Assessing the Safety of Water in the Animas and San Juan Rivers for Livestock Consumption

On August 7, 2015, the State of New Mexico advised livestock owners along the Animas and San Juan rivers to not let their animals drink river water following the mine spill upstream. **State officials announced on August 14, 2015, that they were lifting this precaution, effective on the morning of August 15, 2015.** We recognize that you still might have concerns regarding the potential risk to your animals that drink river water. This document is to help you assess that risk.

When assessing the safety of drinking water for livestock, you must consider a number of variables, such as the amount of a particular heavy metal or mineral in the water; the amount of water an animal may drink in a given period of time; the species, breed, age, weight, diet, lactation status/level of production, and overall health status of the animal; as well as weather factors such as temperature and humidity. Depending on these variables, ingesting certain heavy metals or minerals may or may not cause the animal to become very ill or even die within a short period of time, or it may contribute to long-term negative effects. With repeated consumption of certain heavy metals or minerals over time, a cumulative effect may develop in the animal.

Example 1: If during a 24-hour period of time, an 800-pound steer drinks a normal amount of water containing a very, very high level of arsenic, for example, the steer most likely will display signs of intense abdominal pain, diarrhea, staggering, trembling, weakness, salivation, and possibly sudden death.

Example 2: If during a 24-hour period, an identical 800-pound steer drinks a normal amount of water with moderately high levels of arsenic for several days, the steer may not immediately display clinical signs; if clinical signs do develop, they may be much less severe than in Example 1. The steer in Example 2 would have to consume more water with a lower level of the contaminant over time before showing clinical signs. Furthermore, if the water contains only slightly high levels of arsenic, clinical signs may never be observed.

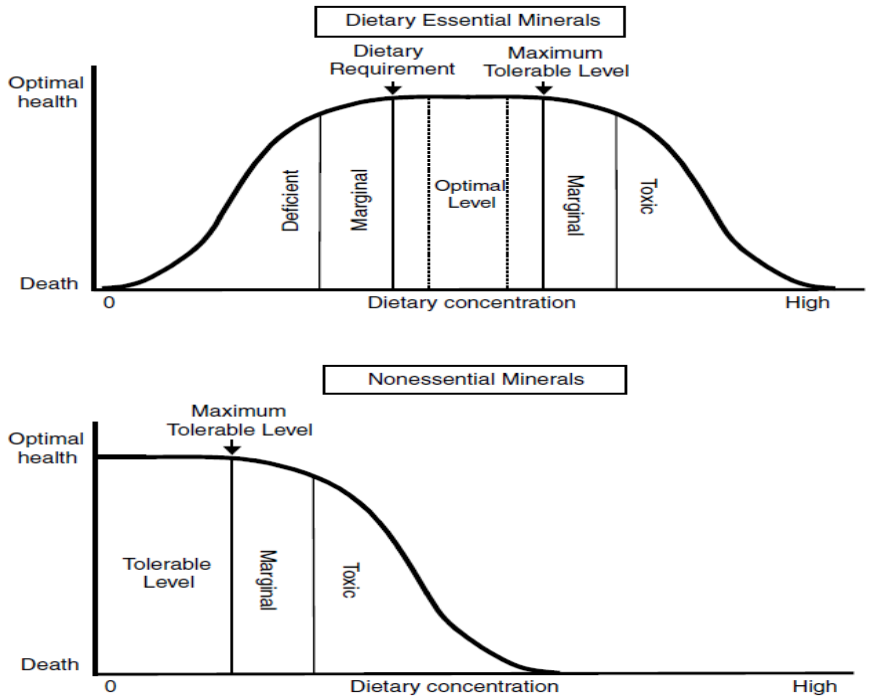
The best way to estimate the risk your animals face is to consider the metals content of everything your animals consume: feed, water, and any mineral supplements you may be providing. The metals content in each of these things adds up. In other words, based on your particular water test results, you may need to adjust the feed or mineral you use.

Herd- or location-specific calculations may be necessary to determine the level of safety for each livestock group. Remember that the effects of consuming a high level of metals or for a long period of time may present a long-term problem with that may not be immediately evident.

The following graph and table show what are considered safe levels of several heavy metals and minerals in drinking water for livestock.

Figure 1. Mineral Concentrations and Animal Health: The relationship between dietary mineral concentrations and animal health is very different for essential versus nonessential minerals.

- For essential minerals (top graph), increasing amounts of a mineral in the diet are highly beneficial up to a point (*requirement*), beyond which additional amounts have little additional value. At some point (*maximum tolerable level*), higher dietary concentrations become detrimental to the animal's health.
- In the case of nonessential minerals (bottom graph), low levels are tolerated without detrimental effects to the health of the animal. At some point, higher concentrations become detrimental to the animal's health.



The table below shows the Maximum Contaminant Levels (MCLs) in water for livestock. An MCL is the highest level of a substance that can be present in the water without harmful effects to the animal.

Table 1. Drinking Water Standards for Livestock
Excerpted from the National Research Council's "Mineral Tolerance of Animals"

Substance	**Maximum Contaminant Levels in Livestock Water** milligrams/Liter (mg/L) or parts per million (ppm)
Arsenic	0.2
Cadmium	0.05
Chromium	1
Cobalt	1
Copper	0.5
Lead	0.1
Mercury	0.001
Nitrate – nitrogen	440
Nitrite – nitrogen	33
* Fluoride	2.0
* Vanadium	0.01
* Zinc	25

** Denotes substances assessed by the U.S. Environmental Protection Agency (EPA) under its secondary standards; all others noted in this table are assessed by EPA under its enforceable standards.*
For more information: http://bit.ly/1ISphlN, page 475

In addition to the information provided in this document, your veterinarian, Cooperative Extension specialist and New Mexico State University staff are available to offer guidance to help you make decisions about allowing your livestock to drink river water again.