

**Testimony of Andrew Watson
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**The Subcommittee on Energy and Mineral Resources
U.S. House of Representatives**

**“Exploring 21st Century Mining Safety, Environmental
Control, and Technological Innovation.”**

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Modern Mines and Mines of the Future **21st Century Safety, Environmental Control, and Technology**

How current mines are doing state of the art mine reclamation and environmental impact remediation

1. Good afternoon. I am Andrew Watson, a licensed engineer in the States of Colorado and Arizona. Since 1991 I have been providing engineering services to hard rock mining companies in the United States and to American mining companies with operations in other countries. My work has principally involved planning and constructing mining infrastructure for containment of mine wastes and mitigation of potential impacts to the environment. Since 1999 I have been involved in planning, engineering and implementing mine closure reclamation and closure projects in the western US.

For the past ten years my colleagues and I have been facilitating workshops on mine closure and reclamation and I can attest to the attention mining companies are giving the environmental performance of their business. A mine has a finite life and miners are not free to redeploy their capital unless they can dispose of their obligations and move on to the next project. Miners today make great effort to both limit disturbance during mining and to reclaim disturbance as an operation comes to an end. A mines performance is measured over a very long period, and mining companies are committed to staying in business for a very long time.

2. Miners have made significant progress in looking after health and safety of their personnel and the communities they serve. Examples include real time fatigue monitoring of drivers using dash cameras, and use of wearable tools to monitor vital signs real-time and keep workers safe.
3. Miners also deploy real-time sensors and communications to monitor ground movement, water flows and quality, air quality and other industrial indicators like gasses, so that management can adapt to the circumstances before environmental issues arise. Miners have demonstrated improved environmental performance over the past years and continue to apply continuous improvement. The industry does demonstrate that doing things right is better for business than fixing mistakes, and is pro-active in using appropriate technology and practicing adaptive management for a better outcome.
4. Since 1998 when the larger multinational mining companies collaborated to address sustainability and establish what has become the International Council of Minerals and Metals (ICMM), significant know-how has been shared across the industry in an effort to improve the environmental and social performance of the mining industry as a whole. Miners have stewardship programs for tailings and waste management, basin-wide water management initiatives and community development commitments. More and more miners ascribe to the Global Reporting Initiative,

promoting increased transparency and accountability through public reporting of a wide range of environmental indicators.

5. What gets measured gets managed, and it is evident that management and the owners are motivated to see improvement in key environmental indicators. Indeed, in conjunction with the UN initiative around water as a human right, water has been a metric widely reported by miners over the past few years and significant improvements have been realized, as evidenced by reduced water consumption and reduced impacts to water quality in the surrounding environment.
6. The industry continues to invest in planning for the entire mining lifecycle. Since 2006 there has been a marked interest in planning for mine closure, with annual international conferences dedicated to the subject and sessions on mine closure and long-term environmental performance at every major mining conference. Miners in the US are aligned with, and are contributing to, the international body of knowledge. In fact managing, closing and remediating of mines in the US provides examples of how the mining legacy can be managed. The work done by the coal industry and uranium industry provide examples cited worldwide, and hard-rock miners are fast establishing a suite of examples of successful remediation that representatives from other countries come to see.
7. Miners and technology providers are investing in water treatment technologies that permit the beneficial recovery of metal and mineral values previously considered contaminants. Ion exchange, membrane separation and electro-dialysis are examples of techniques to improve water quality for beneficial reuse. This in conjunction with the drive to use less water will result in a lower overall environmental footprint. I see collaboration between miners and technology vendors and service providers, as well as between miners and other industries where water use and water quality is a concern.
8. Miners have also invested in improved process technology and better, customized reagents, recovering far more metal value from each ton of ore than in decades past. This improvement in efficiency means that the tailings contains lower residual concentration of metals and leachable elements of concern. This promises that future mines will not behave as poorly as some of the legacy sites that are emblematic of how abandoned mines impact the landscape.
9. The mining industry is patently aware of the cost of legacy mine sites left abandoned. These serve as reminders of how not to end any endeavor and do pose technological challenges. The silver lining is the many lessons learned through observing and remediating these sites, but we cannot afford to, nor do we, operate that way today.

In fact the concept of abandoned mines is scarcely applicable today; it is neither legal nor acceptable for a mining company to walk away. Miners almost without exception have in their portfolio one or several elements that are in the process of closure and reclamation. The public record shows a significant investment by mining companies in the reclamation of components of their mining properties no longer in use.

At the same time, Miners are applying lessons learned and are not generating impacts that will impair their businesses and our environment in the future. Mines have closure plans. There is public participation in the permitting process. Miners demonstrate the availability of financial resources to address closure in an appropriate manner. When areas of a mine have been remediated, modern technology is deployed to monitor, for example, flux through a cover system, so that potential impacts are monitored and models of the anticipated performance are calibrated. In this way the system can be improved and the strategy adapted for success, well before the surrounding environment is impacted.

10. Even in the present climate of depressed commodity prices miners continue to meet their obligations. Many millions of dollars will be spent on planning for closure this year and hundreds of millions will be spent installing measures to limit the potential long term impacts at closed mines. The mining industry provides metals and minerals essential to society and readily consumed by the community to support the way we live. The mining industry is committed to staying in business so as to meet obligations to the shareholders and the communities we serve, including our obligation to protect the environment that sustains us.

Thank you.