



Colorado Molybdenum Standards for Upper Colorado Basin

What standards and use designations is Climax proposing or supporting in this proceeding for Tenmile Creek and Clinton Creek?

As a party to the Colorado Basin Standards proceeding, Climax is proposing a site specific molybdenum water quality standard of 3,967 micrograms per liter (also known as parts per billion or ug/L) or 3.96 milligrams per liter (also known as parts per million, or mg/L) to meet the water supply use that has been designated for lower Tenmile Creek (Segment 14). This standard is protective of human health, which is the focus of the water supply designation. Climax is proposing this instead of the 210 ug/L adopted as a “basic standard” by the WQCC in 2010.

Climax is not proposing any water supply standard to apply to upper Tenmile Creek (Segment 13). Climax is also not proposing an agricultural standard to apply to either upper or lower Tenmile Creek. This is consistent with the CDPHE’s conclusion that no direct water supply use occurs in upper Tenmile Creek and no agricultural use (forage irrigation or cattle grazing) occurs in either of these segments, based in part on information supplied by Climax to CDPHE. In addition, while CDPHE proposes that the agricultural use designation should apply to the Clinton Creek drainage (Segment 15), Climax believes the evidence supports that irrigated forage and grazing, which are the focus of the molybdenum standard for agriculture, are not occurring and are unlikely to occur in the future. Other parties have proposed a water supply use designation to apply to the Clinton Creek drainage. No water supply or agricultural uses are occurring in the Clinton Creek drainage, and Climax therefore believes no standard should be applied.

Why is Climax proposing molybdenum standards for the water supply use designation different from the basic standard adopted by the WQCC?

Since 2007, Climax has participated in every Colorado water quality proceeding related to molybdenum. In several of those proceedings, Climax testified about the limitations of the available scientific studies assessing molybdenum effects on human health and the fact that new scientific studies were underway which were likely to provide far better scientific guidance on appropriate water quality standards. Two of those studies are now complete. One of the studies has been published in a peer reviewed journal, and Climax understands that a second study is due to be published in the near term. For those reasons, Climax decided it was now time to present our information to WQCC.

While this proceeding will be the first time the WQCC will have the opportunity to consider these recent studies, Climax has presented the conclusions of these two recent studies to both CDPHE and EPA. In September 2013, Climax provided CDPHE and EPA with information on this recent scientific research concerning molybdenum’s possible effects on human health, as well as technical information supporting a revised agricultural standard. We met again with CDPHE and EPA in March 2014, after the Water Quality Control Division proposed to apply the 210 ug/L basic standard in Lower Tenmile Creek in its Proponent Prehearing Statement for the Colorado River Basin rulemaking. At CDPHE’s recommendation during the March meeting, Climax filed a motion to submit our Special Prehearing Statement with technical justification well in advance of the regular due date for response to the CDPHE’s Prehearing Statement. The early filing was intended to notify all parties involved in the proceeding so they would

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have additional time to understand what we are proposing and why.

Climax's proposed standard is based on the results from two international studies on molybdenum toxicity to humans that were conducted over a 7-year period by independent experts in this field. The first, a repeat dose dietary study conducted on animals, has been published in the peer reviewed scientific *Journal of Regulatory Toxicology and Pharmacology*. The lead author of this study is Dr. F. Jay Murray, a toxicologist with forty years of experience in toxicology and human health risk, who will testify as an expert in this proceeding. Dr. Murray's credentials and experience are presented in his written testimony submitted in this proceeding. The second study, a prenatal developmental toxicity study, also conducted on animals, was completed by the Research Triangle Institute (Research Triangle Park, NC). The Study Director was Dr. Rochelle W. Tyl, an internationally recognized expert in teratology and developmental toxicity. This study is expected to be published in the 2014 or early in 2015. These studies were sponsored by the International Molybdenum Association, or IMO, of which Climax is a member. The studies were intended to develop reliable, high quality scientific information on potential human health effects of molybdenum in drinking water. These studies were subsequently submitted to the European Chemicals Agency as part of industry's registration dossiers under the European Union's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation as well as to the Pennsylvania Department of Environmental Protection, which has considered, but not implemented, a molybdenum standard for water quality. The details of each of these studies, and supporting documentation, are included in our prehearing statement.

Both recent studies call into question the 1990 study by Fungwe et al. relied on by the WQCC in its adoption of molybdenum standards, which significantly underestimated the true No Observable Adverse Effect Level (NOAEL) and Lowest Observable Adverse Effect Level (LOAEL) associated with molybdenum exposure. Our proposed 3,967 ug/l water supply standard is derived using the same equation used to calculate WQCC's 210 ug/l number with the revised NOAEL. Dr. Murray noted that neither of the two recent studies confirmed the findings of the Fungwe study, which was a PhD dissertation study conducted on rats. Dr. Murray's study and his testimony note that there are many serious limitations in the Fungwe study.

Because of the regulatory and other consequences of adoption of a standard in Tenmile Creek, Climax expects the process for the Colorado Basin Standards hearing to allow consideration of the best scientific evidence, which would be the results of the IMO-sponsored studies.

Why is Climax confident that these studies are the best scientific evidence?

Both studies were submitted last year to the Cooperative Chemicals Assessment Meetings (CoCAM) program of the Organization for Economic Cooperation and Development (OECD) with a view to achieving Mutual Acceptance of Data (MAD) status. MAD status means that the OECD member countries, including the United States, agree that the data are suitable for regulatory purposes and must consider the data set under their individual regulatory programs. EPA, as the United States representative, was party to the CoCAM process and supported MAD status. CoCAM reviewed the data for both toxicity studies performed by IMO and independent researchers, along with other data, and granted MAD status to the dataset in October 2013. Information about OECD approval is publicly available, and can also be provided upon request.