

IN RE: RULEMAKING FOR CONSIDERATION OF THE ADOPTION OF REVISIONS TO THE MOLYBDENUM STANDARDS IN THE BASIC STANDARDS AND METHODOLOGIES FOR SURFACE WATER, REGULATION #31 (5 CCR 1002-31) AND RESOLUTION OF THE MOLYBDENUM TEMPORARY MODIFICATION ON SEGMENT 14 OF THE BLUE RIVER IN THE CLASSIFICATIONS AND NUMERIC STANDARDS FOR UPPER COLORADO RIVER BASIN AND NORTH PLATTE RIVER, REGULATION #33 (5 CCR 1002-33)

CONSOLIDATED RESPONSIVE PREHEARING STATEMENT OF THE WATER QUALITY STAKEHOLDERS

Town of Frisco, Copper Mountain Consolidated Metropolitan District, Copper Mountain Resort, Grand County, Clinton Ditch and Reservoir Company, Eagle River Water and Sanitation District, Upper Eagle Regional Water Authority, Eagle Park Reservoir Company, and the Northwest Colorado Council of Governments (collectively “Water Quality Stakeholders” or “Stakeholders”) do hereby submit their Collective Responsive Prehearing Statement in the above-referenced matter. Denver Water is one of the Stakeholders that engaged the experts described below, but Denver Water is submitting its own prehearing statement.

I. Water Quality Stakeholders. The entities comprising the Water Quality Stakeholders include water supply providers located downstream of Climax Molybdenum Company (“Climax”) mining and milling operations, and other Stakeholders concerned with the quality and safety of water in streams for domestic water supplies, agriculture, and other purposes. Many of the Stakeholders have had a good relationship with Climax over the years and appreciate Climax’s transparency in developing its proposal. To better evaluate the potential risks associated with the Climax proposal to change the molybdenum standards, the Stakeholders engaged experts to provide them with an independent assessment.

II. Summary of Water Quality Stakeholders’ Position. Based upon the analyses of the Water Quality Stakeholders’ experts, the Stakeholders ask that the Commission decline to adopt Climax’s proposed changes to the statewide molybdenum standards for domestic water supply and agriculture classifications and the proposed changes to Upper Colorado River Segment 8 and Blue River Segment 14. Climax’s proposed standards include unacceptable levels of uncertainty and risk. If the Commission desires to establish new molybdenum standards, the Stakeholders request that the appropriate level of uncertainty and risk as described by the Stakeholders’ experts be considered to ensure that any new molybdenum standard remains protective of domestic water supply and agricultural uses of water.

III. Domestic Water Supply Classification. Climax proposes to change the basic standards for domestic water supply classifications on a state-wide basis from 210 ug/L to 9,000 ug/L and to apply that standard immediately to the mainstem of Ten Mile Creek (Blue River segment 14, from the confluence with West Ten Mile Creek to Dillon Reservoir). Joseph Cotruvo, Ph.D, analyzed this proposal for the Stakeholders, as set forth in **Exhibit A**. Dr. Cotruvo was the first Director of EPA's Drinking Water Standards Division, and is a former Director of EPA's Risk Assessment Division and a long-time member of the World Health Organization's Committee on Guidelines for Drinking Water Quality. The following is a brief summary of Dr. Cotruvo's analysis.

Although molybdenum is an essential nutrient at very low levels, it is a health concern for humans (and other animals) at higher concentrations. Molybdenum deficiency in humans has not been observed. Molybdenum is present in virtually all foods at trace amounts. Generally, public water supplies contain little molybdenum. More than 99% of public drinking water supplies in the United States have molybdenum concentrations of 40 ug/L or less.

The development of protective water quality criteria for domestic water supplies typically starts with data from toxicological studies on animals. The EPA has issued risk assessment guidance for converting such toxicological data to water quality criteria to protect human health. The goal is to evaluate all available information and reach a reasonable judgment on the human exposure level that will not result in adverse health effects in the human population with an appropriate margin of safety. In making that conversion, EPA has developed standard uncertainty factors, which include the following:

- A. 10-fold safety factor to account for uncertainty in extrapolating from animal data to humans; and
- B. 10-fold safety factor to account for extrapolating from shorter-term chronic studies to longer-term exposures over the course of a human life; and
- C. 10-fold safety factor to account for individual variation in sensitivity among members of the human population; and
- D. An additional modifying factor ("MF") up to a maximum of 10 to address other scientific uncertainties or lack of data.

The safety factors are not added together – but multiplied together. Thus, applying EPA's standard uncertainty factors, but without any additional MF, results in a safety factor of 1000 (10 x 10 x 10). The resulting number is the benchmark number to protect human health assuming all dietary intake is through drinking water. The next step is to determine the relative source contribution ("RSC") likely to be met by drinking water. Typical default RSC values are 20% (where drinking water is expected to be a small contributor to intake), and 80% (where drinking water is a large contributor to intake). EPA has also developed more protective approaches for children to reflect the relatively larger dietary intake that occurs relative to a child's body weight. Colorado's existing standard of 210 ug/L molybdenum for rivers classified for domestic water

supply is similar to other existing published molybdenum values for drinking water. Climax proposes to use toxicological data from studies performed by an industry group, the International Molybdenum Association (“IMO A”), to change that standard to 9,000 ug/L by applying an uncertainty factor of 30 (10-fold factor for extrapolating from animal data to humans and 3-fold factor to account for individual variation in sensitivity among humans), and an RSC of 50%. The resulting proposed standard of 9,000 ug/L is higher than an earlier epidemiology study documenting impacts to humans and exceeds the NAS Institute of Medicine’s Upper Tolerable Limit of daily exposure in humans by more than 9-fold.

Dr. Cotruvo’s analysis and recommendations regarding the IMO A studies are summarized as follows:

- Using the IMO A toxicological studies but applying the standard EPA uncertainty factors (10 x 10 x 10 = 1000), results in a water quality standard of 120 ug/L – 480 ug/L, using the 20% and 80% RSC values. There is a good basis for using these standard EPA factors. A 50% RSC as used by Climax results in a standard of 300 ug/L.
- Using the IMO A toxicological studies and applying EPA’s calculations to protect young children, results in a standard of 23 ug/L – 90 ug/L, using the 20% and 80% RSC values. A 50% RSC as used by Climax results in a standard of 66 ug/L.
- There is no disagreement that a 10-fold safety factor is appropriate to address uncertainty is converting animal data to human data. Dr. Cotruvo does not believe there is any legitimate basis for ignoring the 10-fold safety factor to extrapolate from a 90-day study in rats to a lifetime exposure as was done in the Climax proposal. Individual sensitivities to molybdenum toxicity compounded by copper deficiencies in some people supports a 10-fold safety factor for individual differences in sensitivity. However, using an uncertainty factor of only 3 for that uncertainty, as employed by Climax, results in a total safety factor of 300 (10 x 10 x 3), not 30.
- Using the IMO A toxicological studies and applying a safety factor of 300 as calculated above, and a 50% RSC value as used by Climax, results in a water quality standard of 1,000 ug/L. Although Dr. Cotruvo is not supporting that standard, it provides an upper range.

In conclusion, if the Commission were to consider using the IMO A studies to set new domestic water supply standards in Colorado, the above calculations result in a range of approximately 66 ug/L – 1,000 ug/L, depending upon the level of risk the Commission is willing to accept.

IV. Agricultural Classification. Climax proposes to change the basic standards for agriculture on a state-wide basis from 300 ug/L to 1,000 ug/L and to replace the existing standard of 190 ug/L on Upper Colorado River Segment 8 (mainstem of Williams Fork) with 1,000 ug/L. It is noted that the basic standard of 300 ug/L was disapproved by EPA because of assumptions regarding copper supplementation.

Jennifer Heath, Ph.D, analyzed this proposal for the Stakeholders, as set forth in **Exhibit B**. Dr. Heath has a Ph.D in toxicology from Cornell University, and a Master’s degree in Toxicology and

Animal Nutrition from North Carolina State University, and has 30 years of experience in evaluating mammalian toxicity and risk assessment issues for both the public and private sectors. The following is a brief summary of Dr. Heath's analysis.

There is a long history of scientific literature examining the adverse effects to cattle associated with exposure to molybdenum. Peer-reviewed literature documents the adverse effects of molybdenum on a wide range of endpoints in cattle, including metabolic functions, reproduction, blood chemistry, nursing, embryos, and growth.

Although Dr. Heath believes the Kistner study conducted at CSU is a well-documented and executed study, she disagrees with using that study, by itself, to establish a new molybdenum standard in Colorado for agricultural use without any degree of safety. The Kistner study is narrow in its scope and reflects optimal feedlot conditions that does not reflect many ranching and range conditions. For example:

- The study included only healthy young steers at a stage of rapid growth. Thus, it does not speak to other life stages or conditions of cattle (e.g. female, pregnant, lactating, breeding, young, old) that would be found on ranches throughout Colorado.
- The primary indicators of toxicity examined in the study were associated with growth and meat production, and not the adverse effects documented in other studies.
- The animals were fed for only 112 – 151 days. Thus, the study is not a chronic study, nor a lifetime study.
- All animals were fed an optimal, commercial diet containing copper supplementation which can mitigate molybdenum impacts. Actual practices downstream of the Henderson Mill, for example, varies widely with respect to supplementation and none of the cattle consume a commercial diet.
- The animals were given growth promoters, antibiotics, and ionophores, which can alter rumen fermentation.
- Grazing cattle ingest molybdenum, through soils, plants, and disturbed sediment consumed with natural waters, which adds to the overall molybdenum intake.
- The caloric demands of free range cattle, particularly in mountain environments and in the winter, are far greater than those of cattle on feedlots.

The Kistner study recognized that its results were unexpected by showing no adverse effect at molybdenum concentrations that were documented to have adverse effects in other studies. The Kistner study described how these results could be due to diet type (including sulphur and copper content), or because drinking water may bypass the rumen and minimize adverse effects. However, the amount of drinking water bypassing the rumen ranges widely, may not apply to

young cattle, and is affected by diet, with less bypass occurring, for example, in cattle that consume hay. As the Kistner study recognizes, “factors that influence ruminal bypass of drinking water and diet type (forage versus concentrate) need further investigation.”

Ordinarily, when developing regulatory standards, the entire body of scientific evidence is considered in order to examine the studied effect of different durations, different conditions, different study animals, different measured endpoints of toxicity, and other factors. Uncertainty factors are routinely applied to address such gaps in knowledge, as well as individual variability or sensitivity to a toxic compound. For example, historical research has demonstrated a number of adverse effects in cattle as a result of molybdenum exposure, including reproductive and growth effects. Yet, this body of knowledge is not considered in Climax’s proposal. In this instance, Climax is proposing a new water quality standard based upon a single study with a limited scope, while not incorporating any prior scientific evidence or utilizing any uncertainty.

Dr. Heath’s opinion is that there is inadequate information to support the proposal to change the molybdenum standard in Colorado to 1,000 ug/L for agriculture purposes.

V. Other Stream Segment-Specific or Stakeholder-Specific Issues. The Stakeholders share many of the same concerns with the proposed domestic water supply standard and/or proposed agriculture standard. In addition, the following issues have been identified:

A. Ten Mile Creek Molybdenum Concentrations. Molybdenum concentrations at the Climax Mine Outfall were relatively low for the five years before mining operations restarted, but increased again after mining operations recommenced. Measured molybdenum concentrations at Copper Mountain were over 2,500 ug/L during one sampling event in 2016. *See Climax Exhibit 4.*

B. Grand County Observations. In addition to the possibility of elevated molybdenum concentrations in precipitates and sediments in the Williams Fork River, the County is concerned that there is also increased molybdenum consumption by livestock in the Williams Fork valley resulting from airborne migration of molybdenum from mine tailings and other means. These points further emphasize Dr. Heath’s conclusions on why a single feedlot study is not a good basis to set new molybdenum standards protective of cattle operations that occur throughout the state.

C. Copper Mountain Resort. Copper Mountain Resorts primary source of water is from Tenmile Creek (Segment 13) below the Climax Mine and before any dilution from West Tenmile Creek. Copper Mountain diverts hundreds of acre-feet a year primarily for irrigation and snowmaking. Copper Mountain Resort is very concerned with the degradation of water quality that the proposed standards would allow which could impact its ongoing operations. It is noted that Segment 13 currently has no molybdenum standard, but Climax’s discharges into Segment 13 must not cause exceedances of the molybdenum standard in Segment 14. Changing the standard in Segment 14 to 9,000 ug/L creates an unacceptable risk for Copper Mountain Resort. A more detailed summary of concerns is set forth by Scott Fifer, P.H. of Resource Engineering in **Exhibit C**, attached hereto.

D. Copper Mountain Consolidated Metropolitan District (“District”). The District is located approximately five miles downstream of the Climax treatment facility discharge and provides potable water to the Copper Mountain community. The District diverts from groundwater wells that produce from the alluvium of West Ten Mile Creek. Those wells receive return flows from Copper Mountain Resort’s irrigation and snow making uses, which divert directly from Segment 13 below Climax’s discharge. The magnitude of the increased stream standards proposed by Climax raises significant concerns for the District. Those concerns are discussed in more detail in **Exhibit D**, attached hereto.

E. Town of Frisco. The Town of Frisco’s municipal water supply is surface water diverted from North Tenmile Creek, and ground water tributary to the mainstem of Tenmile Creek. Because water rights are decreed for specific purposes, the volume of water available for diversion under a specific water right may depend in part on whether that water is of sufficient quality for the decreed use(s). That principle underlies the requirement of section 37-92-305(5), C.R.S., that the supply of water used within a decreed plan for augmentation must be “of a quality . . . so as to meet the requirements for which the water of the senior appropriator has normally been used.” It also underlies the Colorado Supreme Court’s holding in *City of Thornton v. City & County of Denver*, 44 P.3d 1019, 1024-25, 1028-30 (Colo. 2002) (“The WRDAA [Water Right Determination and Administration Act] and the WQCA [Water Quality Control Act] therefore preserve the common law standard that the introduction of pollutants into a water supply constitutes injury to senior appropriators if the water is no longer suitable for the senior appropriator’s normal use.”). Any degradation of water quality in Segment 14 that reduces the volume of water available for the municipal uses for which the Town’s water rights are decreed, including use within the Town’s potable water supply, thus may cause material injury to the Town’s water rights. Such a reduction could occur if, for instance, the U.S. Environmental Protection agency adopts a molybdenum standard under the Safe Drinking Water Act, and water quality in Blue River Segment 14 does not meet that standard. Like its upstream neighbors on Tenmile Creek, and based on the analyses of the Water Quality Stakeholders’ experts, the Town believes that there remains significant uncertainty regarding risks to human health from exposure to molybdenum via the potable water supply. The Town therefore respectfully requests that the Commission deny Climax’s proposal to alter current molybdenum standards.

VI. Witnesses. The following witnesses may provide testimony on the subject matter of the proceedings, including any matter identified in this prehearing statement, the attached exhibits, in any supplemental or rebuttal disclosure filed by any of the Stakeholders or other parties, or in rebuttal as necessary at the hearing:

- A. Joseph Cotruvo, PhD.
- B. Jennifer Heath, PhD.
- C. Lane Wyatt for NWCCOG
- D. Jeff Goble (Public Works Director) and Dave Koop (Water Foreman), Town of Frisco.
- E. R. Scott Fifer, P.H., Resources Engineering, Copper Mountain Resort.
- F. Bryan Webinger (District Manager) and Robert Martin (Public Works Director),

- Copper Mountain Consolidated Metropolitan District.
- G. Katherine Morris, Grand County Water Quality Specialist.
 - H. Steve Bushong, Clinton Ditch and Reservoir Company, Eagle Park Reservoir Company, Eagle River Water and Sanitation District, Upper Eagle Regional Water Authority.

The Stakeholders reserve the right to call additional witnesses in response or rebuttal to testimony or evidence presented by any other party.

VII. Exhibits. The following may be used as Exhibits in the above-captioned matter:

- A. Exhibits A, B, C, and D attached hereto, along with illustrative exhibits based upon the information disclosed therein or in this Prehearing Statement;
- B. Any document or exhibit produced by any other party; and
- C. Any document needed for purposes of impeachment or rebuttal.

VIII. Conclusion. For the reasons given above and in the reports prepared by the Water Quality Stakeholder' experts, the Stakeholders ask that the Commission decline to adopt Climax's proposed changes to the statewide molybdenum standards for domestic water supply and agriculture classifications and the proposed changes to Upper Colorado River Segment 8 and Blue River Segment 14. Climax's proposed standards include unacceptable levels of uncertainty and risk. If the Commission desires to establish new molybdenum standards, the Stakeholders request that the appropriate level of uncertainty and risk as described by the Stakeholders' experts be considered to ensure that any new molybdenum standard remains protective of domestic water supply and agricultural uses of water.

Respectfully submitted this 27th day of October, 2017.

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CERTIFICATE OF SERVICE

I do hereby certify that on this 27th day of October, 2017, a true and exact copy of the foregoing **CONSOLIDATED RESPONSIVE PREHEARING STATEMENT OF THE WATER QUALITY STAKEHOLDERS** was sent to the Water Quality Control Commission as follows:

via email: cdphe.wqcc@state.co.us
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Denver, CO 80246-1530


