COLORADO WATER QUALITY CONTROL COMMISSION
STATE OF COLORADO

RESPONSIVE PREHEARING STATEMENT

OF THE COLORADO MINING ASSOCIATION

REVISIONS TO THE BASIC STANDARDS AND METHODOLOGIES FOR SURFACE WATER, REGULATION #31 (5 CCR1002-31); THE BASIC STANDARDS FOR GROUND WATER, REGULATION 41 (5 CCR1002-41); & SITE-SPECIFIC WATER QUALITY CLASSIFICATIONS AND STANDARDS FOR GROUND WATER, REGULATION #42 (5 CCR 1002-42)

I. STATEMENT OF FACTUAL AND LEGAL CLAIMS

The Colorado Mining Association requested and received Party Status in the above referenced rulemaking.

II. BACKGROUND

Colorado Mining Association (CMA) appreciates the opportunity to comment on the Water Quality Control Division's (WQCD) proposed changes to Regulation 41, The Basic Standards for Groundwater. The two primary comment areas discussed below address proposed changes to total and dissolved metals standards and points of compliance regulatory language.

III. Written Testimony

A. Total vs. Dissolved Metals:

WQCD has proposed to change the form of the standards for metals from dissolved to total recoverable. The proposal is specific to agricultural and domestic uses for antimony, arsenic, barium, beryllium, cadmium, copper, chromium, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc. Because the total recoverable form of a chemical is equal to or greater than the dissolved form, the proposed change is essentially a lowering of the groundwater standards for these metals with little justification or explanation. The following comments assume that this

change will lead to a corresponding change in the required sampling and analysis methods for groundwater regulatory programs. Because standards will be based on the total recoverable form of the metals, compliance monitoring will likely be based on the total recoverable form. Note that changes from dissolved to total were also changed for boron, chloride, nitrate, nitrite, nitrate + nitrite, sulfate, but because these pollutants are primarily found in dissolved form, the following comments are not directed to these non-metal chemicals.

Unfortunately, there was no stakeholder discussion of the WQCD proposal before the hearing process commenced. Although the WQCD made a presentation to the 10-year Roadmap Workgroup regarding regulations 31, 41, and 42 in May 2019, that presentation did not mention the potential to change the form of metals standards. CMA was not aware of the WQCD proposal to change the form of these standards to total recoverable until the draft hearing notice was made available. Until the WQCD prehearing statement was filed, CMA was not aware of the basis for the WQCD proposal and was not able to evaluate the proposal thoroughly. Based on significant questions about the technical basis for the WQCD proposal and the potential effect on groundwater programs, CMA suggests that additional stakeholder discussion is necessary before the WQCC should consider the WQCD proposal. In light of the short time period before the rulemaking hearing, the WQCC should consider deferring this portion of the proposal until the next triennial review.

The Commission is required to consider several factors when it adopts changes to water quality standards. These factors include (1) the need for standards to regulate specified pollutants, (2) the availability, practicality, and technical and economic feasibility of treatment techniques, (3) the existing extent of pollution or the maximum extent to be tolerated as a goal, (4) whether the pollutant arises from natural sources, (5) beneficial uses of water, and (6) information about the risk associated with the pollutants. C.R.S. 25-8-204(4). The WQCD has provided very little information on the record or to stakeholders to evaluate these factors. First, regarding the need for the proposed changes, it is noted that the current Regulation 41 already includes the statement that total concentration (not filtered) may be required on a case-by-case basis if deemed necessary to characterize the pollution caused by the activities. Additionally, there is very little information about the existing extent of pollution from the total recoverable or colloidal forms of compounds statewide, or the potential natural sources of these pollutants in groundwater. Furthermore, there has been inadequate consideration of the potential costs that could arise from analytical results for total recoverable metals in more turbid water samples. This could include costs associated with re-sampling/re-analyzing and potentially investigating erroneously high results.

WQCD cited as part of its proposal the intended alignment between Regulation No. 31 and Regulation No. 41, but fails to acknowledge that in several instances, regardless of total recoverable or dissolved form, the standards will not align. The groundwater standards for human health, domestic water and agriculture uses outlined in Regulation No. 41 may be higher or lower than the National Primary and Secondary Drinking Water Regulations. Additionally, EPA MCLs are specifically drinking-water standards, not groundwater standards, such as the intent of WQCD Regulation 41. The enforcement of primary drinking water standards is to ensure safe drinking water so in many cases it may be appropriate to use the total recoverable fraction, since there are potentially contributing factors that can impact the concentration of metals in drinking water (e.g., corrosion of household plumbing/pipes). Applying this logic to groundwater standards is not appropriate. To best understand and measure the chemistry of groundwater, it is more appropriate for the sampling approach to minimize the influence of non-groundwater related factors (e.g., sample turbidity, well casing corrosion, biofouling). Similarly, the U.S. EPA's Maximum Contaminant Levels for protection of drinking water are applied to drinking water supply systems, which may undergo various forms of treatment that affect the source water, potentially including filtration and coagulation. In cases where the water has been filtered, the total recoverable form of the metal should be nearly identical to the dissolved form of the metal and it would be appropriate to apply a total recoverable standard. However, for waters that have not been filtered, total recoverable and dissolved forms can be considerably different.

B. Issues with Turbid Samples:

A vast amount of research has been aimed at water quality sampling and analysis methods. One issue that is well understood is that many metals are present in the geologic matrix of unconsolidated sediments and bedrock. If these particulates are present in a water quality sample, they will be accounted for with the total recoverable analysis method and potentially lead to false-positive results. Conversely, use of the dissolved analysis method (filtration with a 0.45 µm filter) avoids these issues but has potential to underestimate the colloidal forms of the metal (particle size 0.003 to 10 µm), if present, potentially leading to false-negative results.

Comparison of filtered and unfiltered samples shows that significant differences in concentrations can occur due to turbidity (Gibbons and Sara 1993). The Gibbons study reported variances twice as large in inter-well comparisons and five times as large in intra-well comparisons when comparing unfiltered to filtered samples. Statistically significant differences were found between filtered and unfiltered samples for barium, iron, potassium, magnesium, manganese, lead, and zinc. Use of unfiltered samples will lead to a large number of false positive results, where turbid samples could be mistaken for groundwater contamination and potentially lead to lengthy and unnecessary water

quality investigations. Filtered samples would provide a better balance, minimizing both false positives and false negative rates within the samples. Although the potential for colloidal transport may not be fully accounted for, it should be recognized that only certain geologic conditions lead to colloidal metals transport. The fact that comparable variability was found across sites and included upgradient wells indicates that colloidal metals are unlikely to be the reason for the observed variability.

Filtered samples also minimize the variability that can result from changes in sample collection methods (e.g. bailing, purging, low-flow sampling) or changes to sampling personnel. Ultimately, sampling methodologies that result in highly turbid samples are more likely to affect the accuracy of groundwater contaminant concentrations to a greater extent (Puls and Powell 1992b). The intent of the Puls study was to examine appropriate utilization of filtration for groundwater sampling for metals parameters. Findings of the study demonstrated that colloidal transport was not found to be a major contributor to contaminant concentration differences, but rather excessive turbidity caused by sampling method contributed significantly.

WQCD has provided no data to demonstrate that contaminants in Colorado groundwater are being underestimated as a result of colloidal transport, or resultant impacts of this underestimation. As local geologic conditions influence the transport of colloids, (McCarthy and McKay, 2004) geologic conditions could be considered on an individual basis to determine if total recoverable parameters are necessary to capture colloidal material, rather than requiring permittees to make an unnecessary change to current practices. Also, as noted above, the current Regulation 41 language already notes that total concentration (not filtered) may be required on a case-by-case basis if deemed necessary to characterize the pollution caused by the activities.

C. Cause and Mitigation of Turbid Samples:

In some cases, elevated turbidity may be the natural flow condition of an aquifer. Alternatively, and more commonly, there are several aspects of well installation and groundwater sampling that have the potential to cause high levels of turbidity. This includes well construction (e.g. drilling method, steel versus PVC casing, screen slot size, filter pack design and installation), well development, and purging techniques (Puls and Powell 1992). CMA recognizes that there are some cases where high turbidity in groundwater may be caused by poor well installation, development, or purging techniques. For these situations, low-flow sampling procedures are one method of minimizing the potential for highly turbid samples (Puls and Barcelona 1996). These sampling methods require specialized equipment that is not as widely

used as typical submersible pumps or well bailers. Furthermore, in low-permeability aquifers, the use of low-flow sampling techniques may be impractical. In some geologic settings sample turbidity may not be reduced to ambient levels even with proper well design, installation, development, and specialized sampling methods (USEPA 2002, Nielsen 1993, Reece 1993). There are also situations where purge sampling methods are more representative than low-flow methods, such as wells that are screened across multiple strata, where low flow sampling would be limited to collection near the depth of the intake. Lastly, many wells are affected by biofouling, which can lead to elevated concentrations of suspended solids (including iron and manganese) and increased turbidity. For wells that are influenced by biofouling, the sampling method might have only a minor influence on sample turbidity, and the filtering of the sample might prove the only effective method for analyzing the actual groundwater chemistry.

Changing the groundwater standards for metals to the total recoverable form obligates the regulated community to spend significant resources investigating the influence of turbidity on sample results and potentially installing replacement wells and implementing new sampling techniques, training, and equipment that may or may not mitigate any identified issues. Changes in sampling techniques such as low-flow sampling would require new equipment and specialized training and may not fully address sample turbidity. If outside contractors conduct the sampling, an evaluation of their sampling capabilities and potential changes to the costs of sampling would have to be considered. Addressing wells that were installed and developed historically based on practices at that time may require installation of new replacement wells. WQCD should recognize that addressing turbid groundwater samples could incur significant costs on existing regulated facilities.

The WQCD's Proponent Prehearing Statement (PPHS) references a guidance document from U.S. EPA on low-stress purging, i.e. low-flow sampling. Is it the WQCD's intent to require low-flow sampling going forward? Alternatively, has the WQCD considered development of groundwater sampling guidelines that address issues with turbid samples? For example, Wyoming has developed recommendations for addressing these samples with a hierarchal approach to the sampling method based on turbidity readings (WDEQ 2005). This guidance recommends starting with conventional purging techniques and depending on turbidity readings (threshold of 20 NTUs), recommends moving to flow-flow purging, well redevelopment and resampling, and ultimately collection of samples for dissolved metals analysis.

Similarly, Connecticut has developed recommendations for identifying the cause of turbidity and determining when sample filtration may be appropriate to address elevated turbidity. The Connecticut guidance noted that samples above 5 NTU may be filtered to

reduce false positives as a result of turbidity, but consideration of other factors should be given when considering marginal samples (CDEEP 2012).

D. Impact on Historical Datasets:

Such a change will also bring into question the validity of existing datasets. As new data are collected, any increase in concentration will need to be investigated to determine if the change is representative of in-situ groundwater chemistry or simply the result of this potentially significant change in sampling and analysis methods. Again, this will be a considerable waste of resources on behalf of both the regulated community and the State implementing agencies.

Similarly, regulation 41.5(C)(6) allows for interim narrative standards for groundwater where standards have not been assigned. The narrative standard states that groundwater quality shall be based on (A) existing ambient quality as of January 31, 1994 or (B) the quality which meets the most stringent criteria set forth in Tables 1 through 4. Most mining facilities will have historical datasets based on the dissolved form. Determining ambient quality as of 1994 based on the dissolved form of the metal will not translate directly to future monitoring based on the total recoverable form. In these instances, would facilities that show a total recoverable concentration that exceeds a permit limitation that was set in dissolved form be considered a violation of standards?

E. Adequate Justification:

WQCD made no demonstration that the dissolved and total recoverable forms for these metals are equivalent. Without such a demonstration, stakeholders cannot determine what impact the proposed changes would have on their facilities. Based on the limited justification provided, stakeholders have no way of determining whether the impact of this proposed change would be negligible, such as at sites where the total to dissolved ratio is approximately 1:1, or whether the proposed change is significant change to the numeric standard, such as at sites where the total recoverable and dissolved fractions show measurable differences. WQCD should evaluate available groundwater data and determine what impact these changes would have on the regulated community.

WQCD has not shown that the current standards offer inadequate protection for public health or the environment. There has been no demonstration that current standards for dissolved metals and existing sampling methods failed to identify groundwater contamination issues where they exist. This is particularly true for a change that would

be implemented statewide. WQCD must show that there is a need for updating these standards.

Similarly, there has been no showing that the colloidal transport of metals is so pervasive in Colorado groundwater that it needs to be accounted for by a change in the form of the standard. There are researchers that suggest colloidal transport of contaminants is not a widespread issue (Reece 1993). If the WQCD is concerned about the colloidal fraction of metals that are being underestimated by the dissolved analysis, WQCD should show that there are natural groundwaters within the state that contain a significant fraction of metals in the colloidal form. Is data available from groundwater within Colorado that demonstrates this and if not, has WQCD considered conducting additional sampling to establish their justification for the change?

F. Alternative Approaches:

The WQCD should maintain the groundwater quality standards for metals in the dissolved form. The existing regulatory frameworks typically compare groundwater quality of downgradient wells to that of ambient groundwater or upgradient wells. This degree of protection can be maintained by keeping the water quality standards in dissolved form. Compensating for unlikely scenarios of contamination through the use of total recoverable analysis is not a reasonable approach.

The WQCD's PPHS suggests a default of the total recoverable form but allows for consideration of the dissolved fraction on a case-by-case basis. CMA suggests that instead of a reform to all of the metals standards, WQCD should consider a default of the dissolved form while allowing application of the total recoverable form on a site-specific basis. This will allow the WQCD to identify and address the specific situations where application of a total recoverable standard are more representative of in-situ groundwater chemistry and therefore necessary, such as a site where compliance issues have been identified and detailed hydrogeologic investigations are already underway.

G. Point of Compliance:

WQCD proposes changes to Section 41.6(D) for designation of groundwater points of compliance. CMA does not believe that these proposed changes directly impact the mining industry as explained below.

H. Impact to the Mining Industry:

As proposed, Regulation 41 will retain the existing language at 41.6(B), which authorizes the Division of Reclamation, Mining, and Safety (DRMS) as an "implementing agency". This language at 41.6(B) further explains that the points of compliance established in sections 41.6(C) and 41.6(D) shall not apply to activities regulated by the implementing agency unless the point of compliance established by the implementing agency is determined to be inadequate by the WQCC. Therefore, it is CMA's position that the WQCD's proposed changes to points of compliance regulations at 41.6(D) does not alter the designation of points of compliance at mining facilities by the DRMS.

CMA appreciates the opportunity to provide comments on the proposed changes to Regulation 41. Any questions regarding these comments may be directed to Stan Dempsey at sdempsey@coloradomining.org.

III. Witnesses

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Respectfully Submitted this 26th day of February, 2020

FOR THE COLORADO MINING ASSOCIATION

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