQCC's authority to adopt WQS at NMSA 1978, Section 74-6-4(D), which states that the WQCC *"shall adopt water quality standards for surface and ground waters of the state based on credible scientific data and other evidence appropriate under the Water Quality Act. The standards shall include narrative standards and as appropriate, the designated uses of the waters and the water quality criteria necessary to protect such uses. The standards shall at a minimum protect the public health or welfare, enhance the quality of water and serve the purposes of the Water Quality Act. In making standards, the commission shall give weight it deems appropriate to all facts and circumstances, including the use and value of the water for water supplies, propagation of fish and wildlife, recreational purposes and agricultural, industrial and other purposes."*

For these reasons the SWQB finds that the term "Temporary Standard" is appropriate, is within the scope of the WQS, and avoids confusion with other state variance rules and regulations. We urge the WQCC to reject the SJWC's proposal.

SJWC: The SJWC suggests that a Petitioner for a Temporary Standard should not be required to submit UAA-like information.

SWQB Rebuttal Response: As the SJWC notes (Nylander Testimony, SJWC NOI, p. 9), the SWQB Temporary Standard proposal is similar to that proposed by the SJWC in 2003, which included two critical requirements: 1) documentation that one of the conditions for granting the Temporary Standard/variance exists; and 2) variances granted shall be reviewed by the WQCC at least every three years (Nylander Testimony, SJWC NOI, p. 9, K.1.f and K.4, respectively). To

meet the first requirement, the SJWC incorporated by reference all of the factors under 40 CFR §131.10(g) (Nylander Testimony, SJWC NOI, p. 9, K.1.f.). The 2003 SJWC proposal also includes the following requirements under K.2 (viii) and (ix):

> *(viii) documentation that one of the conditions set out in paragraph K(1) exists; (ix) the interim water quality standard sought by petitioner, along with evidence that the interim standard will not impair or otherwise negatively impact existing water quality...*
>
> (Nylander Testimony, SJWC NOI, p. 9)

Consistent with the 1977 EPA Office of General Counsel legal opinion on WQS variances (SWQB Rebuttal Exhibit 9), the 2003 SJWC proposal included EPA's requirements that documentation for a temporary WQS must align with one (or more) of the §131.10 (g) or UAA factors, which was included by reference under paragraph K (1). The SJWC language proposed in 2003, however, provided no information on how these requirements would be met. The current SJWC testimony proposes striking (1)(a), (5) and (6) in the current SWQB proposal, however, these requirements merely provide details on a clear path for both the affected regulated community and the WQCC in consideration of a Temporary Standards proposal. For this reason the SWQB urges the WQCC to reject the SJWC proposal.

SJWC: The Temporary Standard proposal should allow for interim standards for designated uses and not just be limited to applicable criteria.

SWQB Rebuttal Response: The SWQB proposal states the designated use is not to be modified on a temporary basis (Subsection 20.6.4.10.F(3) NMAC). As proposed by the SWQB, a Temporary Standard would affect the criterion for a particular pollutant associated with a designated use for a limited time. According to the EPA guidance in the 2013 proposed WQS

regulations, *"Typically, states find [WQS] variances that apply to a specific pollutant(s) and discharger to be most useful."* (78 FR 54532). The EPA guidance allows that a temporary use, and associated temporary criterion, may be adopted as part of a Temporary Standard. However, as a Temporary Standard is not intended to be a step towards a modification to the designated use, the proposal is limited to a Temporary Standard for a particular criterion. Also, as designated uses carry with them several criteria, this approach avoids any confusion about which criterion is being addressed in the Temporary Standard. The SWQB urges the WQCC not to modify the proposal as suggested by the SJWC.

B. Proposed Changes to Piscicide Applications under 20.6.4.7.16 NMAC

Summary of Amigos Bravos Testimony and SWQB Rebuttal

Amigos Bravos proposes that for piscicide applications not covered under an NPDES permit, the SWQB should keep mandatory the requirements under Subsection 20.6.4.16.C NMAC, specifically that the WQCC must hold a public hearing. The SWQB appreciates the importance of public participation in the review of piscicide applications not covered under the federal permit program, but does not agree with the Amigos Bravos' proposal. The Adjudicatory Procedures under Section 20.1.3 NMAC, which are also cited under Subsection 20.6.4.16.C NMAC allow for the public to request a review during a public hearing, if the reasons support it. The SWQB's rebuttal testimony is presented below.

SWQB Rebuttal Response: As stated in its NOI Testimony, the SWQB, in collaboration with the New Mexico Department of Game and Fish ("NMDGF"), proposes to amend Section 20.6.4.16 NMAC to streamline the piscicide use process for more efficient use of governmental

resources applied to enhance fishery management and conservation activities in New Mexico (Pintado Testimony, p.36). The SWQB's proposed revisions to Subsections 20.6.4.16.C, D and E NMAC provide for a hearing to review the piscicide application not covered by NPDES at the WQCC's discretion. The NMDGF has been required to present piscicide applications to the WQCC for at least six public WQCC hearings over the past ten years. According to the NMDGF, the WQCC has *"heard the same testimony with little new information regarding human or environmental health concerns. Consistent expert testimony indicates the products and their use are safe and effective for fishery management and conservation goals in New Mexico."* (NMDGF memo, SWQB NOI Testimony Exhibit 15)

In the SWQB's proposal, piscicide applications that are not covered under the NPDES will still require a petition to be filed with the WQCC and written notice given to political subdivisions, water planning entities, local conservancy and irrigation districts, and local media outlets. This includes newspaper publication in the locality affected by the proposed application. (Subsections 20.6.4.16.A and C NMAC). This provides information to the public about the proposed application, and allows individuals from the affected locality the opportunity to comment on and participate in the proposed project.

Any petition filed with the WQCC and reviewed by the SWQB is a public document and available for review. The opportunity to provide input in writing and in advance of any decisions has not changed. Additionally, the adjudicatory procedures under Section 20.1.3 NMAC, which are cited in Subsection 20.6.4.16.C NMAC provide for the public in the affected locality to request a hearing when reasons support it. The SWQB recommends that the WQCC should reject the Amigos Bravos proposal to make mandatory a public hearing for piscicide applications.

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Ref: 8EPR-EP

JUN 20 2013

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

Subject: EPA Action on Multiple Sets of Temporary Modifications for Arsenic

Dear Mr. Butler:

The U.S. Environmental Protection Agency (EPA) has completed its review of multiple sets of temporary modifications for arsenic adopted by Colorado's Water Quality Control Commission (Commission). Each submission included an Opinion of the Attorney General certifying that the standards were duly adopted pursuant to State law. Receipt of the revised standards initiated EPA's review pursuant to Clean Water Act § 303(c). EPA has completed its review of the revisions, and this letter is to notify you of our action.

Today's action addresses the following sets of WQS revisions:

- The arsenic temporary modification for Upper South Platte segment 14 adopted by emergency rulemaking on December 13, 2011. This temporary modification was adopted with the caveat that it shall remain in effect until the effective date of permanent regulations or one year, whichever comes first. Received by EPA on December 27, 2011.
- The permanent adoption of the arsenic temporary modification for Upper South Platte segment 14. Adopted on August 13, 2012. Received by EPA on August 28, 2012.
- The arsenic temporary modification for Boulder Creek segment 9. Adopted on October 9, 2012. Received by EPA on October 26, 2012.
- Arsenic temporary modifications for multiple segments statewide. Adopted May 13, 2013. Received by EPA on May 31, 2013.

CLEAN WATER ACT REVIEW REQUIREMENTS

CWA § 303(c)(2) requires States and authorized Indian Tribes to submit new and revised water quality standards to EPA for review. EPA is required to review and approve or disapprove the

revised standards pursuant to CWA § 303(c)(3). The Region's goal has been, and will continue to be, to work closely and collaboratively with States and authorized Tribes throughout the standards revision process so that submitted revisions can be approved by EPA.

TODAY'S ACTION

I am pleased to inform you that today the Region is approving, without condition, the new and revised water quality standards identified above. The adopted revisions, and the basis for our action, are summarized below.

Adopted Revisions

The water quality standards revisions approved today are arsenic temporary modifications for certain individual segments where a water supply use classification and a 0.02 µg/L human health-based numeric standard have been adopted.

The revisions adopted May 13, 2013 established new temporary modifications for a number of individual segments, and modified previously-adopted temporary modifications, such that all arsenic temporary modifications are now identical. Each temporary modification identifies interim water quality requirements that apply while the temporary modification is in effect. For discharges existing on or before June 1, 2013, the temporary modifications require maintenance of current conditions. The Statement of Basis and Purpose adopted by the Commission for the May 13, 2013 revisions explains that:

> The Commission intends that, when implementing the temporary modification of "current condition" in a CDPS permit, the Division will assess the current effluent quality, recognizing that it changes over time due to variability in treatment facility removal efficiency and influent loading from natural or anthropogenic sources, and due to changes in the influent flow and concentration over time. Maintaining the current condition will include maintaining permitted total arsenic loading to a treatment facility from arsenic contributors at the levels existing on the effective date of the temporary modification, while expressly allowing for variability in such loading due to changes in effluent quality as described above and due to changes in the influent flow and concentration over time within the permitted design flow of that facility.

For new or increased discharges commencing on or after June 1, 2013, each temporary modification is expressed as a range from 0.02 to 3.0 µg/L. While the temporary modifications are in effect, control requirements, such as discharge permit limits, shall be established using the first number in the range as the ambient water quality target, provided that no effluent limit shall be more restrictive than the second number in the range.

The temporary modifications will expire on December 31, 2021. The Statement of Basis and Purpose adopted by the Commission for the May 13, 2013 revisions explains that:

> The expiration date of the temporary modification was set at 12/31/21 to allow for CDPS permits that are issued prior to the effective date of anticipated changes to the chronic arsenic standard in the 2016 Basic Standards Rulemaking to not have the temporary modification expire within the term of a permit. The Commission adopted this temporary modification to allow time for the Division, dischargers and stakeholders to continue a workgroup process to resolve the uncertainty regarding the appropriateness of the W+F chronic arsenic standard of 0.02 µg/L.

The Division's January 29, 2013 pre-hearing statement and the Statement of Basis and Purpose adopted by the Commission on May 13, 2013 both explain that while the temporary modifications are in effect, the Division will collaborate with a stakeholder workgroup to develop a revised water + fish table value standard for adoption during the 2016 triennial review rulemaking hearing. EPA anticipates that application of the revised table value to individual segments (and deletion of the temporary modifications) would then be considered by the Commission.

Basis for EPA's Action

The revisions are consistent with the temporary modification general policy in *Basic Standards and Methodologies for Surface Waters* (Regulation #31, Section 31.7(3)).[1] EPA's regulation at 40 CFR § 131.13 provides that such general policies may be adopted at State discretion, while also specifying that they are subject to EPA review and approval. The Colorado general policy has been approved by EPA on multiple occasions, and most recently on August 4, 2011.

Temporary modifications are authorized by 31.7(3) where specific circumstances are shown to exist. For example, supporting information must show that there is significant uncertainty regarding the water quality standard necessary to protect current and/or future uses (31.7(3)(a)(ii)(A)), or regarding the extent to which existing quality is the result of natural or irreversible human-induced conditions (31.7(3)(a)(ii)(B)).

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[1] Section 31.7(3) authorizes temporary modifications if an existing permitted discharge has a demonstrated or predicted water quality-based effluent limit compliance problem, and one of two situations is shown to exist: (1) significant uncertainty regarding the water quality standard necessary to protect current and/or future uses, or (2) significant uncertainty regarding the extent to which existing quality is the result of natural or irreversible human induced conditions. Section 31.7(3) requires that adequate supporting information must be submitted, including a justification for the interim narrative or numeric value, any data describing effluent and ambient quality, a plan for eliminating the need for the temporary modification, and a justification for the proposed expiration date. Temporary modification expiration dates are determined by the Commission based on relevant factors, including how soon resolving the issues that necessitated adoption of the temporary modification is deemed feasible. Pursuant to 31.7(3)(e), the Commission must hold an annual rulemaking hearing to review temporary modifications that will expire within approximately two years. Pursuant to such hearings, the Commission may delete, modify, or make no changes to each temporary modification. Compliance schedules requiring actions intended to eliminate the uncertainty regarding the appropriate underlying standard may be included in the permit pursuant to 31.14(15)(b).

During the April 8, 2013 rulemaking hearing, the Commission heard testimony from EPA that there is scientific uncertainty regarding the cancer risk assessment for arsenic, which is currently under review by EPA. Similar information was included in the written comments submitted by EPA to the Commission on February 26, 2013, and March 27, 2013.

In its pre-hearing statement, the Water Quality Control Division (Division) cited several additional factors that contribute to uncertainty regarding the appropriate numeric standard for arsenic. These same reasons were cited in responsive comments submitted by various Colorado stakeholders.

- *Natural contributions*: Many Colorado waters have natural levels above the 0.02 µg/L numeric standard.
- *Technical Feasibility*: Effluent concentrations that can be achieved on a consistent basis are uncertain. The Division's pre-hearing statement noted that: "the wide range of pollutant mixtures (from contaminated groundwater, uncontaminated but arsenic-rich groundwater, to typical domestic wastewater) also complicates the conclusions about technical feasibility."
- *Perceived Unfairness*: There is a risk management/equity question about whether it is appropriate to require ambient surface water concentrations that meet the (purely health-based) table value standard when much higher finished drinking water concentrations are allowed to be delivered to households.[2] The 10 µg/L Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) was based on non-health factors and a cost-benefit study.

In addition to being authorized by Colorado's general policy, the arsenic temporary modifications are consistent with EPA's water quality standards regulation (40 CFR § 131.10(g)), which authorizes site-specific adjustments to WQS if the State can demonstrate that it is not feasible to attain a designated use (which is not an existing use as defined at 40 CFR § 131.3). Where supported by the factual circumstances, this provision of the EPA regulation may allow for: (1) removal of designated uses, (2) adoption of less-stringent designated use sub-categories, and/or (3) adoption of WQS variances. EPA believes that several of the factors that contribute to uncertainty regarding the 0.02 µg/L arsenic standard are closely aligned with attainability factors in 40 CFR § 131.10(g). For example, 40 CFR § 131.10(g)(1) authorizes WQS revisions where "naturally occurring pollutant concentrations prevent the attainment of the use" and 40 CFR § 131.10(g)(6) authorizes WQS revisions where "controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact."

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[2] Colorado's table value assumes an incremental cancer risk level of 10^{-6} (or 1 in 1,000,000).

Based on review of the evidence submitted to the Commission, EPA concludes that the revisions to water quality standards that are the subject of today's action are consistent with both Colorado's approved general policy (31.7(3)) and EPA's water quality standards regulation (40 CFR §§ 131.10(g), 131.13). Accordingly, the revisions are approved.

ESA Consultation

It is important to note that EPA approval of State standards is considered a federal action which may be subject to the Section 7(a)(2) consultation requirements of the Endangered Species Act (ESA). For ESA Section 7(a)(2) to apply, EPA must be taking an action in which it has sufficient discretionary federal involvement or control to protect listed species. Human health water quality criteria are designed to protect humans, not plants and animals. EPA's discretion to act on Colorado's submission is limited to determining whether the criteria ensure the protection of the designated uses upon which the criteria are based (i.e., use by humans). Therefore, today's EPA approval is not subject to ESA Section 7(a)(2) consultation requirements.

CONCLUSION

The arsenic temporary modifications adopted on December 13, 2011, August 13, 2012, October 9, 2012, and May 13, 2013 are approved. EPA Region 8 thanks the Commission and the Division for their efforts to review and revise Colorado water quality standards. Questions regarding this letter may be directed to David Moon, the Region's water quality standards coordinator, at 303-312-6833.

Sincerely,

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C.

DECISION OF THE GENERAL COUNSEL ON MATTERS OF LAW
PURSUANT TO 40 C.F.R. SECTION 125.36(m)

No. 58

In the matter of National Pollutant Discharge Elimination System, Permit Number NY 0001368, for Bethlehem Steel Corporation, Lackawanna, New York, the Presiding Officer has certified one issue of law to the General Counsel for decision pursuant to 40 C.F.R. §125.36(m). The parties, having had an opportunity to provide written briefs in support of their respective positions, present the following issue:

QUESTION PRESENTED

"Does EPA have statutory authority to establish thermal effluent limits, based on receiving water flow and characteristics when such requirements have not been included in a water quality certification, and no officially promulgated thermal effluent guidelines and standards exist?"

After reading the briefs and analyzing the parties' positions, I believe this question might be more accurately phrased and addressed as three distinct questions.

QUESTION OF LAW NO. I

"Does EPA have the statutory authority to establish thermal effluent requirements, based on State water quality standards, when such requirements have not been included in a State certification under Section 401 of the FWPCA, and when the State certification specifically includes certain less stringent thermal limitations?"

SWQB Rebuttal Exhibit 9

ANSWER

Yes, EPA has both the authority and the obligation, pursuant to Section 301(b)(1)(C), to assure that NPDES permits contain sufficient limitations "necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations." This obligation exists independently of State certification.

DISCUSSION

The FWPCA clearly establishes an obligation for the permitting authority to insure that permits contain effluent limitations necessary to meet State water quality standards. Section 301(b)(1)(C). (See Decisions of General Counsel, #13, #44) The Act also provides that States may certify specific limitations as necessary to comply with Section 301 (including 301(b)(1)(C)) of the Act or with "any other appropriate requirement of State law." Section 401(d). Limitations contained in a State certification must be included in a NPDES permit. EPA has no authority to ignore State certification or to determine whether limitations certified by the State are more stringent than required to meet the requirements of State law. (See Decision of General Counsel, #44) In the absence of State certification, EPA must, pursuant to Section 301(b)(1)(C), independently interpret and apply State water quality standards. (Cf. EPA v. California, 96 S. Ct. 2022, 2032 (1976)) The question presented herein, however, has not previously been addressed: when the State does certify specific limitations as

necessary to meet water quality standards, does the Administrator still retain his obligation to independently interpret and apply State water quality standards so as to ensure compliance with Section 301(b)(1)(C)? I believe the answer is clearly that the Administrator does retain such obligation since his authority pursuant to Section 301(b)(1)(C) is independent of State certification.

Any other answer would illegally restrict the Administrator from insuring that a permit met all the relevant requirements of the Act. For instance a State might certify that the technology-based effluent limitations under Section 301(b)(1)(A) were sufficient to meet water quality standards. EPA, however, might know that additional, more stringent limitations are required to meet the applicable State water quality standard. Must EPA ignore such information merely because of the State certification? Or suppose the State certifies specific limitations which are less stringent than the limitations contained in a 303(e) plan submitted to EPA by the State and approved by EPA? Is EPA legally required to ignore the 303(e) plan recommendations? Or suppose the State certifies specific limitations for some pollutants but ignores other pollutants which are included in the water quality standards. Is EPA to ignore such other water quality standards? For the Administrator to blindly accept State certification as the final authority in any of these cases, he would be forced to ignore the language of Section 301(b)(1)(C) and his duty under the Act to assure compliance therewith.

In enacting Section 401, Congress clearly intended to give the States an opportunity to assure that federally-issued NPDES permits contained limitations necessary to implement the State's water quality standards. There is no indication in the Act, or in the legislative history, however, that Section 401 was intended to limit the authority and obligation of EPA to independently assess the need for more stringent conditions to meet the requirements of Section 301(b)(1)(C).

QUESTION OF LAW NO. II

What are the relevant water quality standards applicable to this NPDES permit?

ANSWER

The relevant water quality standards are those in effect on the date of initial permit issuance, August 30, 1974.

DISCUSSION

The Administrator has previously determined the general rule that the appropriate water quality standards to be applied to a permit are those which were in effect at the time of initial permit issuance. (See Decision of the Administrator, In the Matter of U. S. Pipe and Foundry Company, NPDES Appeal No. 75-4, October 10, 1975) The State thermal standards adopted in July 1969 were the standards in effect on the date of initial permit issuance. At the time of initial permit issuance, such standards had not been approved by EPA. Nevertheless, the standards were valid under State law and are binding upon EPA pursuant to Section 301(b)(1)(C) until and unless EPA supersedes such standards

by promulgating under the authority of Section 303(b) or 303(c). State water quality standards exist independently of EPA approval or disapproval (see attached memo, dated February 3, 1975) and do not become Federal standards through the EPA approval process.

QUESTION OF LAW NO. III

"In developing limitations pursuant to Section 301(b)(1)(C), should EPA consider a provision contained in the State's water quality standards such as a "grandfather" clause which is not a water quality standard as defined by the FWPCA and which does not relate to receiving water uses or criteria?

ANSWER

No, EPA is not required and in fact is without authority to consider provisions of State law which are not water quality standards, treatment standards, or compliance schedules in determining appropriate limitations under Section 301(b)(1)(C). EPA must ignore such requirements.

DISCUSSION

The "Criteria Governing Thermal Discharges" adopted by the State of New York in July, 1969, include the following water quality standards for "non trout" waters:

> "The water temperature at the surface of a stream shall not be raised to more than 90°F at any point. Further, at least 50 percent of the cross sectional area and/or volume of the flow of the stream including a minimum of 1/3 of the surface as measured from shore-to-shore shall not be raised to more than 5°F over the temperature that existed before the addition of heat of artificial origin or to a maximum of 86°F whichever is less..."

The thermal criteria certified by the State included only the first sentence of the standard cited above, i.e., a 90°F limit for the discharge. EPA however included in the permit the additional language found in the standard.

Although the State of New York did not submit a brief, it appears that the State's failure to certify the entire thermal criteria is based upon another portion of its "Criteria Governing Thermal Discharges." This provision states as follows:

> EXTENT OF APPLICABILITY OF CRITERIA TO EXISTING DISCHARGES
>
> In determining whether a discharge existing prior to the adoption of the above criteria complies with the applicable standard for thermal discharges ('None alone or in combination with other substances or wastes in sufficient amount or at such temperature as to be injurious to fish life....or impair the waters for any other best usage... (6 NYCRR 701 3 et. seq.)), these criteria are intended only to be a frame of reference. (emphasis added)

This "grandfather" clause which distinguishes between existing discharges such as Bethlehem and new dischargers has been the subject of continuing controversy between Federal authorities and the State of New York since 1969. The existence of this clause was a major factor in the failure of the Federal Water Pollution Control Administration to approve the 1969 thermal standards.

Revised thermal standards adopted by New York in September, 1974 also included a clause exempting dischargers from the numerical thermal criteria on the basis of age. On February 25, 1975, the EPA Regional Administrator approved the numerical criteria submitted by the State

but exempted the grandfather clause from his consideration. He determined that the grandfather clause was inconsistent with Section 316(a) of the FWPCA and in addition was incompatible with the nature of water quality standards since it differentiated among dischargers on the basis of age and was unrelated to the existing or desired quality of the receiving water. (40 Fed. Reg. 13216-17, March 25, 1975)

I also believe that a "grandfather clause" is not an acceptable part of a water quality standard. Therefore I believe as a matter of law that the Region was correct in ignoring such a clause in its determination of the thermal water quality standards which were applicable to this permit.

In reaching this conclusion, I do not mean to suggest that all variance procedures contained in State water quality standards are illegal and unacceptable under the FWPCA. In Decision of the General Counsel #44, I specifically considered the question of an Illinois variance procedure. The Illinois procedure allowed for a limited exception to meeting a water quality standard upon a showing that compliance "would impose an arbitrary or unreasonable hardship." In my decision, I held that EPA would not itself provide for the hearing to determine whether a discharger qualified for such a variance, but would incorporate a State-determined variance in a NPDES permit.

It is important to distinguish the type of variance in Illinois from the variance presented by this case. Section 101(a)(2) of the

FWPCA sets as an interim goal the achievement of water quality wherever attainable, that provides for the "protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water" by July 1, 1983. In order to attain this goal, EPA has required States to set their water quality standards at such levels "wherever attainable." EPA regulations provide that "in determining whether such standards are attainable for any particular segment, the State should take into consideration environmental, technological, social, economic, and institutional factors." 40 C.F.R. 130.17(c)(2). EPA's regulations are more specific in regard to downgrading existing water quality standards. Standards may be lowered only when the State can demonstrate that one of three factual situations exists:

> (i) The existing designated use is not attainable because of natural background;
>
> (ii) The existing designated use is not attainable because of irretrievable man-induced conditions; or
>
> (iii) Application of effluent limitations for existing sources more stringent than those required pursuant to Section 301(b)(2)(A) and (B) of the Act in order to attain the existing designated use would result in substantial and widespread adverse economic and social impact.

Thus, under these regulations, a State may downgrade a water quality standard for a particular stream segment if attaining the standard will require treatment in excess of best available technology ("BAT") for industrial point sources or best practicable waste

treatment technology ("BPWTT") for publicly-owned treatment works, and such additional treatment would result in "substantial and widespread" impact.

A number of States, however, have adopted a somewhat different approach. Rather than downgrading the standard for an entire stream, or stream segment, some States have maintained the standard, but provided that individual dischargers may receive variances for a limited time period from meeting the standards. This approach appears to be preferable environmentally. The more stringent standard is maintained and is binding upon all other dischargers on the stream or stream segment. Even the discharger who is given a variance for one particular constitutent (e.g., chlorine) will be required to meet the applicable criteria for other constituents. The variance is given for a limited time period and the discharger must either meet the standard upon the expiration of this time period or must make a new demonstration of "unattainability."

EPA will accept such variance procedures as part of State water quality standards as long as they are consistent with the substantive requirements of 40 C.F.R. 130.17. Therefore, variances can be granted by States only when achieving the standards is "unattainable." In demonstrating that meeting the standard is unattainable, the State must demonstrate that treatment in excess of that required pursuant to Section 301(b)(2)(A) and (B) of the Act is necessary to meet the standard and must also demonstrate that requiring such treatment will result in substantial and widespread economic and social impact which

exceeds the positive economic and social impact of enhanced water quality. EPA Regional Administrators should not accept State variance determinations unless they are accompanied with an adequate record to support the determinations.

The justification submitted by the State should include documentation that treatment more advanced than that required by Sections 301(b)(2)(A) and (B) has been carefully considered and that alternative effluent control strategies have been evaluated.

Since State variance proceedings involve revisions of water quality standards, they must be subjected to public notice, opportunity for comment, and public hearing. (See Section 303(c)(1) and 40 C.F.R. 130.17(a)). The public notice should contain a clear description of the impact of the variance upon achieving water quality standards in the affected stream segment.

Total maximum daily loads included in any plan prepared pursuant to Sections 208 or 303(d) and (e) must be adjusted to reflect the variance. The granting of a variance to any one discharger should not effect the load allocations or effluent limitations required for other dischargers on the steam segment.

As noted above, however, the exemption procedure developed by New York for thermal dischargers does not in any way meet these requirements. The New York procedure provides a blanket exemption for all dischargers of a certain age. This exemption from otherwise applicable standards is not related to any demonstration or determination of "attainability" and does not incorporate any economic or environmental test for the particular

discharger. For the reasons noted above, such an exemption procedure cannot be considered as part of a water quality standard under Section 303 of the Act.

G. William Frick

G. William Frick
General Counsel

Dated: 29 MAR 1977

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 21 1984

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Draft Guidance for Application and Review of Section 301(c) Variance Requests

FROM: Martha G. Prothro, Director
Permits Division, Office of Water Enforcement and Permits (EN-336)

Stuart Sessions, Acting Director
Regulatory Policy Division, Office of Policy, Planning and Evaluation (PM-221)

TO: Regional Water Management Division Directors

The Permits Division (OWEP) and the Regulatory Policy Division (OPPE) have developed a draft technical guidance manual to assist with the preparation and review of section 301(c) variance requests. As you know, section 301(c) of the Clean Water Act provides a method whereby a discharger may obtain a modification of the requirements of section 301(b)(2)(A), which requires the application of best available technology economically achievable (BAT). An applicant may be granted a section 301(c) variance for nonconventional pollutants, if the proposed modified requirements:

(1) will represent the maximum use of technology within its economic capability; and,

(2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

The purpose of the attached draft guidance is to assist applicants in completing requests for 301(c) variances and EPA Regions and States in reviewing the requests. For the purpose of financial evaluation, we have divided applicants into two groups, regulated and unregulated industries. Regulated industries are those whose rates of return are set by public utility commissions. Most firms are unregulated.

SWQB Rebuttal Exhibit 10

Unregulated firms should perform three financial calculations to determine if they are eligible on economic grounds for a section 301(c) variance. Similarly, regulated firms should perform two calculations to determine their economic eligibility. EPA will grant a variance only if the financial tests (or comparable demonstrations by the applicant) indicate that the required pollution control technology is not economically achievable and if the applicant can demonstrate reasonable further progress toward elimination of the discharge of pollutants. We have provided worksheets for performing the various financial calculations. The tests are designed to be understood by those with minimal training in financial management or accounting. If the results are unrepresentative or inconclusive, additional review or assistance is available from financial analysts at OPPE for the benefit of both permit writers and applicants.

We are eager to receive your comments and suggestions on the draft guidance. We also suggest that you provide copies of the guidance to the NPDES States in your Region. We are particularly concerned about your views on ease of use by both applicants and permit writers and on the appropriateness of the financial screening tests which we have developed. Please send your comments and any comments from your States by September 18 to Tom Laverty or Marilyn Goode of the Permits Division. If you have any questions about the draft guidance, please have your staff contact them at FTS 426-7010. Thank you for your help in putting the guidance in final form.

cc: Regional Permits Branch Chiefs

Attachment

Technical Guidance Manual for Application and Review of Section 301(c) Variance Requests

I. INTRODUCTION

A. Purpose of this Manual

The purpose of this guidance manual is to outline a simple, expeditious methodology for assessing the economic capability of dischargers applying for section 301(c) variances. The economic tests specified here are those that EPA prefers and recommends for use in reaching a decision on a section 301(c) variance request. However, as this manual provides guidance only and is not binding, applicants are free to submit other evaluations of their financial condition that respond to the section 301(c) requirements. EPA also may perform further evaluation of applicants' financial ability. Variance determinations will be made on a case-by-case basis as part of the permit issuance process. Accordingly, permit writers will explain their reliance on any specific tests in determining economic capability as well as any conclusion reached. The public will have an opportunity to participate in this decision through the NPDES procedures (40 CFR Part 124) and the ultimate decision on the request will be judicially reviewable as part of the NPDES permit.

B. Statutory Background

The Clean Water Act requires achievement of best available technology economically achievable (BAT) effluent limitations for all nonconventional pollutants by July 1, 1984 or not more than three years after EPA establishes the limitations, up to July 1, 1987, whichever is later. Section 301(b)(2)(F).

Section 301(c) of the Clean Water Act (P.L. 95-217) establishes a mechanism whereby a direct discharger may obtain a modification of the requirements of Section 301(b)(2)(A). The discharger can be granted a Section 301(c) variance by showing that the modified requirements:

(1) will represent the maximum use of technology within the economic capability of the owner or operator; and,

(2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

Section 301 (j)(1)(B) imposes an application deadline for Section 301(c). An applicant for a Section 301(c) variance must submit its application not later than 270 days after promulgation of the applicable effluent guideline or 270 days after enactment the Clean Water Act 1977, whichever is later.*

* See 40 CFR 122.21(l)(2) for specific requirements on the submission of section 301(c) variance requests.

II. APPLICATION AND REVIEW PROCEDURE

A. Summary of Section 301(c) Variance Process

A Section 301(c) variance request must clearly demonstrate that the modified requirements represent the maximum use of technology within the firm's economic capability and that the modified requirements will result in reasonable further progress toward the elimination of nonconventional pollutants. With respect to the latter showing, at a minimum, the applicant must demonstrate compliance with all applicable BPT limitations and pertinent water quality standards. In addition, the proposed alternative must provide for a reasonable degree of improvement in the applicant's discharge. Recommended criteria for demonstrating 'reasonable further progress' are described in Section C below.

The methodologies for determining economic capability for regulated and unregulated industries differ. Regulated industries are those in which Public Utility Commissions (PUCs) set the firm's rate of return, such as the electric utility industry. Most firms are unregulated.

Unregulated firms should calculate three financial tests to determine if they are eligible on economic grounds for a Section 301(c) variance. EPA, generally, will grant a variance only if all three tests indicate that the required pollution control is not economically achievable and the applicant makes the requisite demonstration about reasonable further progress.

Similarly, regulated firms should perform two financial calculations. EPA, generally, will grant a variance only if both tests indicate that the pollution control equipment is not economically achievable and the applicant can demonstrate reasonable further progress.

B. Procedure Governing Section 301(c) Variance Requests

Requests for Section 301(c) variances are governed by provisions in the NPDES permit regulations 40 CFR Parts 122 and 124. These provisions specify when variance requests must be submitted, certain requirements of requests, and the decisionmaking and appeal process. The most important provisions include 122.21(l), 124.62, 124.63, and 124.64. Other pertinent provisions include 122.21(n)(2), 124.51(b), and 124.60.

C. Demonstration of Reasonable Further Progress

There are three criteria for determining whether the modified requirements will "result in reasonable further progress toward the elimination of the discharge of pollutants." The applicant for a Section 301(c) variance will have to meet the following

three criteria to the satisfaction of the Administrator.

First, BPT is an absolute floor--a minimal level of control--for all plants to meet. Any applicant for a Section 301(c) variance must demonstrate current compliance with all applicable BPT limitations and continued compliance under the proposed modified limitations.

Second, the applicant must demonstrate that the proposed modified limitations will assure compliance with the pertinent water quality standards. Section 301(c) provides a variance from the technology-based requirements of BAT, but not from the requirement for compliance with water quality standards.

Finally, to insure that "reasonable further progress" will be made, the applicant should demonstrate to the satisfaction of the Administrator that the applicant has evaluated all combinations of pollution control efforts within its economic capability. Such evaluation shall consider new treatment technologies, upgrading of an existing treatment system, and any process modifications or materials substitutions within its economic capability that will result in a reduction of discharges of the pollutant or pollutants for which the variance is sought.

After conducting its evaluation, the applicant then must propose modified effluent limits based on some combination of treatment and production changes that will involve the maximum use of technology within its economic capability and will result in reasonable further progress toward the elimination of the discharge of pollutants.

In some cases, the availability of technologies only in discrete increments may result in an applicant proposing to use technologies that require an investment that is less than its maximum economic capability. Furthermore, EPA interprets economic capability in terms of the longer-term viability of an applicant. Therefore, the Agency will not require additional controls that may entail a significant risk of exceeding the applicant's longer-term economic capability. However, the Administrator may review pollution control methods not selected by the applicant in determining whether the applicant's selection of control methods satisfies the statutory criteria that proposed modified limits would represent maximum feasible efforts within its economic capability and would ensure reasonable further progress toward the Act's goal of the elimination of pollutant discharges into the Nation's waters. The Administrator's best decision will necessarily be made on a case-by-case basis.

Whenever possible, the Agency will determine reasonable further progress in such a manner to be compatible with the ultimate attainment of compliance with BAT limitations. This will avoid investments in pollution control equipment which could not be later adapted

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

In the Matter of:	
PROPOSED AMENDMENTS TO *STANDARDS FOR INTERSTATE AND INTRASTATE WATERS*, 20.6.4 NMAC	**No. WQCC 14-05 (R)**
New Mexico Environment Department,	
Petitioner.	

REBUTTAL TESTIMONY OF JODEY KOUGIOULIS

I. INTRODUCTION

My name is Jodey Kougioulis and I am currently employed as an Environmental Scientist and serve on the Water Quality Standards Team and as the Quality Assurance Officer for the New Mexico Environment Department ("NMED") Surface Water Quality Bureau ("SWQB"). My professional resume is included as SWQB Exhibit 40, in the Notice of Intent ("NOI") direct testimony filed on December 12, 2014.

I am presenting this written rebuttal testimony on behalf of the NMED concerning two proposals filed by Peabody Energy ("Peabody"). The first Peabody proposed revision is to the selenium criteria for wildlife habitat use in Subsection 20.6.4.900.J NMAC. The second is to Subsections 20.6.4.900.D and E NMAC to exempt artificial ponds and man-made wetlands from primary and secondary contact recreation criteria.

II. PROPOSALS AND REBUTTAL

A. Subsection 20.6.4.900.J NMAC - Proposed Revision to Use-Specific Numeric Criteria for Selenium

Peabody has proposed replacing the current total recoverable selenium criterion of 5.0 µg/L for wildlife habitat with a dissolved selenium criterion of 50 µg/L. This change represents an order of magnitude increase in concentration, which is further amplified by basing the criterion on the dissolved fraction of selenium rather than the current total recoverable criterion for selenium. Amigos Bravos rejects this proposal in its entirety because it is based on protection of livestock and large mammals rather than all wildlife species. The SWQB also opposes this proposal in its entirety because it fails to demonstrate that a wildlife standard of 50 µg/L Selenium (dissolved) is protective of sensitive wildlife species in New Mexico. The SWQB's rebuttal testimony directly follows Peabody's proposals presented below.

Peabody Proposal: The current selenium water quality standard for the protection of wildlife habitat is 5.0 µg/L (total recoverable), which is identical to and duplicative of the chronic aquatic life water quality standard. The 5.0 µg/L concentration is based on the current national recommendation by the U.S. Environmental Protection Agency's ("EPA's") ambient water quality criteria for selenium based on the protection of fish, which were determined to be more sensitive than other aquatic life species (e.g., macroinvertebrates). It is

unnecessary to impose 5.0 µg/L as a wildlife standard since any time wildlife and aquatic life are present the relevant aquatic life standard applies.

The NMAC definition of wildlife habitat is:

"Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state." [Subsection 20.6.4.900.G NMAC]

While aquatic life spend their entire lives or sensitive life stages in the water, as stated in the NMAC definition, wildlife use water only for drinking or through incidental consumption during feeding. Thus, different standards are appropriate for terrestrial wildlife than for aquatic life. The exposure to wildlife is expected to be similar to that experienced by livestock; therefore, the livestock standard of 50 µg/L Selenium (dissolved) is appropriate.

Subsection J under 20.6.4.900 - Proposed Revision to Use-Specific Numeric Criteria

Pollutant	CAS Number	DWS	IRR	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-00	
Selenium, dissolved	7782-49-2	50	b	50	50			4,200	p
Selenium, total recoverable	7782-49-2				~~5.0~~	20.0	5.0		

SWQB Rebuttal Response: The SWQB opposes Peabody's proposal to modify the selenium standard for wildlife habitat chiefly because it fails to demonstrate that a wildlife standard of 50 µg/L selenium (dissolved) is protective of sensitive wildlife species in New Mexico. The

proposed criterion is ten times higher than the current total recoverable selenium criteria of 5.0 µg/L for wildlife habitat. This increase is further magnified by basing the criteria on the dissolved fraction of selenium rather than the current total recoverable criteria for selenium.

In addition, Peabody inaccurately reduces and oversimplifies the New Mexico definition of wildlife habitat and use by stating "*wildlife use water for only drinking or feeding purposes, therefore, their potential for harmful effects due to exposure to waterborne selenium is much less than aquatic life as fish and macroinvertebrates.*" (Canton Testimony, Peabody NOI, p. 3) This limited interpretation fails to acknowledge the complete wildlife habitat protections afforded under this designated use:

"Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state." (Subsection 20.6.4.900.G NMAC)

Definitions for wildlife habitat and associated designated use with narrative criteria, were adopted by the Water Quality Control Commission ("WQCC") in 1995, replacing the previous "livestock and wildlife watering" use[1]. At that time, the SWQB argued that the new use was necessary because the "livestock and wildlife watering" use was inadequate to protect wildlife. During the 1998-2000 Triennial Review, the wildlife habitat designated use was revised by adding language to ensure all wildlife components that utilize the aquatic resource were

[1] "Livestock and wildlife watering use" was adopted in 1973, replacing the "livestock watering" use. The use was not defined and there was no mention of criteria specifically protective of this use. Prior to 1973, there were no wildlife-related uses.

protected, and numeric criterion were also adopted, including a criteria for selenium. The WQCC adopted a selenium criterion (5.0 µg/L) based on the EPA's federal Water Pollution Control Act (i.e., the Clean Water Act ("CWA")) §304(a) criteria recommendations, *"which better reflects national standards and avoids overprotection of wildlife habitats."*[2]

In adopting the language in the current wildlife habitat designated use the WQCC has stated that wildlife habitat use (and criteria) is not limited to occasional drinking and feeding, but specifically includes protection for habitat, propagation, and most critically, protection against bioaccumulation. Selenium is a bioaccumulative pollutant, meaning that it accumulates in tissues of aquatic organisms at levels greater than water column concentrations. Selenium is also toxic to birds that consume aquatic organisms contaminated with selenium. The key adverse effects are reduced hatching success in birds and deformities in offspring of exposed female fish and birds. (SWQB Rebuttal Exhibit 12) While New Mexico's current wildlife habitat criteria mirror the EPA's chronic aquatic life protections, they were adopted by the WQCC considering that protecting lower trophic levels would protect higher trophic levels of wildlife from the bioaccumulative effects of selenium.

Peabody's proposal acknowledges the known toxicity of selenium to birds, but gives little weight to this fact by speculating about various mechanisms that may affect selenium toxicity in birds. Peabody states that the nature of New Mexico watersheds may result in the majority of birds in the state residing in small transient populations that only feed in watersheds for a brief time with limited selenium exposure. Peabody hypothesizes that complex feeding behaviors, varied diet, and foraging in diverse environments may result in diluted selenium concentrations in New Mexico birds, suggesting that selenium toxicity to birds may be less of a concern in New

[2] WRCC Statement of Reason for Amendment of Standards, 3100L, January 21, 2000.

Mexico. This position appears to be based on conjecture and is not supported by any evidence presented in Peabody's testimony. Furthermore, it does not provide any support for increasing the wildlife habitat selenium criteria from 5 µg/L Se (total recoverable) to 50 µg/L Se (dissolved). In fact, Peabody's proposal is largely based on a qualitative summary of selected selenium studies on livestock (e.g., horses, cattle) and wildlife (e.g., elk, deer), which are essentially equivalent and used to support the conclusion that adopting the current livestock standard will be protective of the wildlife use. This approach is not appropriate based on the separate wildlife habitat and livestock watering use definitions and criteria adopted during previous Triennial Reviews.

Finally, conclusions drawn from the referenced papers and studies do not expressly support the proposed 50 µg/L Se (dissolved) standard modification of wildlife habitat and furthermore Peabody does not provide a methodology for the derivation of their proposal. While these quantitative studies document the varying effects of selenium on aquatic-dependent species, large mammalian wildlife, and avian species related to habitat, diet, and contact exposure, they fail to provide a scientific foundation to demonstrate that the proposal is protective of all wildlife uses. The lack of research on non-mammalian wildlife and the complexity of selenium toxicity and bioaccumulation demands that any proposal to modify the existing wildlife habitat Se criteria demonstrate through evidence that the proposal is protective of all wildlife habitat uses.

The scientific understanding of selenium toxicity has been evolving since the 1980's. In May, 2014, EPA released for external peer review a new draft Aquatic Life Criteria Document for Selenium in Freshwater (SWQB Rebuttal Exhibit 12). While the EPA noted in their draft that recommendations were not focused on aquatic-dependent wildlife such as birds, they recognize

the concern and need for wildlife criteria development specific to selenium. **EPA** plans to consider this issue in the future.

In summary, it is simply not prudent to adopt a 50 µg/L (dissolved) selenium standard for wildlife habitat without a clear scientific demonstration of adequate protection for all existing or attainable wildlife habitat uses. The current wildlife habitat criteria mirror the EPA's recommendations for aquatic life protection and are based on sound scientific rationale. This was adopted by the WQCC after considerable discussion and review after the 1998-2000 Triennial Review. The EPA is also in the process of developing more guidance specific to wildlife habitat criteria for selenium. The SWQB will continue to evaluate the most scientifically defensible and protective approach for developing wildlife habitat criteria in New Mexico. However, the SWQB recommends that the WQCC reject Peabody's proposal in its entirety.

B. Proposed Revisions to Subsections 20.6.4.900.D and E NMAC

Peabody has proposed changes to Subsections 20.6.4.900.D and E NMAC to exempt artificial ponds and man-made wetlands, which are not Waters of the United States, from primary and secondary contact recreation criteria. Chevron Mining Incorporated ("CMI") and the San Juan Water Commission ("SJWC") have stated their support for Peabody's proposal, while Amigos Bravos rejects the Peabody proposal in its entirety.

The SWQB opposes Peabody's proposal to exempt man-made wetlands and artificial ponds from the primary and secondary contact standards to protect human health as conditioned by the three specified exceptions because it is overbroad, impractical, redundant and may not protect existing or attainable uses. The SWQB's rebuttal testimony directly follows Peabody's proposals presented below.

Peabody Proposal:

D. Primary Contact: the monthly geometric mean of E. coli bacteria of 126 cfu/100 mL and single sample of 410 cfu/100 mL and pH within the range of 6.6 to 9.0 apply to this use. Notwithstanding the listing of designated uses for perennial or intermittent unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment, livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet primary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are permitted or approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S. but a use attainability analysis pursuant to Section 20.6.4.15 NMAC establishes that primary human contact criteria likely will not be met given the intended use.

E. Secondary Contact: the monthly geometric mean of E. coli bacteria of 548 cfu/l 00 mL and single sample of 2,507 cfu/100 mL apply to this use. Notwithstanding the listing of designated uses for ephemeral, unclassified waters, it is not the intent of this regulation to require artificial ponds or man-made wetlands which are used or intended to be used for treatment, livestock watering, and/or wildlife habitat purposes, and that were built for such purposes, to meet secondary human contact criteria if:

1. The artificial ponds or man-made wetlands are not surface waters of the state or waters of the U.S.; or
2. The artificial ponds or man-made wetlands are surface waters of the state, but are not waters of the U.S., and the intended uses are permitted or approved by a state governmental authority; or
3. A written determination has been made by a governmental authority with jurisdiction that the artificial ponds or man-made wetlands are waters of the U.S. but a use attainability analysis pursuant to Section 20.6.4.15 NMAC establishes that primary human contact criteria likely will not be met given the intended use.

Rebuttal Response: The SWQB opposes Peabody's proposed changes to Subsections 20.6.4.900.D and E NMAC to exempt artificial ponds and man-made wetlands, which are not water of the United States, from primary and secondary contact recreation criteria. The WQCC came to the same conclusion in 2009 when it heard virtually the same proposal from Peabody

excepting that the present version has structured the arguments into three criteria-specific exemptions. The WQCC did not adopt Peabody's 2009 proposal, stating *"Peabody's proposal to exempt certain man-made ponds and wetlands that are not waters of the United States from the primary and secondary human contact standards because it is overbroad, impractical, and may not protect existing or attainable uses... These determinations are better evaluated on a case-by-case basis with public comment and Commission review through the UAA process."* (2009 Triennial Review, Pleading Log 134, Order of Statement and Reasons, Pg. 59 and 295-298) The SWQB finds that the current proposal has the same issues the WQCC identified as problematic in 2009.

First, the scope of the proposal is overbroad because it exempts all man-made ponds and wetlands "intended" for a wide category of purposes. The application is vague and uncertain, as the term "intended to be used" is not well defined, and not limited to Peabody's narrowly focused concerns regarding permanent mine impoundments on their New Mexico properties, but to a potentially far greater number of unclassified surface waters of the state. Whether a particular pond or wetland was "intended" for livestock purposes and whether primary contact is an existing or attainable use are questions that turn on many factors including the water's history, location, size, depth, hydrology, ownership and accessibility. While some man-made ponds and wetlands are small, others are of substantial size. As such it is unclear what waters fall into this category and therefore it is impossible to evaluate the merits of Peabody's proposed change in terms of the designated uses of these waters.

Second, the implementation of the proposal through the stated exemptions is impractical because it requires both a federal and state jurisdictional determination and Peabody does not explain the mechanism for making this determination. The U.S. Army Corps of Engineers

("USACE") is responsible for making the regulatory jurisdictional determination; however, they may be unlikely to do so unless a federal permit is involved. As a result, Peabody's proposal would be dependent upon a federal determination that may never occur. Further, the implementation of Peabody's proposal for State-only waters would require that waters have "intended uses [that] are permitted or approved by a state governmental authority." However, the process and who makes this determination (with the possibility that more than one state agency may make this determination) is not described. For the purposes of Peabody's proposal, this determination would have the effect of changing the designated use of water bodies, which is a change in the water quality standards ("WQS"). Under the New Mexico Water Quality Act, NMSA 1978, Sections 74-6-1 to -17 (1967, as amended through 2013) ("WQA") this authority rests with the WQCC and is not delegated to any other agency.

The proposal is also redundant, as the WQCC has adopted WQS that allow changes to the designated use of a water body through a Use Attainability Analysis ("UAA") at Section 20.6.4.15 NMAC. While these WQS mirror federal requirements, they are adopted for state purposes and therefore also apply to all state jurisdictional waters. Further, the implementation of the three specific types of stated exemptions in the proposal is redundant, unnecessary, or in conflict with the existing regulations. For a federal jurisdiction water, and hence state jurisdictional water as well, a UAA would also be necessary and Peabody's proposal cites the requirements of Section 20.6.4.15 NMAC. As noted in Peabody's testimony, federal regulations require that the CWA §101(a)(2) presumption of "fishable/swimmable" uses are attainable unless demonstrated otherwise by a UAA. This proposed language is redundant as there are existing requirements in Section 20.6.4.15 NMAC used to change the designated use of a waterbody. The second exemption for a water that is not a federal or state jurisdictional water is

another example of redundancy in Peabody's proposal. Simply stated, in this situation the water quality standards do not apply and therefore the exemption language is not necessary. Finally, according to Peabody's proposal, the third exemption for a water that is not a federal water but is a water of the state would not apply primary or secondary contact recreation use. As noted above, this exemption has the effect of removing these uses for the water and is therefore in conflict with the WQCC adopted regulations that require a UAA under Section 20.6.4.15 NMAC to lower a designated use.

Peabody is asking the WQCC to remove contact uses from these waters absent any consideration of whether the water supports an existing or attainable use, specifically a recreational use where human contact standards apply. These determinations are better evaluated on a case-by-case basis with public comment and WQCC review through the UAA process as required by Section 20.6.4.15 NMAC. The UAA must demonstrate, in light of site-specific considerations, that a use is not attainable and that the standards applicable to such water should be amended. If Peabody believes that primary contact use is not attainable for a water body, then that condition can be demonstrated through a UAA. Furthermore, the man-made permanent mine impoundments associated with Peabody's permitted operations appear to be waters of the U.S. and have been regulated as such by the EPA under the federal NPDES permit program. As such, under the proposed language a UAA would still be required to remove or lower the CWA §101(a)(2) uses for the permanent mine impoundments on their New Mexico properties.

The requirement to conduct a UAA is particularly appropriate and essential given the wide diversity of impoundments covered by Peabody's proposal that would each need to be considered on a case-by-case basis. Any kind of water feature in an arid environment may attract recreation seekers, especially children. The UAA process allows for the appropriate

consideration of the relevant issues regarding waters *"which are used or intended to be used for livestock watering and/or wildlife habitat purposes and that were built for such purposes"* (Peabody NOI, p. 2) without ignoring other existing or attainable uses. In other words, whether a recreation use is actually existing or attainable is not solely dependent on the intended purpose of a water body.

As documented in the 2009 Triennial Review, Peabody is aware that the UAA process is the appropriate mechanism to remove designated uses. It was acknowledged by Peabody in a correspondence regarding the issue of designated uses that the most appropriate way to exempt these ponds from contact standards is through a UAA.[3] As stated in the correspondence, one way out *is "the federal presumption is rebutted through a use attainability analysis. My suggestion is to do a general UAA on livestock ponds, indicating that the coliform standards cannot be met."* (SWQB Rebuttal Exhibit 13)

Colorado has approved a UAA prepared by Seneca Coal Company, a subsidiary of Peabody, to remove the primary contact use from an ephemeral stream. This seven-page document – of which two pages are photographs – briefly describes the stream's geomorphology, proximity to developed areas, access points, depth and flow characteristics, and existing recreational uses. The information was collected by a site visit and three interviews and demonstrates that UAAs need only be as complicated as the circumstances require.

Peabody's NOI Testimony of John Cochran ("Cochran Testimony") argues that these impoundments were never intended to be subject to human contact standards and are adequately protected through conditions set forth in its permits for their mines under the federal Surface Mining Control and Reclamation Act ("SMCRA"). According to the Cochran Testimony, these

[3] 2009 Triennial Review, Peabody Energy Exhibit 8, Pleading Log 20

ponds and impoundments are subject to approval by the New Mexico Mines and Minerals Division ("MMD") that they meet applicable WQS. However, the MMD and the WQCC have different statutory perspectives and obligations. MMD's obligation is to ensure compliance with the New Mexico Surface Mining Act, NMSA 1978, Sections 69-36-1 to -20 (1993, as amended through 2014) ("NMSMA"), which requires that *"the quality of impounded water will be suitable on a permanent basis for its intended use and that discharges from the impoundment will not degrade the water quality below water quality standards established pursuant to applicable federal and state law in the receiving stream."* NMSA 1978, § 69-25A-19. The WQCC's obligation through the New Mexico WQA is to ensure that all existing or attainable uses for surface waters of the state are protected for CWA purposes. The mechanism and process for changes to designated uses is through the UAA process. Peabody's proposal simply does not acknowledge, nor afford the required protection of, existing or attainable uses for a large category of potentially unclassified waters of the state, nor does it provide a mechanism to demonstrate that human contact standards are not attainable. For the reasons described in the above rebuttal testimony, the SWQB urges the WQCC to reject Peabody's proposal.

EPA United States Environmental Protection Agency | Office of Water Mail Code 4305T | EPA-820-F-14-005 May 2014

External Peer Review Draft Aquatic Life Ambient Water Quality Criterion For Selenium – Freshwater 2014

Summary

EPA is updating its national recommended chronic aquatic life criterion for selenium in freshwater to reflect the latest scientific information, which indicates that toxicity to aquatic life is driven by dietary exposures. As an initial step toward developing a final updated criterion recommendation, EPA is now accepting written scientific views from the public on an external peer review draft criterion document for 30 days. Following closure of the public comment period, the draft criterion will undergo an independent, contractor-led, external peer review. Hence, this version of the criterion document is referred to as the "external peer review draft." Following peer review of the draft selenium criterion, EPA will consider the peer reviewer and public comments, revise the document as necessary, and publish a Federal Register notice announcing the availability of the draft proposed selenium criterion and soliciting scientific views for 30 days from the public. EPA will then revise the document and issue a final selenium criterion.

The external peer review draft criterion has four elements, consisting of two fish tissue-based and two water column-based elements. The external peer review draft criterion document contains a recommendation that states and authorized tribes adopt into their water quality standards a selenium criterion that includes all four elements. The draft criterion document goes on to recommend that (because fish tissue-based concentration is a more direct measure of selenium toxicity to aquatic life than water column concentrations) the criterion affirms that fish tissue elements will be given precedence over the water column elements when both types of data are available.

What are aquatic life criteria?

Ambient water quality criteria for the protection of aquatic life are numeric concentrations of pollutants, with recommended duration and frequency, in surface waters that are protective of aquatic life designated uses. Under Clean Water Act section 304(a), EPA is required to develop and publish and, from time to time, revise, criteria for protection of water quality and human health that accurately reflect the latest scientific knowledge. EPA develops water quality criteria based solely on data and scientific information about the relationship between pollutant concentrations and environmental and human health effects. EPA's recommended water quality criteria are not rules, nor do they automatically become part of a state's water quality standards. States must adopt into their standards water quality criteria that protect the designated uses of the water bodies within their area. These can include scientifically defensible site-specific criteria that are different from EPA's national recommended criteria, as long as the site-specific criteria are protective of the designated use. Water quality criteria are not effective under the Clean Water Act until they have been adopted into a state's water quality standards and approved by EPA.

What is selenium?

Selenium is a naturally occurring chemical element that is nutritionally essential in small amounts, but can be toxic to aquatic life (such as fish and invertebrates) in higher concentrations. It can also be toxic to birds that consume aquatic organisms contaminated with excessive amounts of selenium. Selenium is a bioaccumulative pollutant, meaning that it accumulates in tissues of aquatic organisms at levels greater than water column concentrations.

How does selenium enter surface waters?

Selenium occurs naturally and usually enters surface water when it is mobilized by human activities. Cases of excessive waterborne selenium are mostly related to irrigation of soils that are naturally high in selenium, ash pond discharges from coal-fired power plants, petroleum refinery effluents, and runoff or discharges from certain mining activities.

How does selenium affect aquatic life?

Risks to aquatic life are mostly from contamination of the food they consume rather than from direct exposure to selenium dissolved in water. Selenium accumulates in tissues of aquatic organisms. However, the concentration of selenium in animal tissues does not significantly increase (biomagnify) at successively higher levels in the food web except when the food web is primarily mollusk-based (i.e., the fish eat mostly clams or mussels). Fish are the most sensitive taxa in the aquatic community and bioaccumulate selenium through diet via algae and primary/secondary producers. The key effects are reduced hatching success and deformities in offspring of exposed female fish and birds.

What is the history of EPA's development of selenium criteria?

EPA published the current national recommended chronic selenium water quality criterion for the protection of aquatic life in 1987 (Table 1). EPA sponsored an expert workshop on selenium in 1998 that recommended the fish-tissue criterion approach as more reliable than a water criterion. In 1999, EPA published the current recommended acute water column selenium criterion and reaffirmed the 1987 chronic criterion (Table 1). In 2004, EPA published in the Federal Register a draft criterion expressed as a whole-body fish tissue concentration. Based on findings from the 2009 International Expert Workshop on selenium and collaboration with the U.S. Geological Survey on a bioaccumulation model, EPA revised the 2004 draft to include criteria based on egg-ovary tissue concentration and water column concentrations.

What is the 2014 external peer review draft selenium criterion?

The external peer review draft criterion has four elements, consisting of two fish tissue-based and two water column-based elements. EPA recommends that states and tribes adopt all four elements of the recommended selenium criterion into water quality standards:

1) Fish Egg-Ovary Chronic Element

Available toxicity data suggest that the most robust and consistent measurement endpoint directly tied to adverse aquatic effects is the selenium concentration in fish eggs and ovaries. As a result, one element of the criterion is a concentration in fish eggs and ovaries.

2) Fish Whole-Body or Muscle Chronic Element

EPA also intends to recommend a fish whole-body or muscle element for ease of implementation. Fish egg or ovary tissue from females may only be available at certain times of the year, and states more commonly collect samples of whole-body fish tissue.

3) Water Column Chronic Monthly Element for Lentic and Lotic Waters

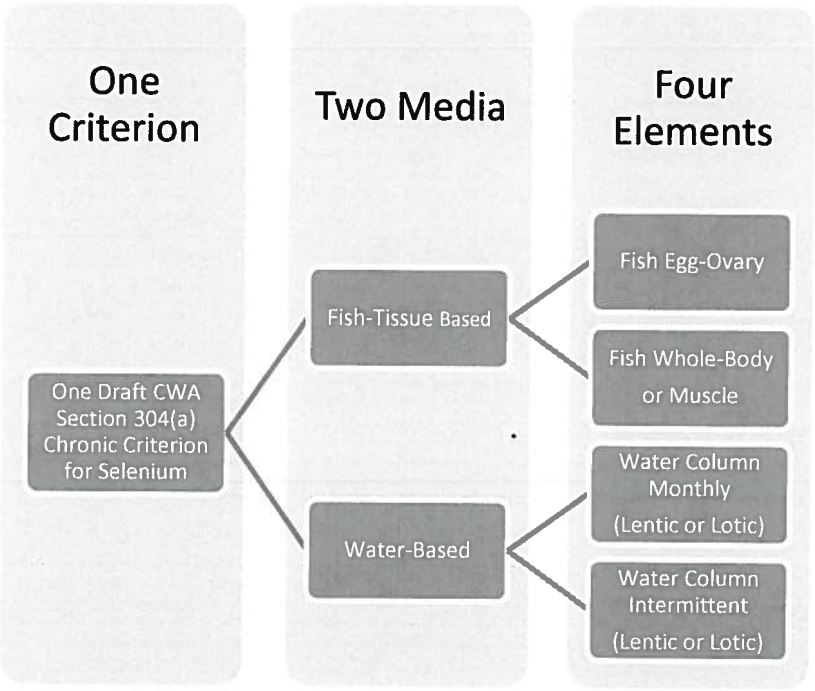
Because obtaining fish tissue may be challenging, EPA recommends a water column element derived from conservative translations of the egg-ovary element concentration for lotic (flowing) and lentic (still) waters, two categories of waters where selenium tends to bioaccumulate differently. This water column element is intended to ease implementation, particularly for developing water quality-based effluent limits for National Pollutant Discharge Elimination System (NPDES) permits. A water column element is also essential where fish are absent from a water body or where it is difficult to collect and analyze fish tissue.

4) Water Column Intermittent Exposure Element

This element is intended to be protective against chronic effects of selenium from short-term or intermittent water column exposures in either a lentic or lotic water, as appropriate.

With regard to the duration and frequency of the selenium criterion, the fish tissue element concentrations are never to be exceeded; the water column element concentrations are based on a 30-day average and are not to be exceeded more than once in three years on average. See Table 1 for more details, and for comparison of the 2014 draft external peer review criterion to the current recommended criteria for selenium.

EPA recommends that states and tribes adopt all four elements of the recommended selenium criterion into water quality standards, expressing the four elements as a single criterion composed of multiple parts, in a manner that explicitly affirms the primacy of the whole-body and/or muscle elements over the water column elements, and the egg-ovary element over any other element. The fish egg-ovary element is derived from analysis of the available toxicity data. The fish whole-body and fish muscle elements are derived from the egg-ovary element coupled with data on concentration ratios among tissues. The water column elements are derived from the egg-ovary element coupled with bioaccumulation considerations. Adoption of the fish whole-body and/or muscle element into water quality standards ensures the protection of aquatic life when fish egg or ovary tissue measurements are not available, and adoption of the water column element ensures protection when neither fish egg-ovary nor fish whole-body or muscle tissue measurements are available.



What happens after the public comment period closes?

Following closure of the 30-day public comment period, the draft criterion will undergo an independent, contractor-led, external peer review. All public comments received during the comment period will be provided to the peer reviewers. Following peer review of the draft selenium criterion, EPA will revise the document and publish a Federal Register notice announcing the availability of the draft proposed selenium criterion and soliciting scientific views for 30 days from the public. EPA will then revise the document again and issue a final updated selenium criterion document.

How to View the Criterion Document and Supporting Information

EPA has established an official public docket for this action under Docket ID No. EPA-HQ-OW-2004-0019, accessed at www.regulations.gov. You may also download the document and supporting information from http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/index.cfm.

For More Information

Contact Kathryn Gallagher by telephone at (202) 564-1398, by email at gallagher.kathryn@epa.gov, or by mail at U.S. EPA, MC: 4304T, 1200 Pennsylvania Ave., N.W., Washington, D.C. 20460.

Table 1. Comparison of EPA's current recommended criteria and the updated 2014 external peer review draft criterion for selenium.

	Current Recommended Criterion		2014 External Peer Review Draft Criterion	
	Magnitude	**Duration**	**Magnitude**	**Duration**
Chronic	5 ug/L	4-day average	15.2 mg/kg dw in fish eggs or ovaries[2]	Instantaneous measurement[7]
			8.1 mg/kg dw in fish whole-body, or 11.8 mg/kg dw in fish muscle (skinless, boneless fillet)[3]	Instantaneous measurement[7]
			1.3 µg/L in lentic aquatic systems 4.8 µg/L in lotic aquatic systems[4]	30-day average
			$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$	Intermittent Exposure[6]: Number of days fewer than 30 with an elevated concentration
Acute	CMC = 1/[(f1/CMC1) + (f2/CMC2)][1]	1-hr average	None[5]	
Criteria Frequency: Water column criteria not to be exceeded more than once in three years on average. Fish tissue criteria are never to be exceeded.				

[1] Where f1 and f2 are the fractions of total selenium that are selenite and selenate, respectively, and CMC1 and CMC2 are 185.9 ug/l and 12.82 µg/l, respectively.
[2] Overrides whole-body, muscle, or water column elements when egg/ovary concentrations are measured.
[3] Overrides any water column element when both fish tissue and water concentrations are measured.
[4] Water column values are based on dissolved total selenium in water.
[5] EPA is not recommending an acute water column-based criterion because selenium is bioaccumulative and toxicity primarily occurs via dietary (chronic) exposure.
[6] Where $WQC_{30\text{-}day}$ is the water column monthly element, for either a lentic or lotic system, as appropriate. C_{bkgrnd} is the average background selenium concentration, and f_{int} is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).
[7] Instantaneous measurement. Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in the fish at a given site. Selenium concentrations in fish tissue are expected to change only gradually over time in response to environmental fluctuations.

Ohara, Jim, EMNRD

From: Ohara, Jim, EMNRD
Sent: Tuesday, October 14, 2008 8:12 AM
To: Ramsey Tim (Timothy.TC.Ramsey@bhpbilliton.com); 'Shepherd, Marie (MShepherd)'; Mark Hiles; 'Coats, Michael (MichaelCoats)'
Subject: FW: Highlights

FYI – Any thoughts on an Ad Hoc meeting date?

From: Jones, Dennis D. [mailto:DJones@PeabodyEnergy.com]
Sent: Monday, October 13, 2008 4:14 PM
To: Cochran, John N.; Murphree, Philip
Cc: Ohara, Jim, EMNRD
Subject: RE: Highlights

Yes, I have to deal with this all the time in Colorado. As stated in the memo, one way out is

"the federal presumption is rebutted through a use attainability analysis."

My suggestion is to do a general UAA on livestock ponds, indicating that the coliform standard can not be met.
Good luck
Dennis Jones
Hydrologist
Senca Coal / Peabody Energy

From: Cochran, John N.
Sent: Monday, October 13, 2008 15:34
To: Murphree, Philip; Jones, Dennis D.
Subject: FW: Highlights

Looks like New Mexico is on the verge of Colorado-esque CWA fervor...

From: White, Cybil B [mailto:Cybil.B.White@bhpbilliton.com]
Sent: Monday, October 13, 2008 15:12
To: Cochran, John N.
Subject: FW: Highlights

I'm not sure if you've seen this, but this has also surfaced:

From: Ohara, Jim, EMNRD [mailto:jim.ohara@state.nm.us]
Sent: Thursday, October 09, 2008 9:06 AM
To: Brancard, Bill, EMNRD
Cc: Shepherd, Holland, EMNRD; Leach, Carol, EMNRD; Smith, Mark A, EMNRD; Bada, Cheryl, EMNRD; Anderson, Monte, EMNRD; Clark, David, EMNRD; Delay, Linda, EMNRD; Guranich, John, EMNRD; Vinson, Joe, EMNRD
Subject: Highlights

Not too much going on this week.

Yesterday I received an e-mail from ED that is likely to have a significant impact on the Coal mines (Of course this will also apply MARP mines). The Surface water folks are telling me that our livestock impoundments have been designated

STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

In the Matter of:	
PROPOSED AMENDMENTS TO *STANDARDS FOR INTERSTATE AND INTRASTATE WATERS*, 20.6.4 NMAC	**No. WQCC 14-05 (R)**
New Mexico Environment Department,	
Petitioner.	

REBUTTAL TESTIMONY OF BRYAN DAIL

I. INTRODUCTION

My name is Bryan Dail. I am currently employed as an Environmental Scientist with the New Mexico Environment Department ("NMED") Surface Water Quality Bureau ("SWQB"). I have a Bachelor's degree in Biology with Chemistry as a minor and a Ph. D in Microbiology. My professional resume is included as SWQB Exhibit 58, in the Notice of Intent ("NOI") direct testimony filed on December 12, 2014.

The rebuttal testimony I am presenting concerns two proposals to amend water quality standards criteria. The first is Amigos Bravos' ("AB") proposal to replace the hardness-based water quality standard (WQS) for aluminum ("Al") with the U.S. Environmental Protection Agency's ("EPA") nationally recommended §304(a) criteria (EPA, 1988). The second proposal is for site-specific copper criteria based on a report conducted by Freeport-McMoRan Chino Mines ("Chino Mines") and applicable to certain streams located within the area known as the

Chino Mines Smelter Tailings and Soil Investigation Unit ("STSIU") near the towns of Bayard and Hurley in Grants County, New Mexico. I will present rebuttal testimony on these proposals in the order mentioned above.

II. PROPOSALS AND REBUTTALS

A. CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH .899 NMAC

SUMMARY

Amigos Bravos proposes to remove in its entirety the hardness-based water quality standard ("WQS") for Al adopted by the Water Quality Control Commission ("WQCC") during the 2009 Triennial Review and replace it with the EPA's nationally recommended §304(a) criteria (EPA, 1988). The SWQB recommends that this proposal be rejected by the WQCC because Amigos Bravos has provided no scientific evidence that the current hardness-based Al standard is not sufficiently protective of aquatic life. Further, as detailed below, the current standard is more protective than what AB proposes and would protect for alkaline waters with low hardness as has been reported by Gunderson (1994) and others. Below, the SWQB provides its point-by-point rebuttal responses to Amigos Bravos' arguments.

SWQB REBUTTAL RESPONSES

AB: The current hardness-based criteria for aluminum pH 6.5 to 9.0, previously approved by the WQCC and the EPA, is not protective of aquatic life. Accordingly, it should be replaced with the EPA-recommended dissolved Al criteria of 87 ug/l and 750 ug/l that New Mexico had in place

prior to 2010, until such time that there is sufficient scientific data to develop a hardness-based criterion that is appropriate in western waters.

SWQB Rebuttal Response: The SWQB appreciates the concern expressed by Amigos Bravos about the aquatic life protections previously adopted and approved by the WQCC, and approved by the EPA. The current hardness-based Al criteria are the culmination of analyses of multiple studies of the effects of water hardness on Al toxicity that were not part of the 1988 EPA guidance.[1]

The Federal water quality standards ("WQS") regulation at 40 CFR §131.11(a) require that water quality criteria must be adopted that protect the designated use, and that such criteria *"must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use."* Numeric criteria, based on relevant site specific conditions, are allowed in New Mexico's WQS under Subsection 20.6.4.10.D NMAC. This allowance is also consistent with the federal WQS regulations under 40 CFR §131.1 l(b)(l)(ii) that provide States with the opportunity to adopt water quality criteria that are modified to reflect site-specific conditions.

The EPA will approve site-specific criteria developed using appropriate and scientifically defensible procedures. For example, the EPA recognizes that laboratory toxicity studies may not represent site-specific water quality that impacts toxicity of metals and therefore, EPA allows for a determination of factors that ameliorate metal toxicity. From the EPA website:

"National water quality criteria for aquatic life may be under- or over-protective if:

[1] U.S. Environmental Protection Agency (EPA). 1988. *Ambient Water Quality Criteria for Aluminum - 1988.* EPA 440/5-86-008. Office of Water, Washington, DC.

The species at the site are more or less sensitive than those included in the national criteria data set (e.g., the national criteria data set contains data for trout, salmon, penaeid shrimp, and other aquatic species that have been shown to be especially sensitive to some materials), or physical and/or chemical characteristics of the site alter the biological availability and/or toxicity of the chemical (e.g., alkalinity, hardness, pH, suspended solids and salinity influence the concentration(s) of the toxic form(s) of some heavy metals, ammonia and other chemicals)[2]*."*

The Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (EPA, 1985), and subsequent guidance (*Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* (EPA, 1994)) were the basis for the development of New Mexico's current hardness-based formula for the protection of aquatic life use ("ALU") and represent a significant increase in the understanding of metal toxicity in natural waters. Amigos Bravos, in their filed testimony (AB NOI, p.15), acknowledge and support hardness-based criteria development as potentially more realistic than the 1988 guidance. There are available today the results of a considerable number of additional toxicity studies that have been conducted for Al. Thus, absent a demonstration of protection outside of the pH range of the current hardness-based Al criteria or the 1988 guidance, a reversion to the 1988 aluminum guidance does not meet the WQCC's task of developing "*criteria for water quality that accurately reflects the latest scientific knowledge*" (§304(a)(1), Clean Water Act ("CWA")). Rather, the proposal is a reversion to previous standards when less was known, and advances protection only insofar as it is over-protective in some circumstances and under-protective in others. Moreover, AB promotes applying the older criteria to waters outside of the pH range for which the criteria were developed and provides scant support (only a handful of studies) for application in these waters. Furthermore, new Al guidance that uses water hardness as well as other ameliorative water constituents is forthcoming from the EPA, anticipated later in

[2] http://water.epa.gov/scitech/swguidance/standards/handbook/chapter03.cfm

2015 (Eignor, 2013). Therefore, the most prudent action would be to maintain current approved criteria as they are based upon the state-of-the-science, more protective at low hardness, and fully consider new guidance as it may help fine tune the previously-demonstrated water hardness/aquatic life protection relationship, as well as the concern for ALU protections outside of pH 6.5 to 9.

AB: New Mexico's hardness-based standard fails to address important pH effects where the pH is >7.5, a condition prevalent in many New Mexico streams. Hardness protects against, but does not eliminate, lethality at low concentration dissolved Al over long periods. According to a peer-reviewed study, a mortality of 50% would be projected at a little more than 3 mo.(109d): at 100 mg/J CaC03, 0.16mg/I dissolved Al, pH=8.6.

SWQB Rebuttal Response: The optimal pH for salmonid species is reported to range from 6.5 to 8.0 (Hartman and Gill, 1968; Behnke and Zarn, 1976), and AB is correct in stating that some New Mexico streams naturally exceed pH 7.5. However, AB cites only one study that shows toxic effects of Al on salmonids at moderately alkaline conditions (pH 7.98 to 8.58; Gundersen *et al.*, 1994). The development of New Mexico's current hardness-based Al standards used the Gundersen *et al.*, 1994 study in the acute aluminum criteria equation; however, that study did not meet data use requirements for the development of the chronic or sub-lethal levels of Al criteria. At pH>8, the alkalinity of waters alone may cause physiologic challenges to salmonids given their pH preferences. A review of the literature regarding Al toxicity at alkaline pH suggests equivocal effects at best, and suggest that initial toxicity trial conditions, rather than natural water conditions, may dictate observed negative salmonid physiologic responses (Poléo and

Hytterød, 2003; Winter *et al.,* 2005). In natural alkaline waters, the dominant form of aluminum is the aluminate ion, and this ion has been reported to be in a non-toxic state. For the one study cited by AB, which concluded higher toxicity at alkaline pH, it is not clear if the aluminum form used was in steady state (*i.e.*, not undergoing reactions because of differences in the pH of the Al supply tank, dilution tanks, and fish exposure tanks as these undergo mixing). This is crucial because reactive Al intermediates formed in mixing waters of differing pH could lead one to erroneously conclude that steady-state Al at alkaline pH is toxic to aquatic life, when the state of the aluminum form is not actually known. In other words, it is not known whether the lethal effects are the result of alkaline pH, or its impact on the form and pH of the supplied Al.

AB: First, the proposed change is vague and confusing. There is no indication what water quality standards will apply for purposes of the CWA to those waters where the pH is less than 6.5. Second, the SWQB problematically states that the hardness-based criteria will not apply in waters with a pH of 6.5 for "federal CWA purposes" but will apply for non-CWA purposes (*i.e.,* for exclusively State purposes and per the New Mexico Water Quality Act).

SWQB Rebuttal Response: The EPA approved the hardness-based criteria for chromium III, copper, lead, manganese, nickel, and silver, which were adopted by the WQCC during the 2009 Triennial Review, without exception, but initially declined to take action on the hardness-based criteria for three other metals (aluminum, cadmium, and zinc), citing the need for additional review. After the State of New Mexico ("State") provided clarification, the EPA, in a letter dated April 30, 2012 and Record of Decision ("ROD") Addendum, approved the hardness-based

criteria adopted for cadmium and zinc. For aluminum, the EPA provided limited approval stating:

> *"EPA has determined that the hardness-based equations would be protective for waters within the pH range of 6.5 to 9.0, particularly at low hardness levels, but would not be protective for waters below that pH range. Therefore, EPA is approving the hardness-based equation for aluminum for only those waters of the State where pH is equal to or greater than 6.5, but is disapproving these equations in waters where the pH is less than 6.5. Consistent with EPA's regulations, the previously approved 304(a) criteria for aluminum are thus the applicable water quality standards for purposes of the CWA in waters where the pH is at or below 6.5. In such cases, as the permitting authority in New Mexico, EPA will apply the previously approved 87 µg/L chronic total recoverable aluminum criterion."*

The EPA later explained by letter dated June 18, 2012 that the ROD contained a mistake, it erroneously referred to total recoverable instead of the dissolved fraction applicable to the chronic criterion, 87 µg/L aluminum (as dissolved).

However, the EPA's recommendations remain problematic. The State's proposal for hardness-based equation for Al included separate equations for both acute and chronic criteria. The EPA's pH limitation apparently applies to both equations as it *"is disapproving these equations in waters where the pH is less than 6.5."* (EPA letter and ROD, April 30, 2012) However the EPA states they will apply *"the previously approved 304(a) criteria for aluminum ... 87 µg/L chronic [dissolved] aluminum criterion"* for both the acute and chronic criteria despite that fact that there is a previously approved §304(a) criteria for acute dissolved aluminum, which is 750 µg/L. (EPA letter and ROD, April 30, 2012) The EPA's letter does not provide a justification to apply the chronic criterion in place of the previously approved acute aluminum criterion in low pH waters. The SWQB's goal is to clarify in the WQS the applicable water quality criterion for aluminum. We understand that the EPA has disapproved the hardness-based equations for aluminum for water below pH 6.5, and this would be the same exception were the

WQCC to adopt the 1988 criteria. The SWQB further finds the EPA's recommendation is not well justified, and appears ambiguous about what criteria should apply in low pH waters. In this situation, the approach suggested by the EPA to resolve the disapproval appears to apply the criteria for Al in a different way than recommended in the EPA's §304(a) criteria document, and also deviates from use of the acute criteria of 750 ug/L (as dissolved) previously adopted by the State and approved by the EPA. Because of the EPA's disapproval, and to clarify the applicability to the extent possible, the WQS simply state that the EPA has disapproved the formulae for low pH waters. This was explained in the amended SWQB Petition filed on October 24, 2014. As a practical matter, the EPA has both water discharge permits and WQS oversight authorities, and for purposes of the CWA, the EPA shall apply their recommendation accordingly. For other purposes (*i.e.*, non-CWA or State purposes consistent with the New Mexico Water Quality Act) the formulae approved by the WQCC apply.

AB: Third, while it is true that the current standard was approved by the WQCC during the last Triennial Review, this approval was given prior to the EPA's determination that hardness-based criteria are not protective of waters with a pH of 6.5 or less. The SWQB and this WQCC must account for this new information and should adopt Amigos Bravos proposed changes to ensure that New Mexico's water quality standards are, in fact, protective of water quality in all waters of the State.

SWQB Rebuttal Response: The hardness-based criteria adopted by the WQCC for New Mexico did not promote applicability below pH 6.5. Indeed, excepting a segment specific criterion, pH below this value would indicate impairment.

1) AB/GUNDERSEN: Some research indicates that calcium can be protective against some forms of aluminum toxic to aquatic life, particularly at low pH values. However less is known about the potential protective effects of calcium at near-neutral to alkaline pH. As the pH decreases from 7.0 (becomes more acidic), the solubility of aluminum increases. Studies have shown that these soluble forms of aluminum are acutely toxic (causing death) to aquatic life. However, the toxic mechanisms of both inorganic monomeric aluminum (soluble aluminum) and polymeric forms of aluminum (insoluble aluminum) at alkaline pH are poorly understood. This coincides with a lack of understanding on the effects of other water quality parameters (*i.e.*, hardness) on aluminum toxicity to aquatic life at alkaline pH.

SWQB Rebuttal Response: Toxic effects of Al outside the 1988 EPA guidance in the peer-reviewed literature is somewhat equivocal, however, the guidance provides for aquatic life protections between pH 6.5 and 9, which addresses all but a small number of New Mexico waters. The EPA used this range because it is within pH 6.5 to 9 that, absent other toxics, "*water quality is adequately protective of freshwater fishes and invertebrates*" (EPA, 1976)[3]. Thus, outside the range of pH 6.5 to 9, pH itself may be the limiting factor to aquatic life, and likely explains the dearth of literature. Much of the variability in existing peer-reviewed toxicology trials at higher pH are attributable to the unfavorable conditions to aquatic life at high pH, the ameliorative effects of other dissolved substances in natural waters, and specifics related to the manner in which the trials were run (*e.g.,* the form of Al used and the ageing of Al in solution).

[3] U.S. EPA. 1976. Quality criteria for water [The Red Book]. PB-263943 or EPA-440/9-76-023. National Technical Information Service, Springfield, VA.

The 1988 EPA guidance notes that numerous studies were not used in criteria development because pH was less-than 6.5 or greater than 9, and that "*control mortality was too high in many tests reported…*"

Subsequent to the 1988 EPA guidance, several studies have addressed Al mortality at higher pH. A notable study by Gundersen *et al.*, (1994) showed significant mortality at moderately high pH (exceeding 8), and also demonstrated acceptable control survivorship. These researchers manipulated the acute exposure trial pH (7.97 to 8.58), total aluminum (~0 µg/L to 11,960 µg/L) and Total Hardness (21.9 mg/L to 144.5 mg/L) to investigate interactions of these three variables on Rainbow trout survivorship (Table 1). They reported the first signs of mortality in acute trials (15% loss) at pH 8.34, a Total Hardness of 23.4 mg/l and a Total Al of 3,730 µg Al/l. As a comparison, a calculation using New Mexico's hardness formula would set the acute Al criteria for this hardness to 468 µg Al/l. Therefore, the currently adopted hardness-based Al formula calculates a criterion that is almost 8-fold less than the concentration of initial onset Al-induced mortality in the Gundersen *et al.* study. More importantly, the hardness-based calculation results in a more stringent Al threshold than AB's proposed reversion to the 1988 guidance of 750 µg/l.

Table 1. Adapted from Gundersen *et al.*, 1994. Acute Rainbow trout mortality trials in weakly alkaline waters and variable Al and pH. NA=not applicable.

Toxicity Trial pH	Total Hardness	Total Al	Filterable Al*	As Filterable Al	% Survival	NM's Acute Al limit by Hardness Calc	EPA's 1988 Acute Al Guidance
	(mg/L as CaCO3)	(µg/L)	(µg/L)	(%)	(%)	(µg/L)	(µg/L)
7.97	23.1	NA	NA	NA	100	459.8	750
8.02	34.2	NA	NA	NA	100	787.0	750
8.06	83.3	NA	NA	NA	100	2,663.4	750
8.06	112.5	NA	NA	NA	100	4,019	750
8.12	21.9	810	110	13.6	100	427.4	750
8.10	33.1	1,120	90	8.8	100	752.5	750
8.23	84.2	910	160	17.6	100	2,702.8	750
8.25	144.5	1,050	200	19.0	100	5663	750
8.22	22.9	1,860	180	9.7	100	454.4	750
8.20	33.9	2,040	210	10.3	100	777.5	750
8.23	84.2	1,920	160	8.3	100	2,702.8	750
8.25	114.5	1,680	200	11.9	100	4,117.6	750
8.34	**23.4**	**3,730**	420	11.3	**85**	**468**	**750**
8.36	36.3	4,320	460	10.6	85	853	750
8.36	83.0	4,170	420	10.1	95	2,650.2	750
8.33	188.4	3,940	520	13.2	100	4,310.8	750
8.58	24.6	11,960	1,000	8.4	0	501.2	750
8.58	37.7	9,330	940	10.1	5	899.3	750
8.56	83.3	7,950	880	11.1	35	2,663.4	750
8.56	120.2	9,850	900	9.1	15	4,400.8	750

At onset of mortality (15%, in **bold**) and low hardness (23.4 mg/L as $CaCO_3$), New Mexico's hardness-based calculation affords more protection than a reversion to 1988 EPA Al guidance. *Filterable Al in Gundersen *et al.*, 1994 is defined as that which passes a 0.4 µm nominal pore size filter.

More recently in the peer-reviewed literature, several studies have illustrated that the aluminum species predominating at alkaline pH is unlikely to exert toxic effects (Poléo and Hytterød, 2003). They report:

> *"Under alkaline (pH 9.5) steady state conditions, 350 mg Al/ l (predominantly aluminate ion, $Al(OH)_4^-$) had no acute toxic effect on the salmon..."* Moreover: *"No increase in toxicity was evident under non-steady state conditions, i.e. lowering Al solubility as pH was lowered from 9.5 to 7.5. The results indicate that the toxicity of the aluminate ion ($Al(OH)_4^-$) is low, and particularly lower than the corresponding toxicity of cationic Al hydroxides."*

In addition, a Rainbow trout study by Winter *et al.*, (2005) found that:

> *"Aluminum accumulation by trout gills was highest at pH 6–8,...moderate Al accumulation by trout gills at pH 5 and 9, and trout at pH 4 and 10 did not accumulate any Al on their gills."*

These findings indicate that protections afforded between pH 6.5 and 9 identify the most important water quality conditions at which aquatic life is vulnerable to Al. Winter *et al.*, (2005) also found that additions of natural organic matter ("NOM"), a water quality constituent not measured by the SWQB, and thus not part of the hardness-based criteria, ameliorated toxic effects at all pH levels tested. Combined, these data suggest that the form of Al does indeed matter, that pH between 6.5 and 9 is the range of concern, that other water constituents (hardness, NOM) afford significant protections, and that the physical ageing of Al solutions used in toxicology tests is important to best mimic natural conditions, and thus the forms of Al likely to be present.

2) AB/GUNDERSEN: *"In my professional judgment and consistent with the scientific evidence, New Mexico's aluminum criteria—which are the least protective of anywhere in the country—should be replaced by the EPA approved Aluminum criteria of 87ug/L chronic and 750 ug/L acute, and based on total recoverable aluminum, rather than dissolved aluminum, as proposed by Amigos Bravos. These criteria—based on total recoverable aluminum—are*

protective of aquatic life uses in New Mexico, particularly since New Mexico waters have species (rainbow trout) that are sensitive to the toxic effects of aluminum."

SWQB Rebuttal Response: Approximately 25 states lack Al criteria altogether[4], thus it is disingenuous to state that New Mexico's is the least protective anywhere in the country. In fact, as demonstrated in Table 1 above, the SWQB's hardness-based calculation provides greater protections to aquatic life at low hardness concentrations than would a reversion to the EPA's 1988 Al guidance. Regarding the AB proposal to use a total recoverable aluminum rather than dissolved aluminum: The metals criteria for the protection of aquatic life uses, Subsection 20.6.4.900.I NMAC, states that the SWQB uses the dissolved form except in the case of aluminum, wherein the Total Recoverable Al is used:

"Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department."

A notable exception to the rule is in the instance where high geologic or "mineral" forms of Al, forms not typically associated with toxicity exist, a filtered sample may be taken. In waters with extraordinarily high turbidity, the SWQB filters the sample through a 10 µm filter to remove most mineral-associated material. This does not create a *de facto* dissolved Al sample as the operational definition of dissolved metal is that which passes through a 0.45 µm nominal pore size filter (Subsection 20.6.4.7.D(4) NMAC).

[4] http://water.epa.gov/scitech/swguidance/standards/wqslibrary/

3) AB/GUNDERSON: In GEI Consultants' ("GEI") report to the Colorado Mining Association (March 2010) regarding development of a hardness based aluminum water quality criteria, GEI pointed out that the 1988 EPA criteria were "21 years old" and since publication of the 1988 Aluminum Document that "information on the environmental significance of freshwater organism Al exposure and available toxicity studies has increased" but did not provide sound scientific evidence that the current 1988 EPA criteria were "substantially overprotective" or that the new information presented a sound scientific basis for changing the EPA standard.

SWQB Rebuttal Response: In Colorado, an EPA-accepted methodology was used by GEI to develop ambient water quality standards. Exhibit 1 of the GEI testimony to Colorado's WQCC states:

> *"There are standard procedures for developing ambient water quality standards, based on the EPA criteria derivation and recalculation guidance (Stephan et al. 1985,* EPA 1994). GEI further states*: "The first step is to gather all available data on the toxicity of a chemical to various forms of aquatic life. These studies are then subjected to detailed technical review to determine if the data are valid. Stephan et al. (1985) provides guidelines for determining whether data from a particular study are acceptable for use. Acceptable data are then compiled to develop acute and chronic toxicity databases containing data for a variety of species. In the case of updating older standards documents, as is the case for the metals in this proposal, existing toxicity databases are reviewed for accuracy and literature searches are performed to ensure the databases are complete and include the most up-to-date science."*
> (SWQB Rebuttal Exhibit 15)

The SWQB has no indication that this was not performed in the development of Colorado's Al criteria and, to the contrary, approval by both Colorado's WQCC and the EPA indicates the demonstration of protectiveness was effectively made for Colorado's waters.

4) AB/GUNDERSON: Furthermore, the EPA has been working on revising the 1988 aluminum water quality criteria and expects to have a draft of these revisions ready by fall 2015 (Eignor, 2013; Eignor *et al.*, 2014). In the EPA document "National Recommended Water Quality Criteria – Correction," the EPA states that while existing criteria are under revision the "*water quality criteria published by the EPA remain the Agency's recommended water quality criteria until EPA revises or withdraws the criteria*" (U.S.E.P.A. 1999). Indeed, EPA region III rejected the proposal submitted by the West Virginia Department of Environmental Protection for hardness-based aluminum criteria (Developed by GEI, August 2011) due to concerns over lack of protection for local species (InsideEPA.com; Doc. ID: 2461044), and the current development of new National aluminum criteria.

SWQB Rebuttal Response: The SWQB is aware that new, hardness-based, scalar national criteria are close to being released for public review by the EPA and that absent a state-specific or regional demonstration that national criteria might not fit for all water quality circumstances, the 1988 publication remains the EPA's recommended guidance. This does not preclude, however, accepted procedures for the demonstration and determination of criteria outside the national recommendations (EPA criteria derivation and recalculation guidance (Stephan *et al.*, 1985; EPA, 1994))[5,6] Indeed, in the EPA's letter of comments on the New Mexico 2008-2010 Triennial Review regarding New Mexico's proposed hardness-based criteria, they note:

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[5] Stephan, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman and W.A. Brungs, January 1985. "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses," USEPA Office of Research and Development, Environmental Research Laboratories: Duluth, Minnesota; Narragansett, Rhode Island and Corvallis, Oregon, 98 pp.

[6] U.S. Environmental Protection Agency (EPA). 1994. *EPA Interim Guidance on Determination and Use of Water-Effect Ratios for Metals.* EPA-823-B-94-001. Office of Water, Washington, DC.

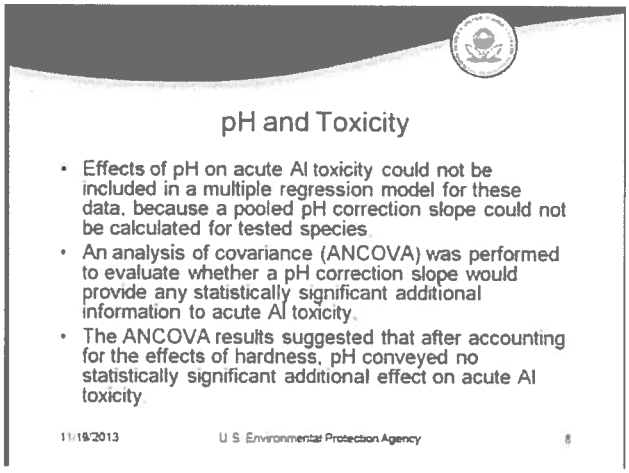
"*EPA considers the hardness-dependent equations for aluminum to be an improvement over the existing criteria for waters within the circumneutral pH range (6.5 - 9.0)...*"

(SWQB Rebuttal Exhibit 16)

Regarding the EPA Region 3's concerns about West Virginia's ("WV") proposed Al criteria, the SWQB understands these concerns were based on local species' sensitivity, specifically endangered (and other) mussel species, some of which are endemic to WV. Protection of highly sensitive mussels endemic to WV does not, *ipso facto*, indicate that New Mexico's Al criteria are not protective for the State. The EPA encourages the development of criteria that are tied to species indigenous to the State.

5) AB/GUNDERSON: The EPA, in its revisions, is evaluating the use of a simplified aluminum Biotic Ligand Model ("BLM") using four parameters (pH, dissolved organic carbon, hardness, and temperature), due to the complex nature between aluminum toxicity and water quality (Eignor, 2014). In addition, there are recent studies (soon to be published) that will provide additional information on aluminum toxicity at the neutral and alkaline pH ranges. One of these studies looking at chronic aluminum exposures to a variety of species at pH 6.0 found that the zebrafish had an EC_{10} of 80 µg/L total aluminum (Stubblefield *et al.,* 2012). This suggests that application of hardness-based aluminum criteria, such as New Mexico's current criteria, at least before these studies are published, is not practical or scientifically sound. Accordingly, and in my professional judgment and consistent with the scientific evidence, New Mexico's aluminum criteria—which are the least protective of anywhere in the country—should be replaced by the EPA approved aluminum criteria of 87 ug/L chronic and 750 ug/L acute, and based on total recoverable aluminum.

SWQB Rebuttal Response: The latest information New Mexico has regarding the EPA's development of a BLM and emergent data regarding pH effects is that pH added no additional information once water hardness was considered (Eignor, 2013)[7].



The study by Stubblefield *et al.*, 2012, on Zebrafish Al sensitivity at pH 6 is apparently a conference paper (non-refereed publication of emergent results) and the SWQB does not have access to the abstract, nor an extended peer-reviewed manuscript, in order to ascertain the reliability of the sensitivities of the six species tested.[8] However, Zebrafish are known to inhabit alkaline tropical waters and are not the ideal organism with which to model Al effects at acidic pH, as they are likely already stressed outside of their preferential pH range. Moreover, as Dr. Gundersen points out in later testimony: "*EPA recommends the use of indigenous species in the development of criteria intended to apply statewide*" (AB NOI, p.10). As previously discussed, a pH below 6.5 is already below New Mexico's WQS criteria for all classified waters (pH 6.6 to

[7] Eignor, D. 2013. Draft Reassessment of the 1988 Ambient Water Quality Criteria for Aluminum. SETAC 34th North America Annual Meeting, Nashville, TN, USA.

[8] Stubblefield WA, Cardwell, AS, Adams WJ, Gensemer RW, Nordheim E, Santore RC. 2012. Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting. Long Beach CA.

8.8, or 9, depending on Aquatic Life Use, Subsection 20.6.4.900.H NMAC), so a lack of protections under the current standards is not demonstrated by the Stubblefield study.

6) AB/GUNDERSON: Why are the GEI Derived Colorado, West Virginia, and New Mexico Hardness-Based Aluminum Criteria Different? The original hardness-based aluminum criteria for Colorado were the same as the criteria developed for New Mexico (GEI report to the CMA, March 2010) but the final Colorado chronic equation was adjusted, which resulted in the chronic criteria being more protective than the New Mexico hardness-based aluminum chronic criteria (Table 1). It is apparent that the Colorado Water Quality Control Commission felt that the original GEI hardness-based aluminum chronic criterion equation was not protective enough. This is reflected in an adjustment in the y intercept of the chronic equation (changed from 0.9161 to -0.1158) resulting in a more protective chronic value (Table 1). In addition, the same hardness based equations produced by GEI were proposed by West Virginia yet they were for dissolved aluminum, making them less protective of aquatic life (Table 1). However, I am unaware of a valid scientific basis for using the same equation for both total recoverable and dissolved aluminum. Equally troubling was the development of the New Mexico hardness-based aluminum equations in 2009 (Chevron Mining Inc.'s notice of intent to present technical testimony – WQCC NO. 08-13), which was for dissolved aluminum. However, the final criteria are based on total recoverable aluminum using the same equations that were derived for dissolved aluminum. If the original criteria were developed for dissolved aluminum, then new equations should have been developed for total recoverable aluminum.

SWQB Rebuttal Response: New Mexico's Al criteria were developed using the EPA-approved methods of acute-to-chronic ratio ("ACR") data. We are not aware of how Colorado derived and adopted their chronic Al criteria.

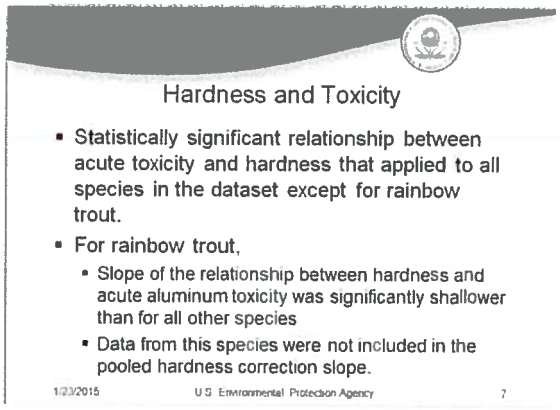
7) AB/GUNDERSEN: Interestingly, the EPA-funded Arid West Water Quality Research Project (AWWQRP, May 2006) developed hardness-based aluminum equations for the region (which includes New Mexico) that are different from the New Mexico/Colorado equations, which included recreationally important species (rainbow trout). Some of the material in this report was also put together by GEI (then Chadwick Ecological) who evaluated the EPA recalculation procedure for the Arid West effluent-dependent waters. Both the acute and chronic equations are substantially more protective than the New Mexico equations. In addition, site-specific equations were calculated, which were even more protective than the regional equation. However, the AWWQRP report pointed out that data to appropriately develop site specific equations was lacking. The variability in these 6 equations demonstrates both a lack of understanding and the lack of data needed to properly calculate hardness-based equations either nationally, regionally, or on a site-specific basis. Therefore, to be protective of aquatic life, it is advisable to adopt 1988 EPA recommended criteria on the basis of total recoverable aluminum, at least until pending studies on aluminum toxicity to aquatic life are made available (published in peer-review scientific journals) and the EPA finishes developing new national aluminum criteria (Biotic Ligand Model). Otherwise, New Mexico risks causing potentially irreparable harm to aquatic life.

SWQB Rebuttal Response: Adopting a national standard when regional or site specific data suggest that there are ameliorative qualities to natural waters fails to recognize that these differences exist. Furthermore, the EPA has a mechanism to address differences that allows for development of a protective criterion that better fits local and/or regional conditions. Different regional criteria guidance through the EPA-funded Arid West Water Quality Research Project ("AWWQRP") is not a weakness of the undertaking but a strength, and was the point of the exercise. The fact that New Mexico and Colorado criteria were, again, different than the regional standards could be expected given differences in the intrinsic water quality in each state. Moreover, additional data available subsequent to the AWWQRP and incorporated into the effort to develop New Mexico's Al criteria would be expected to generate somewhat different water hardness scale results.

8) AB/GUNDERSEN: GEI's omission of recreationally important species is troubling. In GEI's original calculation of a pooled-hardness slope for the Arid West (AWWQRP, May 2006), data from a study looking at the effects of hardness on aluminum toxicity to develop rainbow trout was used (Thomsen *et al.*, 1988). The study was omitted when GEI calculated the pooled-hardness slope for New Mexico criteria. GEI's reasoning was that hardness was not reported in this study (only calcium).However, many studies have shown that it is calcium that reduces aluminum toxicity, with the proposed mechanism being competition of calcium with monomeric aluminum for gill binding sites (Gensemer and Playle, 1999). Hardness measures primarily calcium and magnesium yet magnesium has not been shown to ameliorate aluminum toxicity. The study by Thomsen reported two 48 hour LC50s (the lethal concentration of aluminum that kills 50% of the population) based on two calcium values (1 and 150 mg/L). The hardness for

these 2 calcium values would be 2.5 and 375 mg/L as $CaCO_3$ respectively. Typically reconstituted laboratory dilution waters have calcium magnesium ration of 1:1, which can be quite different to what is measured in the surface waters that can have ratios ranging from 1.6:1 to 8:1 (Naddy *et al.*, 2002). If magnesium were factored into these hardness values, the 2.5 mg/L would not be significantly different (a 1:1 ratio would result in a hardness of 5.6 mg/L as CaCO3). The calcium concentration of 150 mg/L would result in a hardness of 375 mg/L as CaCO3 which is higher than any of the hardness values listed as acceptable aluminum toxicity acute data in the 2010 GEI report. Therefore it seems acceptable to use these values (2.5 and 375 mg/L as $CaCO_3$), particularly when rainbow trout are recreationally important species in New Mexico.

SWQB Rebuttal Response: The non-inclusion of important game fish, namely Rainbow trout, may be attributed to the "shallow response" of salmonids to hardness as compared to other species in the analysis. This phenomenon was reported by Eignor (2015) as a finding in the EPA analysis for the development of new Al criteria as summarized in the slide below:



The omitted Thomsen *et al.*, (1988) paper show an LC_{50} mortality in soft water (1 mg Ca/l or 2.5 mg/L as $CaCO_3$ Total Hardness) at 3,800 µg Al/l and at 71,000 µg Al/l for hard water

(150 mg Ca/l or 374 mg/L as $CaCO_3$ Total Hardness). New Mexico's hardness-based formula would set the Al levels for these soft and hard water examples at 21.8 µg Al/l and 10,071 µg Al/l, respectively. Or, if New Mexico uses the adjusted total hardness suggested by Dr. Gundersen, 2.5 mg/L and 375 mg/L as $CaCO_3$ (New Mexico WQS has an upper limit of 220 mg/L Total Hardness, so for purposes of this discussion, we report this number), New Mexico's hardness-based limits would be 21.9 µg Al/l and 10,071 µg Al/l for either low or high water hardness, respectively. In this case, New Mexico's hardness-based acute Al limits are well below the LC_{50} reported in Thomsen *et al.*, 1988. However, these hardness-based Al limits are not directly comparable to LC_{50} data without further analysis using the *Guidelines for Deriving Numerical National Water Criteria for the Protection of Aquatic Organisms and Their Uses* (EPA, 1985) Ibid. Using data from the Thomson, *et al.* (1988) study in conjunction with other species/taxon data to derive a Final Acute Value and thus an Acute Criterion or Criterion Maximum Concentration was not demonstrated, however, and thus the significance of not using this study cannot be easily ascertained. On the point of reporting Ca hardness and not Ca plus Mg hardness because Mg hardness protections have not been demonstrated, almost all toxicological studies, Gundersen *et al.*, (1994) included, report and/or manipulate both elements that contribute to hardness. At this point it is not possible to disentangle the relative protectiveness of Ca and Mg. However, the SWQB does regularly require dissolved Ca and Mg independent of the water hardness metric and may be able to analyze the meaningfulness of this observation in the future.

9) AB/GUNDERSEN: Gundersen *et al.* (1994) was another study using rainbow trout that was omitted for use in derivation of the pooled-hardness slope for New Mexico criteria. GEI's

rationale for not using this study (according to their March 2010 report) was that the aluminum LC50 calculated for the highest hardness (115.8 mg/L as $CaCO_3$) had undefined confidence limits. However it is not clear why GEI did not use the other 3 LC_{50}s that were calculated at three different hardness values. It is possible that GEI determined that these 3 LC_{50}s did not coincide with the EPA guideline that the highest hardness (83.6 mg/L) value is at least 100 mg/L higher than the lowest (23.2 mg/L). However, in the March 2010 report, GEI used data for *C. dubia* in the hardness regression analysis where the range did not meet the EPA guidelines as well (hardness range 26– 98.5 mg/L). GEI stated that they did not use the high hardness value for C. dubia (194 mg/L) because the LC_{50} for that value was undefined (>99,600 mg/L) but they did count it as fulfilling the EPA guideline requirement for hardness being 100 mg/L higher than the lowest value.

SWQB Rebuttal Response: The SWQB appreciates AB's concern, but it has not been demonstrated how inclusion of some studies mentioned, or non-inclusion of others, would impact the hardness-based Al criteria calculation.

10) AB/GUNDERSEN: Some of the studies used by GEI to derive values in the hardness based aluminum equations should not be used GEI's proposed final Al acute database (Table 4, March 2010 report) list *Tubifex tubifex* (Khangarot, 1991) as the 4th most sensitive species (Genus Mean Acute Value 5,698 ug/L). The GMAV from this species is used to calculate the final acute value (FAV). However there are significant problems with this study. First, the exposure water hardness listed in this study (245 mg/L as $CaCO_3$) does not correspond to the listed calcium and magnesium concentrations (160 and 90 mg/L respectively). Based on these values, the hardness

should be 769 mg/L as $CaCO_3$, which is over 3-fold higher than the listed hardness. Second, the aluminum that was added to exposure water was Al(NH4SO4)2•12H20 (aluminum ammonium sulfate). There is concern that the aluminum ammonium sulfate would contribute ammonia to the exposure solutions (2 ammonia/ammonium ions for every one aluminum ion). The level of aluminum in exposure chambers was not measured in this study as well. Therefore this study should not be used, particularly when this species represents the 4th most sensitive species based on acute toxicity.

SWQB Rebuttal Response: The SWQB concurs with Dr. Gundersen's observation that the combined hardness contributions of reported Ca and Mg for this study calculate to 769 mg/L as $CaCO_3$ hardness rather than that reported (Khangarot *et al.*, 1991). The SWQB is concerned about many of the associated anions and cations introduced in toxicity studies of this type and notes, for instance, potential problems regarding the use of certain Al salts, including $Al(Cl)_3$, which introduces three chlorines for every Al introduced and may cause toxic and/or synergistic effects. However, the SWQB cannot demonstrate this as anything more than a potential problem. Absent specific data that illustrates toxic effects of non-target anions and cations, we conclude that a genus mean acute value ("GMAV") calculated from waters more toxic than expected would likely lead (erroneously) to a more protective (*i.e.*, more stringent) standard.

10) AB/GUNDERSEN: Data from a study looking at the toxicity of a variety of metals (including aluminum) on *D. magna* were used to calculate the pooled-hardness slope, final acute value, and final acute/chronic ratio (Biesinger and Christensen, 1972). However, there are several problems with this study that warrants omission from the database: First, the exposure

water (Lake Superior water had other metal contaminants in addition to the added aluminum (range; Cr = 2-20 ppb, Al 1-26 ppb, Zn 1-2.7 ppb, Cu 0.3-3.2 ppb, Sr 12-27ppb, barium 8-22 ppb, Fe 2-83 ppb, Mn 0.2-11.5 ppb) and the aluminum concentration was not measured in exposure water. Second, the number of test concentrations was not listed, and the pH of the exposure water (before addition of metals had a large range (7.4 – 8.2) was not reported for the acute test chambers. Third, the authors reported that, in the chronic chambers with added aluminum, the pH changed from 6.5 to 7.5, which suggests that the pH likely changed in the acute exposures as well but this was not measured or reported (pH has a very significant effect on aluminum speciation/toxicity).

SWQB Rebuttal Response: It would appear that waters containing other potentially harmful constituents are not ideal for the determination of standards for one constituent, but would seem to potentially skew the hardness-based formulae calculation toward being overly protective.

11) AB/GUNDERSEN: The study by Kimball (1978 manuscript) was used to calculate the slope value from *D. magna* data and provided the acceptable hardness range for the species. Use of this study, like the studies above, is problematic, and calls into question the scientific validity of the current New Mexico hardness based criteria.

• First, this study does not seem to be validated in any way (master's thesis, dissertation

• Second, looking at the unpublished manuscript a hardness value was not reported, only alkalinity was measured and it was not measured in the acute *D. magna* aluminum exposures. However, in the GEI analysis a hardness value of 220 mg/L was reported along with a rather

high LC50 value of 38,000 mg/L. Based on EPA guidelines, this study cannot be used without a measured hardness value. Even more troubling, in the acute *D. magna* aluminum exposure chambers there was a huge difference in the measured pH values between the lowest and highest aluminum exposures (control pH = 8.18, 4 mg/L Al = 7.95, 6 mg/L Al = 7.61, 9 mg/L Al = 7.2, 22 mg/L Al = 6.85, 34 mg/L Al = 6.39, 43 mg/L Al = 5.14). This is unacceptable and these data should not be used. Overall the quality of this manuscript is poor and is not validated by any means. Third, the data for *P. promelas* and *C. dubia*, (ENSR, 1992a and 1992b), as a report for Climax Metals Company, Golden, Colorado, is not a peer-reviewed published study, which makes it difficult to properly evaluate the experimental conditions. Prior to being used as a basis for adopting hardness criteria, this report should be made available for review, particularly since several of the studies used to derive hardness-based aluminum criteria are not acceptable. The fact that NM hardness based criteria was based on these scientifically questionable reports and studies is troubling and is more than enough reason to discredit the standard and provide rational to revert back to the EPA-recommended total recoverable Aluminum criteria.

SWQB Rebuttal Response: It is the SWQB's understanding that this paper/thesis/dissertation (Kimball, 1978) was used to develop the EPA's 1988 Al criteria guidance.

12) AB/GUNDERSEN: The use of data to derive parameters for the New Mexico acute equation (*i.e.* pooled-hardness slope) should not be applied to the chronic equation when peer-reviewed research indicates that the aluminum chronic toxicity mechanism differs from the acute mechanism. The differing chronic (*i.e.,* growth inhibition, reduced reproductive success) and acute effects (death) of aluminum are likely due to two different mechanisms of aluminum

toxicity to aquatic organisms. The survey of scientific literature by Muniz and Leivestad (1980) and Gensemer and Playle (1999) described two mechanisms of aluminum toxicity to fish: 1) ionoregulatory disturbances due to binding of aluminum to gill binding sites; and 2) respiratory distress due to clogging of gills by insoluble forms of aluminum. The respiratory effects of aluminum were clearly demonstrated by the work of Malte and Weber (1988), who eliminated the ionoregulatory effects of aluminum on cannulated rainbow trout by elevating the NaCl levels in the exposure water. Fish showed large respiratory disturbances that were accompanied by aluminum precipitation and clogging of gills. Respiratory disturbances due to aluminum exposures can lead to growth inhibition since fish have to expend more energy on respiration. Gundersen *et al.* (1994), looking at the effects of hardness and dissolved organic matter on aluminum toxicity to fingerling rainbow trout at near-neutral and weakly alkaline pH, found that at near-neutral pH, specific growth rate was inhibited more than at weakly alkaline pH, yet there was no mortality in fish exposed to aluminum at near-neutral pH. However, while there were significant mortalities of fish exposed to aluminum at weakly alkaline pH, specific growth rates were inhibited less at this pH versus near-neutral pH. This shows that aluminum has different effects at different pH values. At alkaline pH, aluminum has more pronounced acute effects (lethal or severe effects) and at near neutral pH aluminum has more pronounced chronic effects (impacts a species over the species lifespan and can result in reproductive impacts), likely due to differences in aluminum species at near neutral versus alkaline pH. These observations are also supported by the work of Freeman and Everhart (1971) who also looked at aluminum toxicity to fingerling rainbow trout at alkaline pH. These authors reported that insoluble polymeric and colloidal aluminum species reduced growth more effectively than soluble aluminum species at pH 7.0 and 8.5. Deriving a pooled-hardness slope from only acute studies and then applying this

to a chronic equation may not properly protect aquatic species from the chronic effects of aluminum. In addition, this shows how pH has a significant influence on aluminum toxicity, where mechanisms of toxicity differ at different pH values.

SWQB Rebuttal Response: Regardless of mode of toxicity, standards developed from Al toxicity trials at a range of pH between 6.5 and 9 can be said to appropriately capture toxicity regardless of the particular mechanism at work. High toxicity observed in circumneutral waters wherein Al is only sparingly soluble, even in acute toxicity studies, suggests that the non-ionoregulatory toxicity is being captured by the shorter toxicological assays (Winter *et al.*, 2005).

13) **AB/GUNDERSEN:** Hardness has only a minor effect on aluminum toxicity and may not be protective at near-neutral to alkaline pH compared to other water-quality parameters (pH, DOC, temperature).

Several studies have shown that other water quality parameters have a more significant effect on aluminum toxicity than hardness. There are a number of studies that indicate that pH has a more pronounced effect on aluminum toxicity than hardness. Gundersen *et al.* (1994) found that, based on multiple regression analysis, pH was determined to be the most important independent variable affecting aluminum-induced mortality in rainbow trout (a recreationally important species in New Mexico) in 96-hr tests when looking at the effects of hardness and pH on aluminum toxicity. In addition, the authors noted that the best predicting model for the effects of aluminum on specific growth rate in rainbow trout included pH, filterable aluminum, and total

aluminum. Specific growth rate was affected most at near-neutral pH (where insoluble polymeric forms of aluminum predominate) and that hardness did not protect fish from the toxic affects of aluminum on growth. Stubblefield *et al.* (2012) looked at the effects of various water quality parameters on the toxicity of aluminum to eight different aquatic species (representing 5 groups) at pH 6. They found that pH, dissolved organic matter, and temperature had the largest influence on aluminum toxicity with calcium, sodium and fluoride having only having a minor influence. Lydersen *et al.* (2002) found that mortality increased in brown trout exposed to aluminum in natural waters with increasing temperature and that temperature had a more significant affect on aluminum toxicity versus total organic carbon. Poleo *et al.* (1991) and Poleo and Muniz (1993) saw a similar relationship between aluminum toxicity and temperature for Atlantic salmon. The observed increase in toxicity was explained by enhanced aluminum polymerization with increased temperature and an increase in fish metabolism (higher O_2 demand) and a decrease in surface water dissolved oxygen levels. This could be particularly significant for salmonid species (species that are sensitive to water temperature and dissolved oxygen levels) that inhabit surface waters where temperature and dissolved oxygen levels can be limiting late in summer (*i.e.* some New Mexico waters). Again, this shows that there are other water quality parameters (dissolved organic carbon, temperature, and pH) that play a significant role in influencing aluminum toxicity to aquatic species and that hardness may play only a minor role.

SWQB Rebuttal Response: As noted in the response to AB/GUNDERSEN #5, the effect of pH on aluminum toxicity may be equivocal at best. The most-recent multivariate statistical analyses of which the SWQB is aware, those reported by Eignor (2013) Ibid. regarding the EPA's development of new Al criteria, suggests that pH adds little to no toxicological information after water hardness is considered. The SWQB acknowledges that other factors such as temperature

impact toxicity, and other dissolved chemical species (NOM, sodium, and fluoride) may provide varying levels of additional protections against Al toxicity, however, a reversion to the 1988 EPA guidance does not account for these factors, and indeed, removes the well-described significant factor, water hardness, from consideration. For these reasons, the SWQB believes it would be in error to return to prior criteria.

14) AB/GUNDERSEN: Little data exists for aluminum toxicity at pH range 8.5 – 9.0

As stated above, pH has a significant effect on aluminum toxicity and more information is needed on the toxicity of both monomeric and polymeric forms of aluminum at this pH range. The New Mexico aluminum criteria are stated to be protective from pH 6.5 – 9.0. However, very little is known about the effects of pH on aluminum toxicity at pH 8.0 – 9.0, pH values that are seen in New Mexico waters. There is evidence that there are differing effects to a recreationally-important species, rainbow trout, at near neutral pH as opposed to slightly basic conditions, and that both dissolved and polymeric forms of aluminum result in toxicity. The statement made by EPA in their final approval of the GEI proposal in 2010 reflects their concern for not using available data for recreational important species. As the EPA explained: Based on our detailed review and correspondence with the State, EPA noted concerns with the selective exclusion and inclusion of specific studies that were used in the recalculation, including the use of non-native species. The EPA learned that the recalculated criteria were derived by GEl as if they were an update to the national criteria. Although GEI generally followed methods outlined in EPA's criteria derivation and recalculation procedures (Stephan *et al.,* 1985; EPA, 1994), since these updates are submitted by the State, EPA views them as State, not national criteria. As such, EPA

recommends the use of indigenous species in the development of criteria intended to apply statewide. In addition, the lack of data on aluminum toxicity at the pH 8.0 – 9.0 range is troubling since the solubility on monomeric anionic aluminum changes significantly over this pH range (Figure 1). As shown in the figure the solubility of monomeric aluminum changes from 285 µg/L at pH 8.0 to 2,855 µg/L at pH 9.0. This is problematic since scientific studies have shown that the toxic mechanism of monomeric aluminum differs from polymeric forms, and that monomeric aluminum appears to be more responsible for acute toxicity versus insoluble polymeric forms that appear to be more chronically toxic (Muniz and Leivestad, 1980; Exley *et al.,* 1991; Gundersen *et al.,* 1994; Poleo, 1995; Sparling and Lowe, 1996). In addition several reports (including the March 2010 GEI report) have noted that most of the research addressing aluminum toxicity has been at acidic pH with very few studies looking at toxic effects at the circumneutral to weakly alkaline pH values. In the Arid West report (AWWQRP, May 2006) it was pointed out that a pH-based equation could not be developed because there was a limited number of studies conducted for any species at a range of pH values. Gensemer and Playle (1999) pointed out that the toxicity of $Al(OH)_4$ is poorly understood because of the lack of research at weakly alkaline pH.

SWQB Rebuttal Response: The SWQB recognizes the dearth of literature covering Al toxicity at pH >8.5, however for reasons already illustrated (*i.e.*, low toxicity of the aluminate ion), there has been no well-demonstrated reason in AB's proposal to re-adopt the 1988 EPA guidance. Indeed, Colorado (prior to adopting hardness-based criteria) and North Dakota (currently) incorporate(d) the EPA's 1988 guidance with the caveat that the chronic criteria would not apply at high pH, or with appreciable water hardness, due to the low toxicity of Al at this pH range.

See Colorado's and North Dakota's pH and hardness exceptions below, as implemented before the adoption of hardness based criteria:

Colorado's past implementation statement for higher pH waters and hardness:

Aluminum: A footnote was added to the chronic aluminum value to explain the application of the standard. Application of the 87 µg/l total recoverable aluminum chronic table value is based on toxicity studies with brook trout and striped bass. The studies underlying the 87 µg/l chronic value, however, were conducted at low pH (6.5-6.6) and low hardness (<10 ppm $CaCO_3$), conditions uncommon in Colorado surface waters. A water effect ratio toxicity study in West Virginia indicated that aluminum is substantially less toxic at higher pH and hardness (although the relationship is not well quantified at this time). Further, field data indicate that many high quality waters in the U.S. contain more than 87 µg/l aluminum when either the total recoverable or dissolved aluminum is measured. Based on this information and considering the available toxicological information in EPA's Aluminum Criteria Document (EPA 440/5-86-008), the 87 µg/l chronic table value standard for aluminum will be implemented as follows: where pH is equal to or greater than 7.0 and hardness is equal to or greater than 50 ppm as $CaCO_3$ in the receiving water after mixing, the 87 µg/l standard will not apply, and aluminum will be regulated based on compliance with the 750 µg/l acute standard. In situations where the 87 µg/l chronic standard applies, a discharger may propose a site-specific chronic standard based on a water effect ratio.

North Dakota's current implementation statement for high pH and hardness waters:

TABLE 1

MAXIMUM LIMITS FOR SUBSTANCES IN OR CHARACTERISTICS OF CLASS I STREAMS

CAS[1] No	Substance or Characteristic	Maximum Limit
		Acute Standard
7429905	Aluminum	750 ug/l
		Chronic Standard
		87 ug/l Where the pH is equal to or greater than 7.0, and the hardness is equal to or greater than 50 mg/l as $CaCO_3$ in the receiving water after mixing, the 87 ug/l chronic total recoverable aluminum criterion will not apply; and aluminum will be regulated based on compliance with the 750 ug/l acute total recoverable aluminum criterion.

AB/GUNDERSEN: It is misleading to state that hardness (magnesium and calcium measured as caco3) ameliorates aluminum toxicity when many scientific studies show that only calcium ameliorates aluminum toxicity.

Since there is a lack of data on the effects of water quality on aluminum toxicity at the pH 6.5 to 9.0 range, it is recommended that the New Mexico surface water criteria revert back to the original EPA values (87 and 750 µg/L, based on total recoverable aluminum). There are still serious questions about how well certain water quality parameters can protect against the toxic effects of aluminum. For example, the EPA needs to reevaluate its position on hardness and aluminum toxicity. It is well established that it is calcium that is protective against aluminum toxicity. The review by Gensemer and Playle (1999) cites several studies that show protective effects of calcium on aluminum toxicity, particularly protection against aluminum induced ionoregulatory disturbances. However, hardness measures the divalent cations in water (predominantly calcium and magnesium). Typically, the ratio of calcium to magnesium in laboratory-reconstituted waters differs from ratios seen in surface waters. Studies looking at the effects of constant hardness concentrations at different Ca:Mg ratios on copper toxicity to a variety or aquatic organism generally showed that exposure water of similar hardness but higher calcium concentrations were more protective (Welsh *et al.,* 2000; Naddy *et al.,* 2002). These studies report that failure to account for differences in calcium between exposure water and surface waters can produce significant errors when predicting metal toxicity. It seems that a more useful approach would be for State agencies to measure calcium in surface waters and consider laboratory studies where the calcium concentration in exposure water is reported. This suggests that hardness-based equations are invalid and, if a model predicting toxicity is desired, that a more effective approach would be to develop an equation based on calcium. Again, if this approach is desired more research on calcium's effect on aluminum toxicity would be needed to cover the broad pH range of 6.5 to 9.0. The Canadian Council of Ministers of the Environment recognizes both the role calcium plays (versus hardness) in ameliorating aluminum toxicity and

the lack of data over a wide pH range and subsequently has issued a conservative water quality guideline for aluminum that somewhat accounts for both calcium (not hardness) and dissolved organic carbon (DOC). CEQG guideline for aluminum = 5 µg/L at pH<6.5; [Ca2+]<4 mg/L; DOC <2 mg/L = 100 µg/L at pH >6.5; [Ca2+] >4 mg/L; DOC >2 mg/L For waters with a pH > 6.5 the recommended guideline is 100 µg/L and for acidic waters with a pH < 6.5 a guideline of 5 µg/L is recommended (see Table 1). These conservative numbers are based on the same studies (Neville, 1985) used in the original EPA document (Ambient Water Quality Criteria for Aluminum 1988) and toxicity tests with amphibians (Clark and LaZerte, 1985).

SWQB Rebuttal Response: As demonstrated in Table 1, a reversion to prior guidance would reduce protections where they are most needed (*i.e.*, in waters with low hardness). It may be that forthcoming Al guidance for hardness based criteria will account for the differences in Ca versus Mg protections, however, both the 1988 EPA guidance and the current New Mexico hardness-based criteria acknowledge or implement the protectiveness of the hardness-based metric regardless of the relative contributions of Ca and Mg, consistent with the use of this metric in toxicological studies. As more is learned regarding Ca, Mg, and dissolved organic carbon ("DOC"), New Mexico will strive to incorporate findings as appropriate for the protection of aquatic life.

16) AB/GUNDERSEN: Adopting the 1988 EPA recommended total recoverable aluminum criteria is protective of aquatic life.

Based on the lack of adequate data looking at the effects of various water quality parameters (*i.e.* calcium, dissolved organic matter, temperature) on aluminum toxicity,

particularly for the pH range of 6.5 to 9.0, I recommend, to protect aquatic life, that New Mexico revert back to the current EPA criteria (87 and 750 µg/L, total recoverable aluminum). These criteria are based on studies evaluating aluminum toxicity to aquatic life at pH 6.5 to 9.0. I recommend adopting the EPA recommended total recoverable aluminum criteria of 87 and 750 ug/L rather than the dissolved aluminum criteria of 87 and 750 ug/L that was previously in place in New Mexico because my previous research has shown that the dissolved criteria is not protective of aquatic life. The 16-day LC_{50}s for rainbow trout fingerlings exposed to aluminum at weakly alkaline pH and two different hardness values (20.3 – 103.0 mg/L as $CaCO_3$) were 430 and 670 µg/L respectively based on dissolved aluminum. These values are lower than the previous New Mexico chronic standard of 750 µg/L for dissolved aluminum (measured by filtration through a 0.4 µm filter). In addition my work also showed that growth in trout was inhibited at dissolved aluminum concentrations between 20 – 30 µg/L. Based on these findings a chronic criterion of 750 µg/L based on dissolved aluminum would not be protective. What is important is that these criteria take into account studies where sensitive species were identified, some of which are related to recreationally important species in New Mexico (*i.e.,* rainbow trout). This was not done in the development of the current, and deficient, New Mexico hardness-base aluminum criteria. The current EPA chronic value of 750 µg/L was derived due to tests with 2 sensitive fish species (brook trout and striped bass). In particular, the chronic value was influenced by values of 87 µg/L (where no striped bass died after a 7-day exposure to aluminum), and 174.4 µg/L (where 58% of the fish died). The EPA went with a chronic value of 87 µg/L to protect this sensitive species. Some may argue that taking the geometric mean (122 µg/L) of these two values would be more appropriate. However, since the effects of water quality cannot be accounted for, it is best to go with the lower values. Recent work by Stubblefield et al.

(2012), calculated an EC_{10} (effective aluminum concentration that inhibited growth of 10 % of the population) of 80 µg/L total aluminum based on studies looking at the effects of aluminum on growth and survival on zebrafish in 35-day exposures. This shows that, depending on exposure conditions, the EPA criteria would barely be protective for this species (although this species is typically used exclusively in the laboratory, it does suggest that there may be other sensitive species in local waters, *i.e.*, in New Mexico waters). In addition, at high temperatures and low hardness values it is possible that sensitive species like rainbow trout may not be protected with a chronic value of 122 µg/L. The EPA criteria have been in effect for over 20 years and utilized by most states, where direct observation of natural surface waters has shown that most species are protected using these values (87 and 750 µg/L).

SWQB Rebuttal Response: As previously noted, New Mexico measures Total Recoverable Aluminum with the exception of high geologic, mineral-bound aluminum waters wherein a high turbidity measurement may lead to the option of filtration through a 10 µm pore-size filter. This is not operationally defined as "dissolved Al" but is an effort to reduce inert forms of mineral Al common to the State's geology, while still accounting for the dissolved and polymeric Al thought to be problematic to aquatic life. Absent additional information on endemic New Mexico species, speculating on their Al sensitivities to derive appropriate criteria is not an acceptable process for criteria development. The hardness-based derivation was based on numerous studies, which concluded that water hardness is a water quality parameter that, among others, provides protections that are acknowledged, but not accounted for in the 1988 EPA guidance. Rainbow trout, a species native to cold water tributaries of the Pacific Ocean, while not native to New Mexico, is a species of economic importance and deserving of protection. However, the State's natural geologic Al loading, and flashy, sediment-laden waters may preclude certain habitats

from providing an adequate and protective niche for this Al-sensitive non-native salmonid. A broadly applied standard for Al may not be fitting for these reasons, and New Mexico will adapt as new information and guidance is made available; fine tuning the hardness-Al relationship and including other water quality parameters that impinge on Al toxicity.

AB/GUNDERSEN: CONCLUSIONS

Going through the process of looking at studies on aluminum effects to aquatic organisms and the processes used to calculate hardness-based aluminum criteria equations it is apparent that there is simply not enough data to derive equations that would protect all aquatic life, particularly factoring in other water quality parameters (pH, DOC, temperature, calcium, fluoride, sodium). There are at least 4 studies that will soon be published that will add to the database on aluminum toxicity but it seems that EPA will need to support further investigations on aluminum toxicity and the influence of water quality on toxicity if the EPA (and State agencies) want to adequately protect aquatic life. While it is true that, while the development of a Biotic Ligand Model may more accurately allow for higher aluminum levels in surface waters while still protecting aquatic life, it will most likely push the limits of organism tolerance while not accounting for the synergistic or additive effects of other contaminants in an ever-increasing complexity of chemical inputs into environmental compartments. Therefore, to adequately protect aquatic life pending the completion of further research, New Mexico should adopt the 1988 EPA recommended criteria.

SWQB Rebuttal Response and Summary: The SWQB appreciates the thoughtful and well-reasoned concerns regarding the current hardness-based Al criteria. The hardness-based formulae

were developed using EPA-approved methods for the advancement of criteria outside the national guidance for Al, published in 1988. Several concerns were elucidated regarding the inclusion or non-inclusion of studies in the development of the current criteria, however, absent a demonstration that inclusion/non-inclusion would significantly change New Mexico's hardness-based calculator, and thus the protections of aquatic life, the SWQB concludes that the protections afforded to low hardness streams, which are stronger than the 1988 guidance, are the prudent criteria that should remain in place.

B. SITE SPECIFIC COPPER CRITERIA FOR NEW SEGMENT 20.6.4.808 NMAC CLOSED BASINS

SUMMARY

Chino Mines has filed a Petition and Notice of Intent to Present Technical Testimony ("NOI") in this matter. Chino Mines' petition adds site-specific aquatic life criteria for copper ("Cu") to Section 20.6.4 NMAC for surface waters located within the area known as the Chino Mines Smelter Tailings and Soil Investigation Unit ("STSIU") near the towns of Bayard and Hurley in Grants County, New Mexico.

Specifically, Chino Mines petitioned that site-specific aquatic life criteria for copper shall apply only to certain surface waters located in the Mimbres River Closed Basin and also within an area known as the Chino Mines Site STSIU and described as follows:

(a) the mainstem of Lampbright Draw beginning at the confluence of Lamp bright Draw with Rustler Canyon to the intersection of Lambright Draw with the southern STSIU boundary and all tributaries thereof that originate west of Lampbright Draw, including Rustler Canyon and Martin Canyon;

(b) Lucky Bill Canyon and all tributaries thereof;

(c) Chino Mines property Subwatershed drainages A, B, C, D-1, D-2, D-3 and all tributaries thereof; and

(d) Chino Mines property Subwatershed Drainages E-1, E-2, and E-3 (Subwatersheds delineated in Exhibit A, Chino Mines petition).

The NMED's SWQB and Ground Water Quality Bureau ("GWQB") have reviewed and commented on model development, model improvements, applicability, and encouraged external peer-review. Chino Mines published a paper on the model in scientific, peer-reviewed literature. As detailed below the SWQB finds that the proposed criteria have been developed based on credible scientific data and provide sufficient protection for aquatic life use. For this reason the SWQB generally supports the STSIU site-specific Cu criteria as proposed in Exhibit I of Chino Mines direct testimony, however the SWQB has specific concerns related to the geographic extent and variable nature of the waters to which this criteria would apply, and the details of the required public participation process. The SWQB recommends that the WQCC ensure that Chino Mines address these concerns before adopting the proposal. Finally, the SWQB recommends that if the WQCC chooses to adopt their proposal that the format should follow the amended proposed rule provided in Exhibit I rather than Exhibit H. All current site specific standards are found in the classified reach description (Sections 20.6.4.97 through .899 NMAC), whereas Section 20.6.4.900 NMAC provides for general criteria.

SWQB REBUTTAL RESPONSE

History of the Site Specific Criteria Development and SWQB Review:

Pursuant to the WQS for site-specific criteria under Subsection 20.6.4.10.D NMAC, the SWQB received a draft report from Chino Mines titled "*Draft Site-Specific Copper Toxicity Model Report*" ("Report") in support of the development of Site Specific Criteria ("SSC") for copper on April 18, 2013. On June 10, 2013, staff from the SWQB and GWQB met with representatives of Chino Mines and the ARCADIS consulting firm to discuss preliminary results of the Report, and application of SSC to certain surface waters located in the Mimbres River Closed Basin and within an area known as the Chino Mines STSIU. The SWQB's understanding was that Chino Mines intended to propose a Cu SSC for the STSIU in a petition to the WQCC during the next Triennial Review of New Mexico's WQS. The SWQB reviewed and made comments on the draft report without implying any acceptance or specific requirements that needed to be met for the WQCC's approval (SWQB Rebuttal Exhibit 17). Rather, comments were provided to ensure that the proposal would conform to the State's requirements for adopting SSC such that the SWQB could support the technical merit of Chino Mines' proposal. The SWQB also reminded Chino Mines at that time that adoption of any proposed SSC would require approval from the WQCC for State purposes and subsequent approval of the EPA for CWA purposes.

New Mexico's Water Quality Act (NMSA 1978, §§ 74-6-1 to -17 (1967, as amended through 2013)) requires that the WQCC shall adopt WQS for surface and ground waters of the State based on credible scientific data and other evidence appropriate under the Water Quality Act (NMSA 1978, §74-6-4.D). Likewise the CWA and associated federal regulations (40 CFR §131.11) require water quality criteria to be based on a sound scientific rationale and contain sufficient parameters or constituents to protect designated uses.

The State and federal WQS rules allow for the adoption of criteria that reflect site-specific conditions and rely on a scientifically derived method including the use of the EPA's Water Effects Ratios[9] ("WER") and Biotic Ligand Model[10] ("BLM") guidance (Subsection 20.6.4.10.D NMAC; 40 CFR §131.12(2)(b)(1)). New Mexico's WQS, specifically Subsection 20.6.4.10.D NMAC, also allow that site specific numeric criteria may be developed based on relevant site specific conditions and a scientifically defensible method, such as presented by Chino Mines in the Report. Therefore, any proposal for adoption of a new WQS should be based on sound, credible, and defensible scientific information, and demonstrate it is protective of the appropriate designated use.

The EPA guidance for conducting WER, BLM, and a multitude of other peer-reviewed scientific studies indicated water chemistry characteristics can influence metals toxicity. The use of these studies and models can potentially be used to predict Cu toxicity for surface waters on a site-specific basis and develop appropriate SSC adjustments. The Chino Mines Report uses accepted EPA methodologies, specifically the WER cited under Subsection 20.6.4.10. D(4)(a) NMAC as a starting point, however, given the variable chemistry the use of single water chemistry parameters (*e.g.,* pH, hardness, alkalinity, etc.) as the sole criterion for a WER model was insufficient to explain relationships between Cu concentrations and toxicity for the STSIU waters.

[9] Interim Guidance on Determination and Use of Water Effects Ratios for Metals. 1994. United States Environmental Protection Agency. Washington D.C.

[10] The Biotic Ligand Model: Technical Support Document for Its Application to the Evaluation of Water Quality Criteria for Copper. 2009. United States Environmental Protection Agency. Washington D.C.

878 Development of toxicity criteria for waters within STSIU drainages required an iterative
879 and step-wise approach. First, site specific data were used to apply the EPA methodology in the
880 development of WER equations. A regression model was then developed with multiple water
881 chemistry parameters from STSIU sample sites that included Total Organic Carbon ("TOC"),
882 Hardness ("H"), Alkalinity ("A") and Total Dissolved Solids ("TDS"). Therefore this approach
883 can be used to develop criteria that avoid both over- and under-prediction of Cu toxicity. The
884 publication of this study in the peer-reviewed literature demonstrates the validity of this
885 approach. The regression model results were able to account for 85% of the observed variability
886 in Cu toxicity. This demonstrates a very strong ability to predict Cu toxicity and that the
887 regression model thus suitable for development of a Cu SSC. As such, the proposed criterion
888 presents a significant improvement on predicting Cu toxicity at the STISU.

889 The Cu model presented in the Report addresses site-specific challenges, and reduces the
890 uncertainty associated with other approaches including hardness-based criteria and the BLM;
891 however, further detail is needed regarding the implementation of the regression model to the
892 entire STSIU. The direct testimony of Dr. Joseph Meyer states that *"water chemistry changes*
893 *along the elevation gradient from the higher, mountainous portions of the STSIU down to the*
894 *lower valley-and-basin portions of the STSIU"* (Chino Mines NOI, Meyer Testimony, p. 12) and
895 further states that *"the ranges of water chemistry parameters in the tested STSIU waters are*
896 *representative of water chemistries known to occur in the STSIU drainages"* (Chino Mines NOI,
897 Meyer Testimony, p. 13). While the SWQB acknowledges that a wide range of water chemistries
898 were sampled and used in the regression model development, these were based only on water
899 collected from perennial pools found in the northeast quadrant of the STSIU, which is generally
900 the higher mountainous portion. Water chemistry data from the lower valley-and-basin portions

or from periods of stormwater flow in the ephemeral channel is not included in the analysis. While the testimony of Dr. Meyer indicates that these waters would be found within the sampled range of water chemistries in the STSIU drainages, no data or analysis has been provided to support this claim. The SWQB recommends that the WQCC limit the geographic applicability of the proposed standards to those actually sampled unless Chino Mines is able to provide additional water chemistry data to support this statement.

Other NOI Testimony regarding Chino Mines' Site Specific Copper Criteria Proposal

Amigos Bravos NOI Testimony (Section II.A.4): This WQCC Should Reject Freeport-McMoRan Chino Mines Company's ("Chino Mines") Proposal For Site-specific Copper criteria For Waters In The Mimbres River Closed Basin

Chino Mines proposes to add Section 20.6.4.902 NMAC. This section would add site-specific copper criteria for the applicable aquatic life designated use for a segment of Lampbright Draw and certain of its tributaries as well as certain tributaries of Whitewater Creek located in the Mimbres River Closed Basin. Amigos Bravos opposes this proposed change. As per Subsection (D)(3)(c) of 20.6.4.10 NMAC, any person petitioning the WQCC to adopt site-specific criteria must "describe the method used to notify and solicit input from potential stakeholders and from the general public in the affected area, and present and respond to the public input received." Chino Mines, in their September 30, 2014 petition, notes that they presented information about the site-specific criteria during one of their regular Community Working Group (CWG) meetings, that they referenced this item on the agenda when advertising for the meeting, and "answered questions from the public" at the meeting.

Chino Mines fails, however, to indicate how many members of the public or other stakeholders attended this meeting and does not disclose, let alone "present and respond to the public input received," in their petition. This lack of information compels the conclusion that Chino Mines has not complied with Subsection (D)(3)(c) of 20.6.4.10 NMAC or demonstrated stakeholder engagement sufficient to justify the promulgation, by this WQCC, of site-specific criteria. Moreover, Chino Mines has made it difficult for this WQCC, Amigos Bravos, and other parties including NMED, to identify issues of potential concern to stakeholders and members of the public in the immediate vicinity of the Chino Mines and the waterbodies in question. Thus,

adoption of Chino Mine's proposed change, in addition to not, on its face, complying with Subsection (D)(3)(c) of 20.6.4.10 NMAC, risks the exclusion of local voices and input, and, as a consequence, the arbitrary and capricious adoption of its proposed change by this WQCC.

SWQB Rebuttal Response: The SWQB understands that Chino Mines presented their proposal at a regular Community Working Group meeting on September 16, 2014. As such, Chino Mines has clearly taken steps to notify and solicit input from potential stakeholders and the general public in the affected area. However the SWQB also recommends that Chino Mines provide additional details regarding the specifics of the presentation and how Chino Mines responded to the public input received so that the WQCC can be sure that provision in Subparagraph 20.6.4.10(D)(3)(c) NMAC has been satisfied.

BEFORE THE COLORADO WATER QUALITY CONTROL COMMISSION
Department of Public Health and Environment, State of Colorado

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PREHEARING TESTIMONY OF STEVEN P. CANTON, GEI CONSULTANTS, INC. ON BEHALF OF COLORADO MINING ASSOCIATION

IN THE MATTER OF THE ADOPTION OF REVISIONS TO THE BASIC STANDARDS AND METHODOLOGIES FOR SURFACE WATER, REGULATION #31 (5 CCR 1002-31)

INTRODUCTION

On behalf of the Colorado Mining Association (CMA), GEI Consultants, Inc. (GEI) has evaluated the acute and chronic aluminum and zinc water quality standards for the protection of aquatic life. Based on GEI's evaluation, CMA is proposing technical updates to Colorado's acute and chronic aluminum and zinc water quality standards for the protection of aquatic life. This testimony provides 1) a general description of the EPA ambient water quality standards development procedure, 2) summary discussions of CMA's proposed standards updates, and 3) comparisons of the current and proposed standards. More detailed information is provided in the two technical documents accompanying this testimony.

STANDARDS DEVELOPMENT METHODOLOGY

There are standard procedures for developing ambient water quality standards, based on the EPA criteria derivation and recalculation guidance (Stephan et al. 1985, EPA 1994). The first step is to gather all available data on the toxicity of a chemical to various forms of aquatic life. These studies are then subjected to detailed technical review to determine if the data are valid. Stephan et al. (1985) provides guidelines for determining whether data from a particular study are acceptable for use. Acceptable data are then compiled to develop acute and chronic toxicity databases containing data for a variety of species. In the case of updating older standards documents, as is the case for the metals in this proposal, existing toxicity databases are reviewed for accuracy and literature searches are performed to ensure the databases are complete and include the most up-to-date science.

In order to perform acute standards derivation calculations, it is necessary to have acute data for at least eight different families, as noted below (Stephan et al. 1985). This is generally known as the "eight-family rule", and includes:

1) Salmonidae (such as trout and salmon)
2) 2nd bony fish family (Class Osteichthyes, such as bass, minnows, catfish)
3) 3rd chordate (another fish or amphibian)

SWQB Rebuttal Exhibit 15

CMA EXHIBIT 1

4) Planktonic crustacean (such as daphnids)
5) Benthic crustacean (such as crayfish)
6) Insect (such as mayflies or stoneflies)
7) Non-arthropod invertebrate family (such as snails or clams)
8) Family in another insect order or phylum not otherwise represented (such as flatworms or segmented worms)

This minimum data requirement (MDR) ensures that any water quality criterion calculated will be protective of a wide variety of species. The same MDR applies when deriving chronic standards; however, because the availability of chronic data is often more limited than acute, an alternative method is available that allows derivation of chronic standards other than by direct calculation. In this case, if acute and chronic data for at least three families (fish, invertebrate, and a sensitive species) are available, an acute-to-chronic ratio (ACR) can be calculated. Using the ACR, chronic standards values can be calculated from the acute standards calculations.

EPA guidance then uses these data, ranked from most sensitive to least sensitive, to derive water quality standards intended to be protective of 95% of the species expected to be present in water bodies. This 95% protection can be modified by the need to protect recreationally, commercially, or other important species, in which case the calculated values are adjusted to be protective of those special groups. Examples of standards derivation methods and such modifications are included in the discussions of the proposed standards updates below and in the accompanying technical documents.

PROPOSED UPDATED AQUATIC LIFE WATER QUALITY STANDARDS

A summary of CMA's proposed updated aluminum and zinc standards is presented below (Table 1). Because they represent the most up-to-date science, these updated standards are a considerable improvement over current Colorado standards, especially with regard to aluminum. It is also important to note that the recommended allowable hardness range for aluminum presented in Table 1 is slightly different from that presented in CMA's January 2010 Water Quality Control Commission (WQCC) Notice submission; to be more protective and representative of available data, CMA now proposes to cap the applicable hardness range at 220 mg/L $CaCO_3$ instead of 250 mg/L $CaCO_3$. Therefore, for hardness concentrations above 220 mg/L $CaCO_3$, the aluminum criteria calculated for 220 mg/L $CaCO_3$ apply.

Table 1: Recommended proposed updated metals standards (as µg/L) at varying hardness levels.

Recommended Equations	Mean Hardness (mg/L as $CaCO_3$)										
	25	50	75	100	150	200	220	250	300	350	400
Updated/Revised Aluminum Standards											
Acute = $e^{(1.3695\ [\ln(\text{hardness})] + 1.8308)}$	512	1,324	2,307	3,421	5,961	8,838	10,071	NA	NA	NA	NA
Chronic = $e^{(1.3695\ [\ln(\text{hardness})] + 0.9161)}$	205	530	924	1,370	2,388	3,541	4,035	NA	NA	NA	NA
Updated/Revised Zinc Standards											
Acute = $0.978 * e^{(0.9094\ [\ln(\text{hardness})] + 0.9095)}$	45	85	123	160	231	301	328	368	435	500	564
Chronic = $0.986 * e^{(0.9094\ [\ln(\text{hardness})] + 0.6235)}$	34	65	93	121	175	228	248	279	329	379	428

Aluminum

GEI's analysis of the current aluminum standards (GEI 2010) was initiated using the current standards document and national aluminum toxicity databases (EPA 1988), which are the basis for current Colorado surface water quality standards for dissolved Al of 750 µg/L acute and 87 µg/L chronic, as well as the footnote added at the 2005 Regulation #31 hearing (CDPHE 2009). The 1988 Aluminum Document is now over 20 years old and does not reflect current scientific understanding of aluminum toxicity to aquatic life. Note that much of the analysis summarized here and in the accompanying technical report (GEI 2010) is based on an evaluation of the EPA recalculation procedure for Arid West effluent-dependent waters conducted by GEI (then Chadwick Ecological) as part of the Arid West Water Quality Research Project, an EPA-funded program managed by Pima County Wastewater Management, Tucson AZ (AWWQRP 2006). This evaluation of the EPA recalculation procedure included an analysis of potential updates to aluminum standards.

The 1988 Aluminum Document presents acute data for 14 genera, including seven species of invertebrates and seven species of fish. These 14 species in 11 families satisfy the "eight-family rule" as specified in the 1985 Guidelines (Stephan et al. 1985). The document reports a calculated final acute value (FAV) of 1,496 µg/L with a criterion maximum concentration (CMC) = FAV÷2 or 750 µg/L (after rounding to two significant digits). Because the chronic database was limited, the acute-to-chronic ratio (ACR) approach was used to derive a chronic standard. A final ACR less than 2 was calculated, which then defaults to 2 according to EPA guidance (Stephan et al. 1985). A final ACR of 2 thus resulted in a chronic standard of 750 µg/L, or equal to the acute standard, since in both cases the FAV was divided by 2. However, EPA did not use this calculated chronic value. Additional data on aluminum toxicity for *Salvelinus fontinalis* and *Morone saxatilis* (Cleveland et al. manuscript and Buckler et al. manuscript, as cited in EPA 1988) were used by the EPA to modify the final chronic value (FCV) to protect these two species (EPA 1988). Interestingly, these two studies were deemed inappropriate for EPA's aluminum chronic database (i.e., they are included in Table 5-6, "Other Data on Effects of Aluminum on Aquatic Organisms"), but were still used to reduce the FCV from approximately 750 to 87 µg/L.

Following GEI's 2006 and 2009 reviews of the available acute studies, 35 acute data points from 13 studies were deemed suitable for addition to a revised and updated acute toxicity database. A review of the available chronic studies yielded 11 new chronic data points from nine studies, which were added to a revised chronic database. More importantly, the 2006 analysis revealed a statistically significant inverse relationship between aluminum toxicity and hardness (AWWQRP 2006). This was not reported in the 1988 Aluminum Document and represents a significant change in how aluminum toxicity should be evaluated. This pooled hardness-based slope and the final ACR were further updated from those reported in AWWQRP (2006) following the 2009 database additions and further evaluation of relevant data (GEI 2010). The resulting proposed new acute and chronic aluminum standards are presented below (Table 2). Since the aluminum equations model hardness values that ranged from 1 mg to 245 mg of $CaCO_3$/L and the slope was derived using hardness values that ranged from 26 mg to 220 mg of $CaCO_3$/L, estimations made outside of this range should be treated with caution. While convention for metals is to use up to a 400 mg/L hardness cap for calculating criteria [40CFR131.6(c)(4)(i)], a conservative approach in this case is to apply the aluminum values calculated at hardness of 220 mg/L to higher hardnesses (GEI 2010). Consistent with Colorado's current aluminum standards, the proposed standards should be applied as total recoverable aluminum. As with Colorado's other metals standards, these aluminum equations are appropriate at the allowable pH range of 6.5-9.0, and should be used at pH < 6.0 with caution (GEI 2010).

Table 2: Existing and revised acute and chronic aluminum standards (as µg total recoverable aluminum/L) at varying hardness levels.

Aluminum Equations	Mean Hardness (mg/L as $CaCO_3$)						
	25	50	75	100	150	200	220
Current EPA/Colorado Aluminum Standards							
Acute = 750							
Chronic = 87							
Updated/Revised Aluminum Standards							
Acute = $e^{(1.3695\,[\ln(\text{hardness})] + 1.8308)}$	512	1,324	2,307	3,421	5,960	8,838	10,071
Chronic = $e^{(1.3695\,[\ln(\text{hardness})] + 0.9161)}$	205	530	924	1,370	2,388	3,541	4,035

Zinc

GEI's analysis and update of the current zinc standards (GEI 2009) is based on 1) the updated Zn standards adopted by the State of Colorado in 2005 (CDPHE 2009), 2) a subsequent review as part of our evaluation of the EPA recalculation procedure (AWWQRP 2006), and 3) additional literature searches in 2008 as part of site-specific zinc standards evaluations for Colorado streams and proposals for New Mexico's Triennial Review (NMED 2010). Also, additional data from recently available studies conducted by the International Lead-Zinc Research Organization (ILZRO) were reviewed in July 2009.

As part of our literature search efforts with the current Colorado zinc equations and the additional efforts as part of the AWWQRP (2006), over 105 usable data points for 37 species were added to an updated acute database. A fall 2008 review of the available acute studies resulted in the addition of 21 more acute data points for 14 species. Additional literature reviews in 2009, which included a review of recently available studies by ILZRO, and database modifications, following further analysis of specific data points, resulted in the addition of 37 more acute data points for eight species to the revised acute zinc database, increasing the acute database from 69 to 71 genera.

In addition to the new acute data, a total of 11 data points for five species were added to the chronic database during the AWWQRP (2006) review. The fall 2008 literature review revealed three new data points for two species, one of which was already in the chronic database; thus, the updated chronic database still did not meet the "eight-family rule" for direct standards derivation of the chronic criterion. An additional literature review, which included a review of recently available studies by ILZRO, and database modifications resulted in the addition of 26 more chronic data points for three species, two of which were already in the chronic database, to the revised chronic zinc database.

The updated chronic database still does not meet the "eight-family rule". As such, the proposed chronic standards below were calculated using an updated final ACR (GEI 2009). The hardness-based slope was also updated using the new data acquired during both the fall 2008 and more recent reviews. Following these technical reviews and addition of new literature, the resulting proposed acute and chronic standards are as presented in Table 3. Consistent with Colorado's current zinc standards, the proposed standards should be applied as dissolved zinc and, as with other metals, are appropriate at the allowable pH range of 6.5-9.0, and should be used at pH < 6.0 with caution.

Table 3: Existing and revised acute and chronic zinc standards (as µg dissolved zinc/L) at varying hardness levels.

Zinc Equations	Mean Hardness (mg/L as $CaCO_3$)									
	25	50	75	100	150	200	250	300	350	400
Current Colorado Zinc Standards										
Acute = $0.978*e^{(0.8525\ [\ln(\text{hardness})] + 1.0617)}$	44	79	112	143	203	259	313	366	417	467
Chronic = $0.986*e^{(0.8525\ [\ln(\text{hardness})] + 0.9109)}$	38	69	97	124	176	224	271	317	362	405
Updated/Revised Zinc Standards										
Acute = $0.978*e^{(0.9094\ [\ln(\text{hardness})] + 0.9095)}$	45	85	123	160	231	301	368	435	500	564
Chronic = $0.986*e^{(0.9094\ [\ln(\text{hardness})] + 0.6235)}$	34	65	93	121	175	228	279	329	379	428

SUMMARY AND RECOMMENDATIONS

Given their greater ecotoxicological relevance, these updated aluminum and zinc standards are a considerable improvement over current Colorado standards. It is recommended that Colorado adopt CMA's proposed revisions for aluminum and zinc standards.

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

DEC - 6 2011

James P. Bearzi, Chief
Surface Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building (N2050)
P.O. Box 5469
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Dear Mr. Bearzi:

Miguel Flores has asked that I respond to the few remaining issues from the State's 2008-10 triennial revision contained in your June 20, 2011, letter. As outlined in our Record of Decision, there were new/revised amendments that the Environmental Protection Agency (EPA) did not take action on. This was intended to allow both the New Mexico Environment Department (NMED) time to provide additional supporting information and to allow ourselves additional time for a more detailed review of some of the State's new metals criteria. Your letter provided requested information for the majority of the provisions that EPA did not act on.

We have completed the detailed review of the metals criteria, considered your response, and would like to provide you with the enclosed response. We have provided specific recommendations and have additional questions based on our detailed review. I would appreciate NMED providing any responses directly to Russell Nelson, our Regional Water Quality Standards Coordinator on the following components:

- Review of Standards; Need for Additional Studies (20.6.4.10(D)(1)(e) NMAC);
- General Criteria – Turbidity (20.6.4.16 NMAC);
- Marginal Warm Water Aquatic Life Use criteria (Subsection H of 20.6.4.900);
- Adoption of a footnote to supplement the hardness-based aluminum criteria,
- Revised derivation of the cadmium criteria; and
- Revised derivation of the zinc criteria.

We would appreciate receiving your response by January 15, 2012, to allow us to come to closure on these issues. If you need additional information concerning the enclosed response, please call me at (214) 665-6653 or Russell Nelson at (214) 665-6646.

Sincerely,

Jane B. Watson, Ph.D.
Associate Director
Ecosystems Protection Branch

Enclosure

Response to the New Mexico Environment Department

Review of Standards; Need for Additional Studies (20.6.4.10 D(1)(e) NMAC)

In our ROD on page 112-113, we asked that the State provide supporting documentation or a methodology that explains what the following statement means and how it would be applied within the existing federal regulatory structure: "...other factors or combinations of factors that...may warrant modifications of default criteria." The Department's June 2011 letter did not provide the requested supporting information. It's important that NMED inform EPA if it intends to provide any additional information that may affect EPA determination on this portion of the new provision.

General Criteria – Turbidity (20.6.4.16 NMAC)

EPA identified several concerns with this revised provision on page 114 of its ROD. EPA requested that the State provide an explanation of how this provision could be implemented consistent with its antidegradation implementation and how it would prevent long-term or permanent degradation that would assist EPA in making a determination. The Department's June 2011 letter did not provide the requested explanation. Please let us know if the Department intends to provide any supporting information that may affect EPA determination on the revised provision.

Marginal Warmwater Aquatic Life Use Criteria (Subsection H of 20.6.4.900 NMAC)

Given the Department's disagreement with the need for a UAA to support a segment-specific maximum temperature higher than 32.2°C (90°F), it is important to explain how we interpreted the revised provision. As described on page 90 of our ROD, we consider the revised provision to be internally inconsistent since the Marginal Warmwater designated use clearly specifies a maximum temperature of 32.2°C yet allows higher temperatures on a segment-specific basis.

Although adopting a segment-specific temperature criterion is not the same as removing a designated use (as specified in the Clean Water Act (CWA) §101(a)(2)), EPA considers the development of a segment-specific criterion to be significant, warranting support through a UAA. Variations in certain hydrologic parameters including temperature, flow and dissolved oxygen, can significantly impact aquatic life even if other factors remain constant. A segment-specific criterion can be considered equivalent to establishing a subcategory of the Marginal Warmwater use. Further, EPA believes that the Department's Air-Water Temperature Correlation is the type of document that would be used to address segments that have been misclassified and to support a segment-specific temperature criterion in a natural water body that routinely exceeds the defined maximum of 32.2°C.

Metals Criteria (Subsection I of 20.6.4.900 NMAC)

As noted in the Department's response, EPA approved the majority of the new/revised provisions adopted by the State but did not take action on the hardness-based criteria for aluminum, cadmium and zinc to allow for a more detailed review. EPA has concluded that review and has considered the additional information provided by the Department and GEI Consultants, Inc. (GEI). While we believe hardness-based metals criteria can be an appropriate approach to protection, we continue to have concerns about how some of the equation-based criteria were developed and if they would be protective of all waters in New Mexico. We have outlined our concerns below and look forward to the Department's response prior to EPA taking final action.

Derivation of the Equation-based Aluminum Criteria

Applicability of the hardness-based equations:

The stated purpose of GEI's analysis in its document *Ambient Water Quality Standards for Aluminum - Review and Update* (GEI 2009) is to revise and update acute and chronic aluminum standards following EPA's 1985 Guidelines. While GEI generally followed the 1985 Guidelines in revising the toxicity dataset, the authors appear to have utilized a very small number of studies specific to New Mexico that would not fully take into account the relevant differences between the sensitivities of the aquatic organisms in the national dataset versus those for organisms found in New Mexico's waters.

To understand this point, EPA believes it is important to describe both the relationship between GEI's document entitled *Ambient Water Quality Standards for Aluminum - Review and Update* (GEI 2009) and the Arid West Water Quality Research Project documents it draws from, as well as the approach taken in developing the hardness-based equations the State's has adopted. For example, the GEI *Review and Update* only references a single report (Buhl 2002) that was conducted in New Mexico. The Buhl report looked at the relative toxicity of waterborne inorganic contaminants including aluminum, using reconstituted lab water simulating water in the Rio Grande. The report indicated that the concentrations of individual contaminants, including aluminum at EPA's recommended 304(a) criteria levels did not pose a hazard to the species tested. The key point is not the results of the toxicity tests themselves but the fact that the study only focused on the Angostura reach of the Rio Grande where effluents comprise a significant portion of river flow. The results of a toxicity study carried out in a single effluent-impacted reach of the Rio Grande would not be appropriate to use in deriving statewide criteria in New Mexico.

As another example, the GEI *Review and Update* also states that it is based primarily on the Arid West Water Quality Research Project *Evaluation of the EPA Recalculation Procedure in the Arid West – Technical Report* (AWWQRP 2006). That *Technical Report* states that it was intended to evaluate the use of the 1985 Guideline *Recalculation Procedure* on selected water quality criteria with different modes of toxicity in specific arid west waters. Since the the GEI *Review and Update* draws from the AWWQRP *Technical Report*, the *Report* also references Buhl (2002) and

other studies conducted in New Mexico by Hamilton and Buhl (1997a and 1997b). The Hamilton and Buhl studies were hazard assessments looking at toxicity from inorganic mixtures and not specifically aluminum toxicity. These studies along the San Juan River represent a single geographic location in New Mexico that would not necessarily be representative of conditions throughout New Mexico. Looking closer, the *Technical Report* also draws from the AWWQRP *Habitat Characterization Study* (AWWQRP 2002), which represents an effort to characterize the habitat of selected effluent-dependent waters across the western U.S. The only site in New Mexico referenced in this *Habitat Characterization Study* is the Santa Fe River, which is accurately referred to as an effluent-dependent water. Given that the Santa Fe River is an effluent-dominated river, data drawn from this study cannot be considered representative of the majority of waters in New Mexico.

Derivation of the hardness-based equations:

GEI reported that it followed EPA's1985 Guidelines, relied on selected studies from EPA's 1988 aluminum criteria document and a literature search in updating the toxicity database in deriving the hardness-based equations that have been adopted. GEI stated that a pH range of 6.5 to 9.0 was established as a limit for data used in updating the databases because EPA established this as an acceptable range for pH in ambient freshwater (Red Book, USEPA 1976) and noted that this circumneutral pH gradient was the same range used to derive current criteria in the 1988 Aluminum Document. While GEI may have generally followed EPA's approach, it does not mean that the resulting criteria provide adequate protection for the conditions that may be found in waters outside of the circumneutral (6.5 to 9.0) pH and 25 to 250 mg/L hardness ranges.

The GEI *Review and Update* explains that the pH of a solution is a major driver of aluminum speciation and that over the range of acceptable circumneutral pH values one could expect that the fraction of monomeric aluminum in solution will change, most notably at lower (approximately 6.5) and higher pH values (approximately 9). Dr. Gensemer's[1] direct testimony to the Commission noted that the existing data suggest that aluminum toxicity increases with increasing water hardness, or with other water quality parameters that covary with hardness such as pH. Focusing on studies conducted at circumneutral pH doesn't consider and appears to discount that monomeric aluminum is more available and is much more toxic at pH outside and particularly below the circumneutral range.

In response to EPA concerns about pH, the Department's response stated that the occurrence of concentrations outside the circumneutral range is rare, basing this statement on an analysis of over 5,000 measured pH data points. Of these, the Department reported that only a small percentage had pH concentrations less than 6.5 and exceeding 9.0. Although EPA doesn't doubt these data, it's difficult to determine their usefulness since no information was provided as to where these monitoring points were, whether they were replicates of a defined set of waters or if they are geographically widespread and representative of all types of waters in New Mexico.

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1 Robert W. Gensemer, Ph.D, GEI Consultants Inc., Pleading Log (PL) 51, NMED Exhibit 2-8-29-10

Even if they were, this only confirms that there are waters that fall outside the circumneutral range and would not be fully protected by the criteria that have been adopted. Further, while we agree with the Department's contention that a waterbody with a pH outside the circumneutral range would be assessed as not supporting the aquatic life use, the fact that the waterbody would be considered impaired as a result of aluminum toxicity as an effect of the pH has no bearing on the adequacy of the criteria that an impairment determination would be based on.

In his direct testimony, Dr. Gensemer's noted that EPA's 1985 Guidelines provide methods for adjusting criteria if it can be demonstrated that toxicity varies as a function of a given water quality parameter such as the relationship between water hardness and toxicity for some divalent metals. For aluminum, the existing data suggest that toxicity increases with increasing water hardness, or with other water quality parameters that covary with hardness. However, as Dr. Gensemer testimony also notes, there is evidence that the toxicity of aluminum to aquatic life is hardness-dependent (i.e., aluminum toxicity is greater in softer waters and decreases as water hardness increases). While we agree with the conclusion that expressing updated aluminum criteria on the basis of a hardness equation rather than as a single fixed value is warranted, there is potential for toxicity increases with both low and high water hardness outside of the 25 to 250 mg/L range that was used for derivation of the aluminum criteria.

Through the Department's response, GEI also noted that the proposed chronic criteria equation would generate criteria in very soft waters (e.g., 12-14 mg/L) that would be protective of the two most chronically sensitive species (striped bass and brook trout). However, the GEI *Review and Update* also refers to Dr. Gensemer's direct testimony, which noted that these two tests were conducted at the lowest pH allowable in the criteria range (6.5). While this may support the protectiveness of the hardness equations at the lowest end of the criteria pH range, it does not give EPA any confidence that the hardness-based criteria will be protective in waters below a pH of 6.5 or in the upper end or outside of the circumneutral range. EPA recognizes that little data is available below 20 mg/L hardness for most metals, but has evaluated the limited data for several metals and determined that capping hardness at 25 mg/L without additional data or justification may result in criteria that provide less protection then intended by EPA's 1985 Guidelines. As a result, EPA recommended in its National Water Quality Criteria (2002) that hardness not be capped at 25 mg/L, or any other hardness on the low end. Further, given that only studies in the 25 to 250 mg/L range were used, the 250 mg/L upper end of this range may be much less than the hardness of some waters in New Mexico. For hardness over 400 mg/L, EPA recommends two options: (1) calculate the criterion using a default Water Effect Ratio (WER) of 1.0 and using a hardness of 400 mg/L in the hardness equation; or (2) calculate the criterion using a WER and the actual ambient hardness of the surface water in the equation.

Conclusions:

Although GEI generally followed the approach in EPA's 1985 Guidelines in recalculating the national toxicity database, we are concerned that most of the studies that were carried out in New Mexico to derive these criteria were either carried out in effluent-impacted and effluent-dependent waters or were not looking at aluminum toxicity and would not be appropriate for use

in the development of statewide criteria. EPA considers the hardness-dependent equations for aluminum to be an improvement over the existing criteria for waters within the circumneutral pH range (6.5 - 9.0) but would not be appropriate as statewide criteria. The characteristics that may be found in all waters in New Mexico must be considered.

To gain EPA approval, the State should consider revising the current provision, adopting language or a footnote to the hardness-based criteria table that recognizes that aluminum toxicity increases at low pH. This language or footnote should require that where pH is equal to or greater than 7.0 the chronic hardness-dependent equation will apply. Where pH is less than 7.0, in the receiving water after mixing, either the 87 µg/l chronic total recoverable aluminum criterion or the criterion resulting from the chronic hardness-dependent equation will apply, whichever is more stringent.

Derivation of the Equation-based Cadmium Criteria

Adjusting the calculated acute criteria for the protection of commercially important trout species by incorporating new data with different species and new tests on species already in the dataset is an appropriate approach. However, we have a number of concerns that are outlined below:

- The GEI *Review and Update* included data on the arctic grayling (*Thymallus arcticus*) which is not indigenous to New Mexico from Buhl and Hamilton (1991). EPA specifically excluded this test from the 2001 criteria document database because the toxicity test was conducted improperly due to low dissolved oxygen and should not be used here.

- The Davies et al. (1993) tests should not have been included in the calculation of chronic cadmium since this data provides information about chronic toxicity of juveniles, which are not necessarily the most sensitive lifestage. This study should not be used in the criteria calculation but could be used as supplementary information to support the derived criterion (i.e., to support the toxicity of cadmium to rainbow trout (*O. mykiss*).

- Inclusion of juvenile fathead minnow data is not justified, as this is not the most sensitive lifestage. Furthermore, inclusion of this data markedly increases the data variability reflected in the low R^2 value of 0.29 for the species slope.

- The GEI *Review* takes exception with EPA's decision related to fathead minnow data acceptability in the 2001 cadmium criteria update. The 2001 cadmium criteria update made it clear that no juvenile Fathead minnow data was used due to data availability for a more sensitive stage (< 24 hours stage and fry stage). There is also data that shows that adults are approximately 10X more resistant than fry, (24 hour stage). The decision in 2001 was made to limit data to sensitive stages and adults in agreement with Section IV G and H of the 1985 Guidelines. In section IV.G, the Guidelines states that data for the more resistant life stages should not be used in the calculation of the species mean acute

value (SMAV) because a species can only be considered protected from acute toxicity if all life stages are protected.

- In calculating the final acute value (FAV), the authors should use the four genus mean acute values (GMAV) to come closer to the 5th percentile consistent with the 1985 Guidelines.

EPA considers the approach used in developing the hardness-dependent equations for cadmium to be appropriate, but believes that the Department should address the issues outlined above to allow EPA to act on these criteria.

Derivation of the Equation-based Zinc Criteria

EPA identified a few problems that are outlined below that we believe should be addressed.

- In determining the final acute/chronic ratio (FACR), it is unclear whether or not the chronic values follow a pattern with the acute values. EPA's 1985 Guidelines (Section VI.K(1)(2)(3)(4)) provide methods for determining the FACR in the presence or absence of a pattern.

- There appears to be a miscalculation of the GMAV using a species mean acute value (SMAV) of 1649 ug/L. The studies provided in Appendix A all have different LC50s and water hardness levels, but the SMAV remains the same (1649 ug/L) for all tests (see page A-14). The GMAV for brook trout is correct at 1649 ug/L since the acute data in the report is normalized to a hardness of 50 mg/L. New Mexico's revised criteria were derived using the top four most sensitive GMAVs. Instead they should use the second to fifth ranked most sensitive GMAVs to be consistent with the 1985 Guidelines.

- According to the data presented in Table 6 of Appendix A, the brook trout ACR should be 1649/854.7=1.929. However, it is presented as 2.335 in Table 7 of the report. This slight difference alters the FACR from 2.66 to 2.59. The report should identify more clearly that the brook trout ACR is taken directly from the EPA 1987 document to avoid confusion. In addition, the 1987 zinc criteria document acute value (1996 ug/L) is the geometric mean of 1550 ug/L, 2120 ug/L and 2420 ug/L from Holcombe and Andrews (1978) divided by the chronic value of 854.7 ug/L (Holcombe et al, 1979) resulting in ACR = 2.335.

- The newly calculated pooled slope of 0.9094 is slightly greater than the EPA 1985 Guidelines slope of 0.8473, and has an R^2=0.53 which is small for this type of test. The Department should use tests that are more appropriate for the final pooled slope calculation. Regarding the newly calculated pooled slope of 0.9094, the steps describing

the data acceptability and calculations are all acceptable as reported in the document.

As with the other metals discussed here, EPA considers the approach used in developing the hardness-dependent equations for zinc to be appropriate. However, we believe that the Department should address the issues outlined above to better support the zinc criteria.

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September 15, 2014

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Re: Comments on Freeport-McMoRan Chino Mines Company's Draft Petition to Amend Surface Water Quality Standards (NMAC 20.6.4) and Request for Hearing

Dear Ms. Chappelle:

Thank you for the opportunity to provide comments on the above-referenced draft petition and request for hearing which was submitted to the Surface Water Quality Bureau (SWQB) in a meeting on September 3, 2014. It was during this meeting that you requested our comments on the draft petition. The proposed amendments in the draft petition would add site-specific standards for copper for certain waters in the Mimbres watershed within the Smelter/Tailing Soils Investigation Unit (STSIU) of the Chino Administrative Order on Consent (AOC) pursuant to Section D of 20.6.4.10 NMAC.

Previously, a *Revised Site-Specific Copper Toxicity Model Report* (Report) dated October 2013 was prepared by ARCADIS for Freeport-McMoRan Chino Mines Company (Chino Mines) to support the development of site-specific copper criteria that could potentially be applied to surface waters within the STSIU. The Report is also referenced in the draft petition's statement of basis and rationale.

We hope the general and specific comments prepared by staff in the SWQB and the Ground Water Quality Bureau (GWQB), and presented below, will be of assistance in the preparation of the above-referenced petition, proposed amendments and hearing request.

General Comments

The petition proposal should clearly align the applicability of the site specific copper criteria Water-Effect Ratio (WER) with the recommendations in the Report. Inferences beyond that should be sufficiently justified. For example, the formula in the petition proposal allows for bounds (or limits) at the upper ranges of site water samples for alkalinity and dissolved organic carbon (DOC); presumably the WER continues to be as protective at or above these bounds based on the linear relationship described in the Report. However, the formula is silent about lower ranges of alkalinity and DOC, specifically below those ranges sampled in the study area.

The geographic and waterbody relationships in the Report also should align with the proposal. For this reason it is critical that the segment descriptions be refined to be more descriptive such that the waters for which the WER is applicable can be explicitly identified. For example, in Section 3.2.2 Influence of Organic Carbon on Observed Copper Toxicity it is noted that ephemeral waters usually contain more organic carbon than nearby perennial streams (Westeroff & Anning, 2000)[1]. This is important as alkalinity and dissolved organic carbon (DOC) drive the mitigating WER-toxicity relationship, and the WER developed for the STSIU is recommended in the report and in the Fulton and Meyer 2014 publication[2] (Exhibit C) to apply *only to those types of waters (i.e., ephemeral) used for the study*. As noted in Section 4.1 of the Report, the formula or predictive model is expected "to perform very well in water chemistries that are typical of surface water at the Site". If the intent is to apply the site specific copper criteria to *all* water bodies within the STSIU, there could be more explanation about incorporating all waters, not just those that are ephemeral streams or pools (as described in 4.2.2.3 Geographic Extent of Model Application).

The WER formula in the proposal on page 2 is not presented in the Report in the same format, so it is difficult for a reader to understand that the Report supports the formula. The petition could also reference the example derivation of a site specific WER in Table 4 of the Report.

Finally, based on the description provided it appears that the proposal would apply the WER to the critical habitat for the Chiricahua Leopard Frog (CLF), however this is not mentioned in the proposal (see Appendix F of the report). If this is correct you should consider presenting evidence to demonstrate that the proposal is sufficiently protective of this species.

Specific comments are presented below which reference sections in the draft petition.

Specific Comments

Title: The title on page 1 of the draft petition should refer to "20.6.4 NMAC" not "20.6.2 NMAC," which is not the appropriate section of the administrative code to be amended.

Introduction, page 1: in line 3, capitalize 'part' (i.e., Title 20, Chapter 6, Part 4).

Proposed Amendment:

1. Based on the draft petition, it seems appropriate to include a new segment as 20.6.4.808 NMAC for the Closed Basin segment descriptions. We recommend that the proposal for a new segment follow the structure used for other classified segments – that is, first a

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[1] Westerhoff, P., D. Anning. 2000. Concentrations and characteristics of organic carbon in surface water in Arizona: influence of urbanization. Journal of Hydrology 236: 202-222.
[2] Fulton, B., J. Meyer. 2014. Environmental Toxicology and Chemistry, Vol. 33, No. 8, pp. 1865–1873.

description of the segment waters then designated uses followed by site specific criteria. Furthermore, the water body descriptions could be refined (see following comments).

2. In accordance with the Report, Section 2 Methods, "All water samples were collected from isolated surface-water pools." Moreover, Fulton & Meyer (2014) note the impetus for the study was a limited application of a WER to ephemeral and intermittent waters. Proposed segment 20.6.4.808 NMAC implies all waters described therein would be included, and ephemeral waters are not mentioned. It is also suggested that you specify that the application of the site specific criteria is only within the boundaries of the study area known as the Smelter/Tailings Soil Investigation Unit in the December 1994 AOC, as delineated in the *Revised Site-Specific Copper Toxicity Model Report* dated October 2013, Figure 1 (Exhibit A).

3. All of the components of the formula on page 2 should be described. For example the term "100" in the numerator over the term "Hardness" is assumed to be attributed to the standard hardness of 100 mg/L $CaCO_3$ (as described in the Report). The term "Hardness" is assumed to be attributed to the sample hardness (as described in the Report). Also, while there are caps or upper ranges recommended for the parameters alkalinity and DOC, there is no mention of a cap for hardness. The last sentence of the paragraph under the WER formula which states, "The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the Site waters" is not clear. For example, no "Sites" are identified in the basin descriptions.

Section (a):

4. The descriptions in the draft petition describe a very broad overlay of the applicability of the site specific criteria. Even though some helpful geographic coordinates are provided, as written these descriptions include basically everything west of Lampbright Draw and everything east of Whitewater Creek. This approach is too vague to provide the clarity necessary for implementation of water quality standards. We recommend that whether they are named water bodies or unnamed tributaries, the specific waters to which the site-specific criteria apply be clearly defined. Also, major tributaries to a named water body should be described appropriately. For example "all tributaries that originate west of Lampbright Draw to the intersection of Lampbright Draw with Highway 180…" could include Martin Canyon and if so, it could be named in the description if proposed for application of the site specific criteria. Water bodies excluded (e.g., springs) could also be specifically mentioned in segment descriptions.

5. Due to the broad segment descriptions, it is not clear if the application of the site specific criteria in certain waters is consistent with the recommendations in the Report. The proposed petition cites Figure 1 of the Report as a reference for the segment descriptions and for applicability of the site specific criteria (Exhibit A). Other than as a very broad overlay, it is not possible to determine from Figure 1 if the segment descriptions in the petition are consistent with the water bodies represented in the Report. Therefore, a list of

waters for which the site specific criteria are proposed could be provided as an exhibit to the petition.

6. One map showing all sampling sites in waters proposed for the site specific copper criteria from both the "*Revised Site-Specific Copper Toxicity Model Report* dated October 2013" and also the hydrology protocol sites in the *"Application of the Hydrology Protocol to STSIU Drainages May 2013"* reports could be provided with the petition to aid in further review. The development of such a map may help in refining the segment descriptions. The ephemeral water bodies in which the site specific copper criteria are applicable (and are also those described in the report, *"Application of the Hydrology Protocol to STSIU Drainages May 2013*"), could be added to the segment descriptions so the WER can be applied to the acute or chronic criteria appropriately. Additionally, a reference to the appropriate site specific criteria segments could be added to the drainage descriptions proposed by the SWQB under 20.6.4.97 NMAC for ephemeral waters, once these are clearly identified.

Section (b):
In general, this section reads like a synopsis of the work plan process; it could include a sentence or two about why a site specific copper criterion that accounts for the effects of the site conditions on toxicity is more appropriate and protective for the study area. Some of this information is in section (d) and could be pulled up into section (b). More specific comments on Section (b) follow below.

7. **First paragraph, first sentence:** The Chino AOC investigation unit in question is more accurately referred to as the "Smelter/Tailing Soils Investigation Unit" or "Smelter Tailing Soils Investigation Unit."

8. **First paragraph, second sentence:** Consider adding the phrase "as the primary contaminant of concern" after the phrase "investigation identified elevated copper in soils."

9. **First paragraph, third sentence:** Suggest rewording this sentence to read: "Surface-water sampling conducted as part of the investigation indicated exceedances of the current hardness-based aquatic life criteria standard for copper in drainages located in this area."

10. **Second paragraph, first sentence:** Suggest deleting the term "ephemeral" from the sentence, or adding "and non-ephemeral" before "surface waters" since the STSIU pre-Feasibility Remedial Action Criteria (pre-FS RAC) for risk to aquatic life apply to both ephemeral and non-ephemeral surface waters.

11. **Second paragraph, second sentence:** Consider deleting the phrase "applicable surface-water quality standards" and adding the following for greater specificity:

    "...the State of New Mexico Standards for Interstate and Intrastate Surface Waters 20.6.4 NMAC for risk to aquatic life in the drainages of the Smelter Tailing Soils Investigation

Unit including all approaches and tools listed in the Code which provides options for site-specific application."

12. **Third paragraph:** This section could do more to actually explain the rationale for proposing the site-specific criteria. For example, there is already language in the *Revised Site-Specific Copper Toxicity Model Report* (October 2013) Introduction Section, page 1, second paragraph that could be used in this fashion in the petition. This material is utilized in the second paragraph of section (d) of the petition, but it still might be worth explaining some more of the rationale earlier in section (b).

13. **Third paragraph, second sentence:** The phrase "monitored by NMED" might not be the most appropriate terminology to use. Suggest using "in communication with NMED" or "...reviewed and commented on by NMED."

Section (c):

14. **First paragraph, first sentence:** Consider deleting "an approved" and adding "...a public participation process according to a Community Relations Plan."

15. **First paragraph, third sentence:** Replace the incorrect acronym "CGW" with "CWG."

16. **First paragraph, fifth sentence:** Delete the apparently misplaced term "information" occurring after "CWG."

17. **First paragraph, fifth sentence:** The Chino AOC investigation unit reference should be consistent with section (b) of the petition (see Comment 3), and is more accurately referred to as the "Smelter Tailing Soils Investigation Unit."

18. **First paragraph, sixth sentence:** Consider mentioning that the meeting was held at the Bayard Community Center.

19. **First paragraph, sixth sentence:** Replace the misspelled term "ARCAIDS" with "ARCADIS."

20. **First paragraph, sixth sentence:** Replace the term "Chino" with "the" preceding "STSIU drainages."

21. **Page 6, first bullet:** The petition might include the phrase "of record" after "local newspaper."

22. **Page 6, second bullet:** Suggest replacing the term "posted" with "included," and inserting the term "physical" before "repositories."

23. **Page 6, last sentence:** The term "recipient" should be plural.

Section (d):

24. **Page 6, last paragraph:** Consider including more summary language justifying the derived model and proposed standard such as the best-fit multiple linear regression (MLR) model results (e.g. *Revised Site-Specific Copper Toxicity Model Report,* page 20, Discussion Section 4.1, second paragraph, last two sentences), statistical significance, R-squared values, and implementation advantages (e.g. as discussed in the *Revised Site-Specific Copper Toxicity Model Report,* page 21, Discussion Section 4.1, first bullet, and page 25, Discussion Section 4.2.2.2, first paragraph, first two sentences, and page 27, Discussion Section 4.2.2.2, last paragraph). Some of the language may be used from the *Revised Site-Specific Copper Toxicity Model Report,* Conclusion Section 5, page 29, third paragraph (of the section starting with "The proposed WER model…") and page 30, last paragraph.

25. **Page 7, and last paragraph, fifth sentence:** "…was modified with NMED approval…" should be deleted. The Department provided comments, but has no approval authority for the method or the report.

We appreciate the efforts by Chino Mines on the development of the draft petition proposal and hope these comments are helpful. If you have any questions about the comments or suggestions in this letter, please contact Bryan Dail at (505) 476-3799 (Bryan.Dail@state.nm.us) or me at (505) 827-2822 (Kristine.Pintado@state.nm.us).

Sincerely,

Kristine L. Pintado
Water Quality Standards Team Leader
Surface Water Quality Bureau

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