

Statement of Mark A. Williamson, Ph.D. Concerning the Gold King Mine

Hearing of the Congressional House Committee of Science, Space and Technology

September 9, 2015

My name is Mark Williamson, I am a geochemist living in Loveland, Colorado, and I earned my Ph.D. from Virginia Tech, in the department of geological sciences. For the whole of my professional career, and extending back into my graduate study days, I have focused on the geochemistry of acid rock drainage (the type of solution discharged from the Gold King Mine), its management, and the associated issues of metals in aquatic and terrestrial environments. Consistent with the language in my invitation to this hearing, I am present to offer my education and experience to the committee in its examination of the circumstances surrounding the discharge of acid rock drainage (ARD) from the Gold King Mine.

Like many of my fellow Coloradans, other professionals that work with ARD issues, and citizens concerned with the quality of our water resources, I was disturbed by the discharge from the Gold King Mine. ARD has a significant impact on water resources, negatively affecting thousands of miles of streams and rivers throughout the United States.

To control, but not necessarily eliminate the discharge of ARD from disused mines, the engineered plugging of mine openings to regulate the flow of ARD has been a simple, relatively effective management technique, but results in a refilling of the mine workings with water. At the Gold King Mine, work plans from 2014 and 2015 that I have seen indicate that such refilling was anticipated and that a potential “blowout” condition was deemed to exist at the collapsed Gold King Mine portal, prompting the need for action.

Despite the anticipated filling of mine workings with water, and the potential blowout condition, field operations at the Gold King Mine used excavation equipment to dig open the collapsed mine portal. It is not clear that any investigations were conducted to assess how much water was present behind the collapse feature, or if there was any water at all. Given the uncertainty, the potential negative consequences, and the benefit of hindsight, a detailed assessment of the situation would have been advisable.

Any number of lines of investigation may have be pursued, including

- drilling a borehole behind the collapse feature,
- inspecting the the mine area for developing seeps and springs,
- searching for exploration boreholes that may extend into mine working,
- reviewing and inspecting older mine maps for potential other mine openings, or, as seems documented in work plans of 2015,
- inserting a pipe through the collapse to pierce it and check for the presence of water.

Of these, a borehole behind the collapse and a pipe piercing the collapse can be used to pump out water, to the extent it is present, in a controlled manner to remove the water and its associated risk. It is not clear from material made public that I have seen that any such investigations or evaluations were conducted.

Without further documentation it cannot be determined if site operations arbitrarily abandoned a conceptual site model (flooded) to dig open the workings, or if evaluation of actual water conditions behind the collapse had been conducted and led to a paradigm shift. Given, the ultimate outcome at the site, and the lack of specific documentation, it appears that appropriate risk reducing evaluations may not have been conducted.

The resulting discharge of ARD from the Gold King Mine was comprised of an acidic metal-bearing solution as well as a metal-containing sludge. Both of these can and do result in negative effects on the quality of receiving streams. The solution phase can result in immediate acute impacts and the sludge acute as well as more long term chronic issues.

Acute effects may have been temporal, largely avoided with the passing of the plume. The chronic, long term effects are undocumented and unclear at this time. Long term effects may include repeated exposure to metals through resuspension of sludge deposited in the river following rain or snow melt.

In closing, it is clear that managing ARD in general, and in older historic mining in particular is challenging. Given the challenging conditions, and the potential harm, care is warranted in pursuing remedial activities. Owing to the lack of available documentation, is not clear just how much care was exercised in the Gold King situation. However, I am optimistic that we will learn the details of this unfortunate event so that such things can be successfully avoided in the future.