



Mining and Metallurgical
Society of America



University of Nevada, Reno



COLORADO SCHOOL OF MINES
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**ADVANCING ABANDONED MINE LAND CLEANUP ...
WITH OR WITHOUT GOOD SAMARITAN LEGISLATION**

APRIL 2019 SUMMIT REPORT

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1.0 EXECUTIVE SUMMARY

INTRODUCTION AND HISTORICAL BACKGROUND

Addressing the public safety, socio-economic and environmental challenges surrounding orphaned and abandoned mine lands rank amongst the top issues the minerals industry and impacted stakeholders have long wished to resolve. While some notable and commendable collaborative efforts have improved conditions on the ground for many legacy mine sites, legislative and administrative obstacles remain that hinder more significant progress on addressing Abandoned Mine Lands (AML) in the United States.

In the fall of 2016, the Keystone Policy Center and the Colorado School of Mines (CSM) Payne Institute for Earth Resources convened a ***Summit on Reasonable Expectations in Mine Closure***. Shortly thereafter, the Mining and Metallurgical Society of America (MMSA), which was in its own planning cycle for an AML-focused event, initiated a conversation with CSM to explore how best to leverage the respective resources and expertise of each organization. It was agreed that a biannual meeting-series that would bring diverse stakeholders together to discuss issues of import to the minerals industry and society would be of great value, with CSM coordinating a fall event and MMSA following with a program in the spring.

The subsequent Fall 2017 Summit, ***A Framework to Manage the Environmental Reality of Orphaned and Abandoned Mine Lands***, was presented by the Colorado School of Mines. The objectives for that Summit were to provide a forum to (1) discuss the status of current abandoned mine inventories, (2) review technology and site best management practices, and (3) establish networking opportunities for further collaborations.

Building on the momentum established by these previous Summits, MMSA facilitated an action-oriented forum with the aim to build consensus on the critical language and programmatic components needed in Good Samaritan legislation to protect those willing and able to voluntarily improve orphaned and abandoned mine sites. In recognition of its ongoing works to improve wildlife habitat on abandoned mine sites, MMSA reached out to Trout Unlimited to become an additional co-sponsor of the forum. The Spring 2018 Summit, ***Good Samaritan Protection to Enhance Abandoned Mine Cleanup – Finding a Path Forward*** was convened on April 26, 2018 at the Colorado School of Mines. The constructive dialogue and idea exchanges during this forum helped to inform and influence the ongoing efforts on Capitol Hill to enact Good Samaritan legislation, as well as some administrative remedies being considered within the Trump Administration.

The April 2019 Summit, ***Advancing Abandoned Mine Land Cleanup (AML) ... With or Without Good Samaritan Legislation***, was moved to Reno, Nevada in order broaden stakeholder engagement efforts and tap into the expertise of the mining industry in other Western states. The forum was convened on April 9, 2019 at the Circus Circus Reno Hotel & Casino and focused on (1) identifying AML projects without appreciable water issues and (2) delineating liability relief mechanisms and administrative remedies currently available under existing law. This event was presented by the Mining and Metallurgical Society of America, Trout Unlimited, the Colorado School of Mines and the University of Nevada Reno College of Science (including the Mackay School). MMSA and its partners

were able to garner additional support and expand the overall diversity of participants as summarized in Appendix C.

SUMMIT PURPOSE

Discuss and promote the passage of necessary liability protection from applicable environmental laws that advance closure and remediation of identified pilot/demonstration projects.

SUMMIT OUTCOME

Increase the diverse coalition of stakeholders working to advance pilot/demonstration projects through Good Samaritan legislation and on-the-ground efforts to improve Abandoned Mine Lands.

The conference was attended by 109 individuals representing a broad spectrum of stakeholders with interest and expertise in AML, including academia, state and federal government agencies, industry organizations, technical and policy consultants, legal counsel, conservation groups and congressional staff. Figure 1 below illustrates the composition of attendees by general affiliation; a complete list of participants is provided in Appendix C.

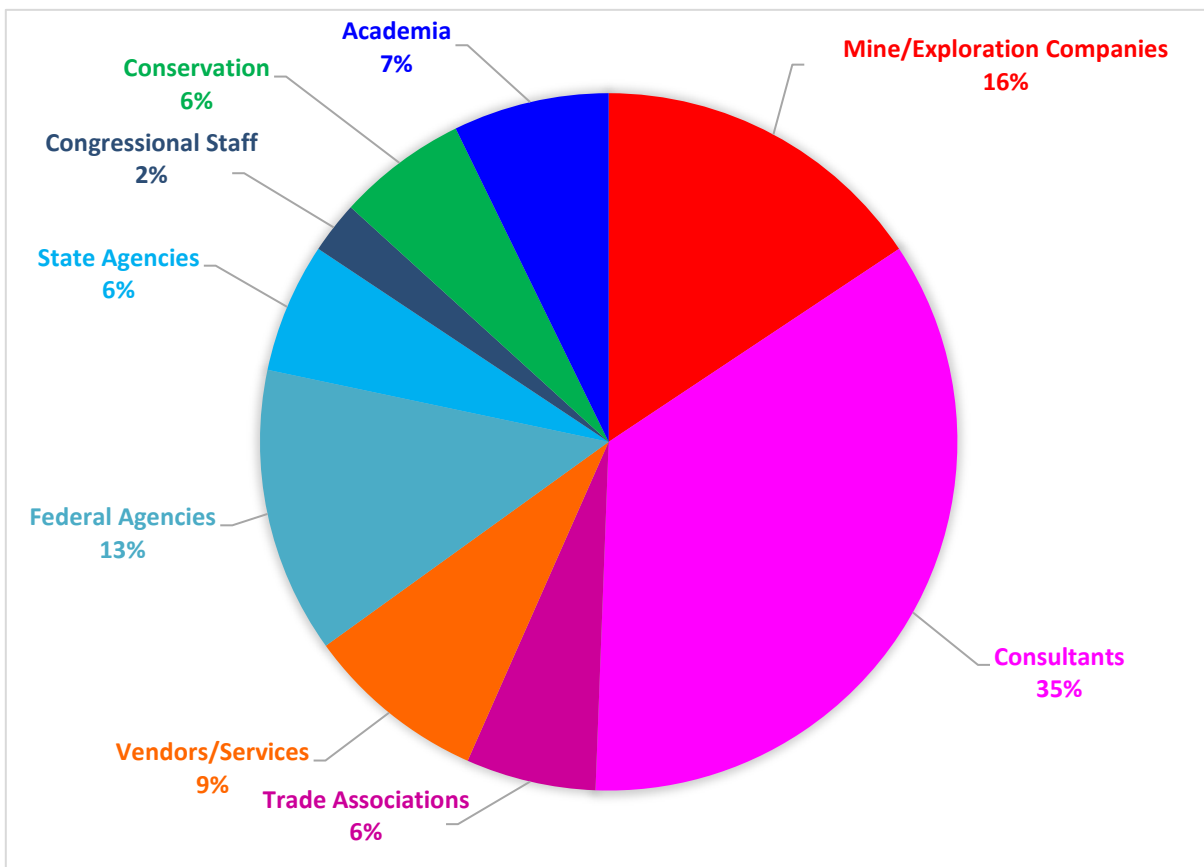


Figure 1: Participating Stakeholders by Affiliation

Three sessions provided the delegates with a high-level overview of the technical, legal, social and political issues surrounding Abandoned Mine Lands, driving discussions throughout the day. An

afternoon breakout session brought delegates together in five teams to discuss and offer recommendations on key topics to help drive the “next steps” and topics for the organizers and growing coalition to consider for future Summits.

Common themes discussed throughout the day included (1) the importance of bringing in the proper expertise, (2) having fully vetted and agreed-to work plans, (3) not letting *perfect be the enemy of the good* by focusing on measurable improvements, and (4) allowing for collaborative stakeholder processes to advance more AML work on the ground.

Highlights from each presentation are provided below, with a more comprehensive summary provided in the subsequent sections and appendices. This report, all available presentations and accompanying documents are available on the MMSA AML Summit Web page.

KEYNOTE SESSION

The Keynote Session, chaired by **Mark Compton** of the American Exploration and Mining Association (AEMA) provided the delegation with a high-level overview of the scope and nature of the Abandoned Mine Lands challenge in the United States. Speakers provided status updates on Good Samaritan legislation efforts, discussed available administrative remedies under existing regulatory frameworks, and reported on the progress that has been made to date on Abandoned Mine Lands from the perspectives of the minerals industry and multiple federal agencies.

- ◆ **Mark Compton**, Executive Director of the American Exploration and Mining Association, provided a brief overview of the trade association’s role in developing and advocating for Good Samaritan Legislation for over 25 years. He emphasized the only way to get Good Samaritan Legislation “across the finish line” is through bi-partisan efforts that require constructive engagement with diverse groups interested in this subject. He stressed that although the industry of today had nothing to do with creating these legacy issues, they have long been and continue to be interested in being part of the solution.
- ◆ **Debra Struhsacker**, Environmental Permitting & Government Relations Consultant, provided a high-level overview of the Abandoned Mine Land clean-up challenge touching upon the different types of AML sites that exist on the landscape and the range of technical responses that are required. She provided her perspectives on what Good Samaritan legislation in general should achieve to provide liability protection for voluntary cleanups. She then provided more specific suggestions for S. 3727, the bill that Senator Cory Gardner (R-CO) and Representative Scott Tipton (R-CO) introduced in the 115th Congress.
- ◆ **Shahid Mahmud**, Team Leader of the National Mining Team of the Environmental Protection Agency (EPA), provided the agency’s perspectives on legacy mines and how a collaborative approach is needed to get more work done on the ground that will help “Mother Nature heal herself.” He referenced some state programs that are advancing AML cleanup and provided specific AML project examples. He discussed how the EPA has engaged with stakeholders aggressively over the last year to identify the hurdles and obstacles encountered with the existing administrative tools, including a plan to hold a “listening session” meeting in Denver on April 17th, 2019 to continue this important dialogue.

- ◆ **Gary Lawkowski**, Deputy Assistant Secretary for the Land and Minerals Management of the US Department of the Interior provided perspectives on Abandoned Mine Lands through the lens of the top priority of the current Administration which is to “create a conservation stewardship legacy second only to Teddy Roosevelt.” He provided an update on the AML inventory efforts of the BLM and then acknowledged the necessity of working together to make notable improvements on legacy sites, particularly in addressing public safety hazards which are often the easier problems to solve. However, due to the many laws and regulations the BLM must work through before any work can begin, things do not move quickly. He added the current Administration is working to make these processes more efficient and “user-friendly”, but this still takes time and money to accomplish, and the agency must still ensure that adequate measures are in place to prevent harm to visitors, employees and the environment.

MID-MORNING PANEL SESSION

This panel session and discussion was led by **Ann Carpenter** of SRK Consulting and Remote Energy Solutions. Seven panelists shared their insights on AML cleanup and then fielded audience questions. The following panelists provided high-level overviews of collaborative partnerships, remediation technologies, products, and field techniques used in AML cleanup.

- ◆ **James Gusek**, Senior Project Manager with Linkan Engineering, presented on what he calls a “pro-biotics” solution to Acid Rock Drainage (ARD). By properly addressing the role that bacteria play in the process, ARD kinetics can be slowed by three orders of magnitude. However, just killing the “bad bugs” results in only a short-term remedy. To eliminate perpetual ARD treatment, it is necessary to implement a three-part integrated strategy that: (1) decimates acid-loving bugs populations, (2) uses organic solutions (like waste milk) that allow the heterotrophic good bugs to out-compete the acid-loving bugs, and (3) establishes sustainable vegetative cover to keep good bugs happy for decades or longer.
- ◆ **Allen Biaggi**, Consultant to the Nevada Mining Association (NvMA), provided the Association’s perspectives regarding legacy sites in Nevada and the necessary inclusion of the mining industry to provide its expertise and knowledge of what works and doesn’t work on the ground. NvMA and its member companies want to be an active partner on Nevada AML cleanup opportunities, provided the appropriate liability protection mechanisms are in place. He stressed the importance of collaboration between industry, agencies, non-profit organizations and tribal communities, and provided examples in Nevada on how current obstacles might be removed or creatively worked around.
- ◆ **Carrie Monohan**, Program Director with The Sierra Fund (TSF), shared how the non-profit developed a comprehensive strategy to address the impacts of the California Gold Rush in the Sierra Nevada. After reviewing an overwhelming database of 47,000 physical and chemical hazards resulting from historic mining in California, TSF defined a more manageable strategic scope focusing only on hydraulic mining and mercury contamination. Using best available science, they developed a conceptual model on how mercury moves through the watersheds of the Sierras from which they developed a regional strategy that guides their work with numerous agencies and communities impacted by mercury contamination.
- ◆ **Rob Ghiglieri**, Chief with the Abandoned Mine Lands Program of the Nevada Division of Minerals (NDOM), provided an overview of the agency’s efforts on AML. The Division of

Minerals was legislatively mandated in 1987 to focus on physical AML hazards and public safety. He described the agency's AML inventory and site prioritization methodology, and reported that inventory efforts are approaching 50% completion. He shared examples of AML projects completed in Nevada, emphasizing the importance of using other agencies and organizations that can bring in funds and other resources to get work done in the field.

- ◆ **Paul Jones** presented for **Jeff Graves**, Program Director of the Inactive Mine Reclamation Program of the Colorado Division of Reclamation, Mining and Safety, providing a summary and update of how Colorado approaches AML cleanup projects. He provided examples of what works with regard to liability protections and project implementation, what doesn't work well on the ground, and future challenges and obstacles that must be overcome to advance AML cleanups from the agency's perspective.
- ◆ **Jeryl Gardner**, Supervisor Professional Engineer with the Abandoned Mine Lands Branch of the Nevada Department of Environmental Protection (NDEP), provided an overview of the agency's program. He discussed the range of partnerships they use on AML that includes NDOM, federal land managers, communities, local agencies and other stakeholders. He provided a status update on the Division's AML inventory and shared examples of the different technologies the State has or will use on projects in Nevada.
- ◆ **Ron Breitmeyer**, Assistant Professor of Geological Engineering with the University of Nevada Reno, provided a summary of past and ongoing research undertaken at two AML sites in Nevada. He touched upon specific techniques and methodologies being developed on these sites that could be utilized by the broader AML community. These include 1) correlating remote sensing data with chemical testing in the field, 2) using high-resolution digital terrain modeling to quantify surface water erosion and soil loss, and 3) generating post-burn hydrology to understand landscape-level changes at AML sites.

EARLY AFTERNOON PANEL SESSION

This session was led by **Jeff Parshley** of SRK Consulting and included discussions by six panelists sharing their insights on key metrics needed for successful AML cleanup. The following panelists discussed their perspectives on site characterization, measuring results for release, possible release mechanisms and building collaborative partnerships.

- ◆ **Carolyn McIntosh**, a Partner at Squire Patton Boggs, provided insights to frame the discussion on identifying suitable AML sites by presenting possible ways to navigate through and around the liability issues derived from the Clean Water Act (CWA) and CERCLA. After providing an overview of the definitions and citizen lawsuit provisions of each statute, she discussed the mechanisms by which Good Samaritans may be granted liability relief within the two existing legal frameworks. CERCLA liability mechanisms discussed included bona fide prospective purchaser protections, comfort letters, Administrative Orders on Consent (AOCs), and Good Samaritan settlement agreements. CWA liability relief mechanisms are covered in the 2007 and 2012 Guidance documents adopted by the EPA.
- ◆ **Carrie Monohan**, Program Director with The Sierra Fund (TSF), discussed the non-profit organization's efforts to develop informational materials on due diligence "best practices" to educate conservation organizations and private land trusts so they could make more informed land acquisition choices. This effort was necessary as many of these lands are

eventually transferred to the public trust to be managed by cities, counties, the State of California or federal land managers. She provided examples where parties were misinformed by flawed sampling and/or consultants without the proper expertise to do site characterization, resulting in clients grossly overpaying for contaminated property.

- ◆ **Jason Willis**, Colorado AML Program Director with Trout Unlimited (TU), described the organization’s role in mine reclamation work. Their principle focus is on improving watersheds that exceed State water quality standards by addressing non-point source facilities. TU is part of the mixed ownership group working on AML sites in Colorado, filling a non-profit, non-governmental organization (NGO) role. TU brings alternative sources of funding to projects (private partnerships), flexibility in contracting, engineering experience to assist in project development, and collaborative relationship building.
- ◆ **Ron Cohen**, Professor Emeritus, of the Colorado School of Mines provided an overview of his many decades in AML and mine reclamation work. He proposed a formulation of eleven key elements that enhance the chances of success in managing mine waste mitigation and abandoned mine remediation through stakeholders–driven projects. He emphasized the importance of having specialists with the proper expertise and knowledge involved to prepare sampling plans, design and construct treatment systems and monitoring. He discussed successful projects that included all the elements, as well as those that failed because one or more of these key components was missing.
- ◆ **Opal Adams** spoke on behalf of **Jim Collord**, CEO of Thunder Mountain Gold who was absent due to scheduling conflicts. She provided a historical overview of the development in the Thunder Mountain Mining District in central Idaho and the mine reclamation that was completed in the 1990s. She then told the story of two mining companies (Thunder Mountain Gold and Dewey Mining) that worked collaboratively with The Trust for Public Land and the U.S. Forest Service to bring these legacy lands that had been cherry-stemmed out of a Wilderness boundary back into the public trust. This case study serves as an example of how to complete reclamation while still preserving the interpretative and mining heritage value of an area for future generations.
- ◆ **Doug Young**, Affiliate of the Keystone Policy Center, provided his insights on Good Samaritan legislation based on his experience in this arena since the mid-90s, including working on six different versions of legislation with Mark Udall. He began with the sentiment that improving watersheds and dealing with safety problems at these sites should be a “cake walk” and then provided his assessment of why there has been such a protracted stalemate. After raising some provocative questions, he offered that the best path forward is to “jettison all the baggage” of these past legislative efforts. He stressed the need to “keep the fires burning” by making the case to Congress that a new statute (that doesn’t try to do too much) is needed and that conferences such as these will help us engage more champions to advance this message.
- ◆ **David Ellerbroek**, Executive Director with the Western Alliance for Restoration Management had to cancel due to scheduling a conflict.

AFTERNOON BREAKOUT SESSION

The afternoon breakout session was moderated by **Ann Carpenter, Jeff Parshley** and **Dayan Anderson**. Delegates were broken into five breakout groups and were asked to achieve the following four outcomes:

1. Outline site characterization criteria, release metrics, and liability release vehicles.
2. Create a list of potential candidate pilot/demonstration sites and rank them.
3. Draft a working list of partnerships and collaborations working on AML.
4. Identify new organizations to invite to the coalition.

Lively interactions within each of the group discussions and during the breakout summary presentations resulted in a breadth of ideas, useful suggestions and common themes. The output from this session is summarized in Section 2.4 and Appendix A of this report.

NEXT STEPS

During both the formal and informal discussions throughout the day, there was an overwhelming sentiment that both the 2018 and 2019 MMSA AML Summits were very useful and informative. More importantly, it was acknowledged that these forums allowed for some “much-needed” open and constructive dialogues between all stakeholders, especially those that had never sat at the same table at the same time before. Furthermore, it was widely recognized that although some work has been successfully completed within the existing regulatory frameworks, there is still a profound need to recruit more “champions” that will take the following message to Congress: *so much more* could be done on-the-ground with Good Samaritan legislation in place to protect those willing and able to improve the landscape to the benefit of wildlife, communities and the general public.

Feedback collected from a post-summit survey recommended these forums continue with suggestions on how to recruit more champions and organizations into the coalition including renewable energy companies, water purveyors, industrial recyclers, cattlemen’s associations, and various downstream users of metals and minerals (e.g., electronics sector, auto industry, agriculture, etc.). It was also recommended that “working groups” be assigned to tackle specific issues and tasks before the next Summit.

2.0 EVENT SYNOPSIS

The Spring 2019 Summit, *Advancing Abandoned Mine Land Cleanup ... With or Without Good Samaritan Legislation*, was held on April 9, 2019 at the Circus Circus Hotel in Reno, Nevada. The event was sponsored by the Mining and Metallurgical Society of America, Trout Unlimited, Colorado School of Mines and the University of Nevada Reno.

SUMMIT PURPOSE

Discuss and promote the passage of necessary liability protection from applicable environmental laws that advance closure and remediation of the identified pilot/demonstration projects.

SUMMIT OUTCOME

Increase the diverse coalition of stakeholders working to advance pilot/demonstration project-focused Good Samaritan legislation and on-the-ground efforts to improve Abandoned Mine Lands.

The conference was attended by 109 individuals representing a broad diversity of stakeholders with interest and expertise in addressing legacy mines, including academia, state and federal government agencies, industry organizations, technical and policy consultants, legal counsel, conservation groups and congressional staff.

Three sessions provided the delegates with an excellent high-level overview of the technical, legal, social and political issues surrounding Abandoned Mine Lands, driving discussions throughout the day. An afternoon breakout session brought delegates together in five teams to discuss and offer recommendations on key topics to help drive the “next steps” for the organizers and growing coalition to consider for future Summits.

Common themes discussed throughout the day included a) the importance of bringing in the proper expertise, b) having fully vetted and agreed-to work plans, c) not letting *perfect be the enemy of the good* by focusing on measurable improvements, and d) allowing for collaborative processes with a diverse web of stakeholders all working to advance AML work on the ground. It was acknowledged that some of this work can continue to be done on some sites within existing legal frameworks, but a growing coalition of champions are still needed to communicate to Congress that *much more* could be accomplished with the passage of Good Samaritan legislation that would protect those willing and able to improve these landscapes to the benefit of wildlife and communities.

This document is a compilation of the information and ideas exchanged during the Summit. It includes abridged summaries of each presentation and a record of the audience questions and discussions, as summarized from the slide presentations and notes taken by MMSA representatives and SRK staff. The document was subsequently reviewed by the conference organizers and speakers. This report, the individual speaker presentations and other accompanying documents are available on the MMSA AML Summit Web page.

2.1 KEYNOTE SESSION

WELCOMING REMARKS

Susan Wager, MMSA AML Summit Committee Chair, welcomed the participants on behalf of MMSA and the Summit co-sponsors. She then provided a brief history of MMSA and the evolution of the current Summit:

MMSA is a non-profit association of professionals whose members represent all facets of mining and metallurgical interests, both domestic and globally. The MMSA was established in 1908 which makes this year our 111th anniversary. The Society concerns itself with the fundamental issues facing the industry such as legislation, economics, education, environment, labor relations, and health and safety. The MMSA is not a technical society, however its membership includes many of the industry's best-known engineers and executives who have testified before Congress and have provided advice to federal agencies.

A principle objective of the Society is to foster helpful cooperation with and between other organizations. In March of 2016, the MMSA formed a committee that recognized the need and opportunity to facilitate constructive dialogues on the important topic of Abandoned Mine Lands which led to the AML Summit held last spring at the Colorado School of Mines and of course, to the program here today in Reno, Nevada.

After recognizing members of the organizing committee and the speakers for their time and efforts, Ms. Wager introduced Mark Compton, moderator of the keynote session.

SESSION MODERATOR

Mark Compton

SESSION OBJECTIVE

Provide status updates on Good Samaritan legislation, administrative remedies and overall progress on AML since the Spring 2018 Summit.

Mr. Compton, Executive Director of the American Exploration and Mining Association (AEMA), provided a brief overview of AEMA's role over the past 25 years with regard to developing and advocating for Good Samaritan legislation, including recent work with Senator Gardner, Representative Tipton and others such as the organizers of these MMSA AML Summits. He asserted that to be successful with Good Sam cleanups and particularly with getting Good Sam legislation "across the finish line," the efforts must be bi-partisan, particularly in the current political environment. He added there is no reason it shouldn't be because this is not a partisan issue. He pointed out that industry wants to see these legacy sites cleaned up first and foremost because it is the right thing to do. Secondly, even though today's industry had nothing to do with creating these legacy issues, some mining watchdog groups use these historic sites to foment opposition to new mine projects. Mr. Compton said that "this is not your grandfather's mining industry, heck it's not even your father's industry." The industry of today is technologically advanced and regulated by a comprehensive suite of environmental regulations, including financial assurance regulations which ensure no new abandoned mine lands are created. Before introducing the keynote speakers, he concluded by saying "AML are a finite problem, we just need to come together to find a solution."

A synopsis of each keynote presentation is provided below. Slide presentations from this session, if available, can be found on the MMSA website. Audience questions and keynote discussions are summarized in Appendix C.

ABANDONED MINE LAND CLEANUP OVERVIEW, GOOD SAMARITAN LEGISLATIVE OBJECTIVES, SUGGESTIONS FOR THE GARDNER-TIPTON BILL

Debra Struhsacker – Environmental Permitting & Government Relations Consultant

Ms. Struhsacker began with a slide illustrating what she called “the universe of the AML problem” using data generated by the Mineral Policy Center (Figure 2). The non-profit organization identified four categories of AML sites and provided examples of the respective response measures needed for each class of AML site. She then pointed out that the principle focus of Good Samaritan/AML legislative proposals has been primarily on the complicated environmental problems which present the greatest threats to wildlife, but represent only 3% of the AML problem according to these data. With this mind, Ms. Struhsacker raised a few questions for the delegation to consider: (1) have we properly prioritized the AML initiatives that many in the room have been working on for over two decades, and (2) would focusing on the sites with safety hazards or simpler environmental problems that represent the lion’s share of the AML issue help us forge a path forward for future cleanups of sites with the more challenging environmental problems?

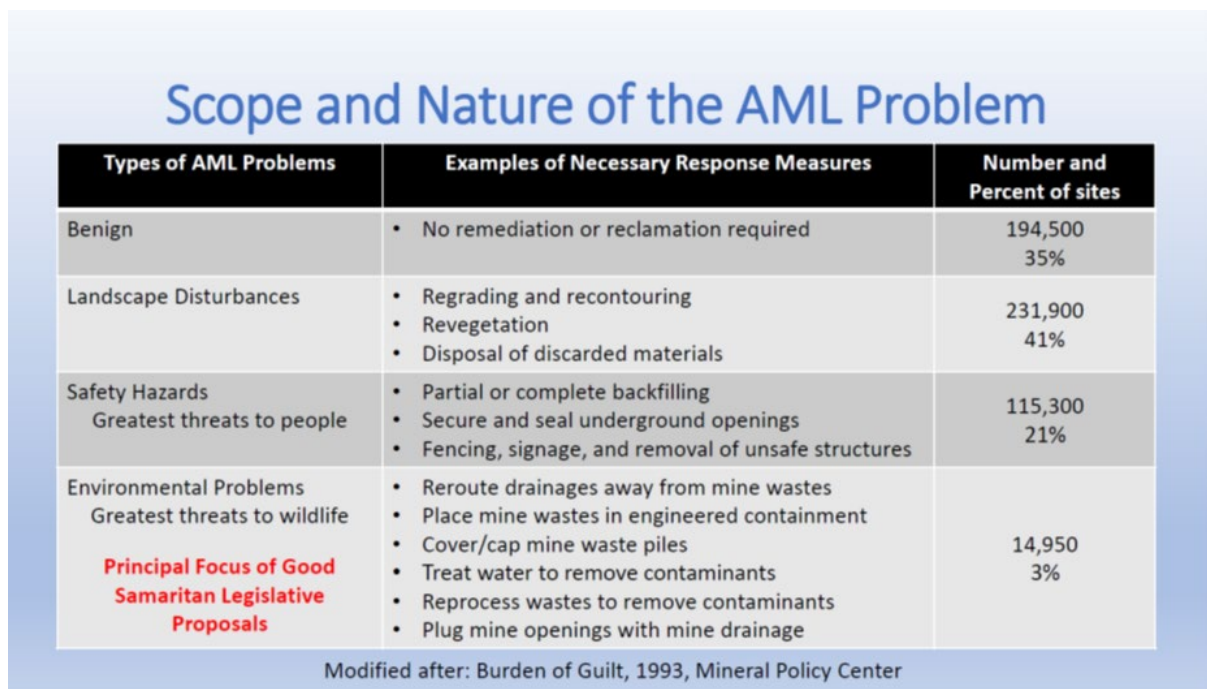


Figure 2: Scope and Nature of AML Problem

After a brief discussion on the role that Clean Water Act and CERCLA liability have played in preventing significant progress on AML cleanups, Ms. Struhsacker shared her perspectives on what Good Samaritan legislation should achieve. She identified the following key objectives and program elements:

- ◆ Facilitate environmental improvement and safety hazards abatement.

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- ◆ Provide CWA and CERCLA liability protection for sites with surface water or groundwater contamination.
- ◆ Develop straightforward and efficient AML project permitting processes by minimizing protracted and complex regulatory review processes.
- ◆ Allow a broad array of stakeholders to qualify as Good Samaritans (“Good Sams”) including public and private-sector participants (including mining companies) with no previous site involvement.
- ◆ Create AML site investigation permits with liability protection that promotes data collection to characterize environmental conditions, determine feasibility of AML cleanup, and develop a remediation work plan.
- ◆ AML site investigation permits should not create a cleanup obligation (She noted the Tipton bill does not currently include this). If a Good Sam recognizes they have “bitten off more than they can chew”, they should be allowed to pass on the data and analyses to agencies and/or other Good Sams.
- ◆ Do not let pursuit of the perfect be the enemy of good. Accept and encourage partial site cleanups that improve the environment. Incremental environmental gains are preferable to maintaining the *status quo* of doing nothing. (Simply put, some cleanup is better than no cleanup).
- ◆ Public-and private-sector Good Samaritans must not be subject to strict regulatory cleanup levels applicable to site operators and Potentially Responsible Parties (PRPs).
- ◆ Cleanup plans must reflect site conditions – there are no site remediation blueprints. Determine environmental improvement objectives on a site-specific basis and authorize a wide range of activities to improve sites.
- ◆ Encourage constructive public involvement and collaboration.

Ms. Struhsacker stressed the need to evaluate the feasibility of using existing regulations to advance Good Sam work and posed two more questions of the audience. First of all, is Good Sam legislation needed for us to address the majority of AML sites in the United States? Secondly, could agencies instead use existing or modified regulations to authorize some Good Sam AML Cleanups?

Ms. Struhsacker reiterated that some environmental problems have straightforward remediation solutions and may not need complex liability relief. For example, there are sites where passive water treatment could improve water quality; some sites with dust hazards could be remediated with covers or caps; and there are some sites where rerouting drainages or covering/relocating wastes could reduce erosion. Environmental problems in arid settings are typically easier to address than sites with water issues and may not require comprehensive liability relief, as there is limited or no Acid Mine Drainage (AMD). We need to identify the regulatory barriers that currently thwart safety hazards abatement or environmental remediation of less complex sites.

Finally, she provided suggestions for the Gardner-Tipton Good Sam Bill that, in her opinion, is currently focused too much on only the *complex* portion of the “AML universe” that involves AMD and water contamination issues. Instead, she recommended the following modifications:

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- ◆ Simplify bureaucratic permitting process to attract more Good Sams.
- ◆ Facilitate more involvement of local communities, stakeholder groups and public-private partnerships.
- ◆ Allow for streamlined process for simpler sites with limited water issues instead of focusing on just AMD water issues.
- ◆ Increase the number of allowable pilot projects (allow 15 for each western hardrock mining state to broaden constituency).
- ◆ Make the number of projects a “rolling number” (if three get done in a State, they can add three more).
- ◆ Lengthen the primary term of the pilot project program to 10-15 years and require progress reports to Congress and Governors every 5 years.
- ◆ Evaluate whether a financial assurance requirement is realistic for all entities and sites; consider potential of using construction-style performance bonds for simpler projects.

In her closing remarks, Ms. Struhsacker emphasized that a strong domestic mining industry can play an important role in AML cleanups with its vast experience in reclamation across the country. She noted however that a Mining Law Bill expected to be introduced by Chairman Grijalva (D-AZ) in May, if passed, would reduce the mining industry’s ability to participate in AML cleanups.

ENVIRONMENTAL PROTECTION AGENCY PERSPECTIVES ON AML PROGRESS

Shahid Mahmud – Team Leader, National Mining Team U.S. Environmental Protection Agency

Mr. Mahmud opened by sharing that the EPA found last year’s Summit very instructive and informative, and judging by the turnout, he expects this Summit will be another great opportunity to continue learning and adjusting. He added that with no single authoritative inventory in the United States and no overarching umbrella to address the magnitude and scope of the problem that Ms. Struhsacker just described, the agency believes the key to making progress is by working collaboratively. He stressed the roles that industry, federal and state agencies, private landowners, academia, watershed groups and conservation groups all play and that a “collaborative approach of helping Mother Nature heal herself” is needed.

Mr. Mahmud referenced work that has been done by coal states such as Pennsylvania, that has its own Good Sam legislation, and western states like Colorado and Montana that have begun to address metal mining AML legacy sites by working collaboratively with watershed coalitions and conservation organizations.

Next, he called attention to the 2007 and the 2012 EPA guidance documents that describe the administrative tools that were developed to address liability concerns of volunteer organizations. Unfortunately, to date only half a dozen projects have moved forward using these existing tools. However, the current administration is passionate about making more progress on AML and identifying what the hurdles and obstacles are, and what potential solutions the agency can offer *within existing laws*.

Over the last year the agency has been meeting with stakeholders like NMA, AEMA, TU, the Interstate Mining Compact and mining companies. This engagement will continue during an upcoming meeting and “listening session” scheduled in Denver on April 17th, 2019, where the agency will challenge participants to think creatively on how to advance these projects with collaborative partnerships. Attendees will include: AEMA, Trout Unlimited, BLM, USFS, Pennsylvania, Office of Surface Mining Reclamation & Enforcement (OSMRE,USDO) and Montana. There will be a call-in option for those not able to attend. Mr. Mahmud stressed that the EPA wants to advance dry projects and build a dataset of what has been successful on the ground. He added that success does not mean we must always achieve clean water act (CWA) standards. However, success should illustrate improvements and a path forward that works with a diverse coalition of Good Samaritans. Furthermore, although the EPA’s focus is on advancing cleanup on dirt projects, the agency realizes that CWA liabilities are a big concern and will therefore be dedicating time during the conference call to talk about these liability concerns.

Mr. Mahmud then provided examples of a few of the projects that have progressed in some fashion under existing laws and using administrative tools currently available:

- ◆ The Black Swan Project in Colorado was moving dirt (14,000 cy of tailings excavated and disposed of offsite). The project led by the Boulder Coalition was funded by money from 2017, and the EPA didn’t require financial assurance for that project, so there are tools to advance the initiatives.
- ◆ One project that just received final signatures, is the Corona Twin Peaks in California where they are “touching water.” The plan is to introduce chemicals to the water to improve water

quality. The Napa County Water Board passed a resolution to call it a “pilot” site to check out different methods of treatment to achieve better environmental results. Work on this project started back in 2012, and the coalition came to EPA recently to use the liability shield to conduct this work toward making the water quality better. EPA, as part of the coalition, are looking at what can do to achieve better results.

FEDERAL LAND MANAGEMENT PERSPECTIVES ON AML PROGRESS

Gary Lawkowski – Deputy Assistant Secretary, Land and Minerals Management of the US Department of the Interior

Mr. Lawkowski opened with a reference to the 10 priorities of the Department of the Interior listed on the agency website that began with Secretary Zinke and continue with then acting Secretary Bernhardt (Figure 3). He added that the agency is looking for ways to preserve the environment for future generations and is committed to finding a workable Good Samaritan approach through the lens of its top priority which is creating “a conservation stewardship legacy second only to Teddy Roosevelt.” Mr. Lawkowski said that “mining is a big part of America’s history and a big part of the American identity, therefore it is no surprise there are a lot of mine sites on our public lands.” He added that 10% of the surface of the United States is managed by the BLM, predominately in the West with over 60% of the State of Nevada belonging to the public.

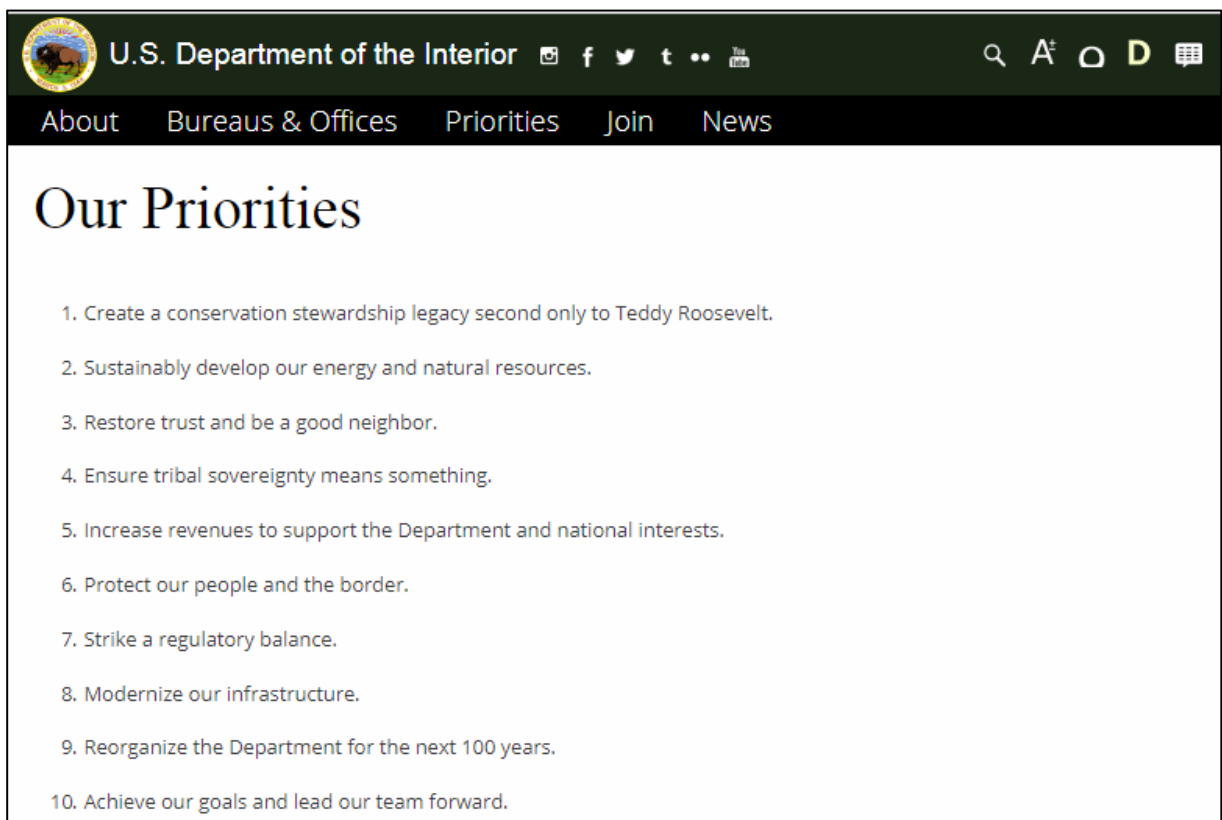


Figure 3: Priorities of the U.S. Department of the Interior (Source: US DOI website)

He next provided a progress update on the BLM's AML inventory. In January of 2017 approximately 52,000 abandoned mine sites and over 97,000 mine features were identified. Now, as of March 2019 that tally has grown to over 56,000 sites and 103,000 features. He added that with such a large footprint, federal land management agencies have a large stake in how to address the problems related to abandoned mine lands. He shared that at the beginning of the Trump Administration, the BLM had addressed about 20% of the identified mine features, and today they are closer to reaching 30%. He added this still leaves a large number of sites and features needing some form of remediation and that this is where partnerships with states, private parties and Good Samaritan organizations become most valuable. Mr. Lawkowski said, "If we can find ways to work together voluntarily to improve the landscape without having to ask the American taxpayer for more funds, without having to ask companies to pay to correct past harm that they didn't cause and aren't connected to, that's all the better. That is a great way for us to be able to move forward to try and address some of these things."

Mr. Lawkowski provided some context concerning the challenges that federal land management agencies face in terms of the number of federal laws and regulations each agency must get through before they can take action such as the National Environmental Protection Act (NEPA), the Historic Preservation Act and the Endangered Species Act. He acknowledged these processes seldom move as quickly as everyone would like. He added that a priority of the current Administration is to find ways to make these processes more efficient and "user friendly", such as through NEPA streamlining, so it doesn't take 20 years to complete simple projects. "These hurdles aren't insurmountable", he said, "but they do add time and cost to how we go through and how we try to address some of these problems."

Mr. Lawkowski raised the general concern that these processes must still ensure sites are not worse off than when we started and that the American public is not "left holding the bag" of a deteriorating situation. Furthermore, agencies like the BLM still need the ability to ensure any work done on AML sites will have adequate safety measures in place to prevent harm to visitors, employees and the environment. He reiterated that Public Safety is one of the biggest challenges the BLM currently faces and that fortunately it is a challenge they have the authority and ability to address right now without getting into the other liability issues. Partnerships are key to getting work completed on the ground.

In closing, Mr. Lawkowski said he could not comment on any of the specific legislative proposals out there, but reiterated that from the BLM perspective, they will work with whatever framework Congress provides to "promote public safety and promote a conservation legacy second only to Teddy Roosevelt."

2.2 MID-MORNING PANEL SESSION

SESSION MODERATOR

Ann Carpenter of SRK Consulting and Remote Energy Solutions

SESSION OBJECTIVE

Share stakeholder insights on AML cleanup - What works, what doesn't work, and greatest challenges faced today.

Seven panelists representing a broad spectrum of perspectives provided high-level overviews of remediation technologies and field techniques used in AML cleanup. Numerous examples of the role that collaboration plays in getting work done on-the-ground were also shared. A synopsis of each panelist's presentation is provided below. Slide presentations from this session, if available, can be found on the MMSA website. The Q&A portion of the session is summarized in Appendix C.

Ms. Carpenter introduced the session by recollecting the tenor of last year's Summit, and that one thing that came out loud and clear was *don't let perfect be the enemy of improvement* which was echoed again this morning. She added that the common goal we share is to make some improvements, and as Mr. Mahmud said, to allow Mother Nature to take over. She then noted another interesting theme from the morning session was the strength of partnerships, such as the example in California where a local agency (water board) played a role in "identifying a fix" to the liability relief mechanism problem.

A PATHWAY TO WALK-AWAY? 30 YEAR OLD TECHNOLOGY TO SUPPRESS ACID ROCK DRAINAGE REVISITED

Jim Gusek, P.E. – Senior Project Manager, Linkan Engineering

Mr. Gusek, making his presentation remotely, opened the session with a presentation on "probiotics treatment" for acid rock drainage (ARD). He began with an analogy that "the mining industry suffers from a huge bacterial infection and *Acidithiobacillus ferrooxidans* is the main cause of geological disease." He added that "unless we think of a remedy for the patient, we are looking at perpetual treatment." Figure 4 from Mr. Gusek's presentation, illustrates the ARD tetrahedron, an outgrowth of the concept of the "combustion triangle" we all learned in grade school where combustion requires air, heat and fuel. Similarly, the generation of ARD requires four inputs: pyrite, an oxidizer (air, Fe⁺³), water, and the presence of bacteria. He noted that if you cut off one or more of these corners, the kinetics will slow down and the industry typically does so using techniques like installing caps, adding amendments or changing the pH. However, if you cut out the bacteria corner of the tetrahedron, the kinetics can slow by three orders of magnitude. He emphasized it is not enough to just kill the bad bugs, as this results in only short term ARD control. Instead, if good bacteria replace the bad organisms, a more sustainable solution is possible in what he likes to call the "probiotic pathway to walk away" from perpetual ARD treatment.

Mr. Gusek provided a brief historical review of ARD treatment technologies, noting that since the 1950s industry has known that microbial attacks on pyrite improve copper recovery. Research by the US Bureau of Mines in the 1980s found the application of common anionic surfactants (soaps) on two test sites killed these microbes reducing the production of acid and iron 60-95%. However, these effects were temporary as there will always be isolated portions of the microbe population that

survive to recolonize; therefore, it was necessary to apply the bactericides three times per year to control those population dynamics. The next round of research developed slow-release bactericides designed to keep the “bad bugs” in check long enough for revegetation to take hold on the surface of the waste piles. Once established, humic acids generated in the root zone of a revegetated site become a sustainable source of organic bactericides. He listed a variety of organic amendments that encourage heterotrophic microbes (the “good bacteria”) to take over such as composted sewage sludge, paper mill sludge, spent brewery grain, waste milk and dairy products. He also provided a list of seven case studies. Although most of these projects were in coal, Mr. Gusek called special attention to the California Gulch Superfund site in Colorado that used organic matter biosolids; the site is now a gold medal trout fishery.

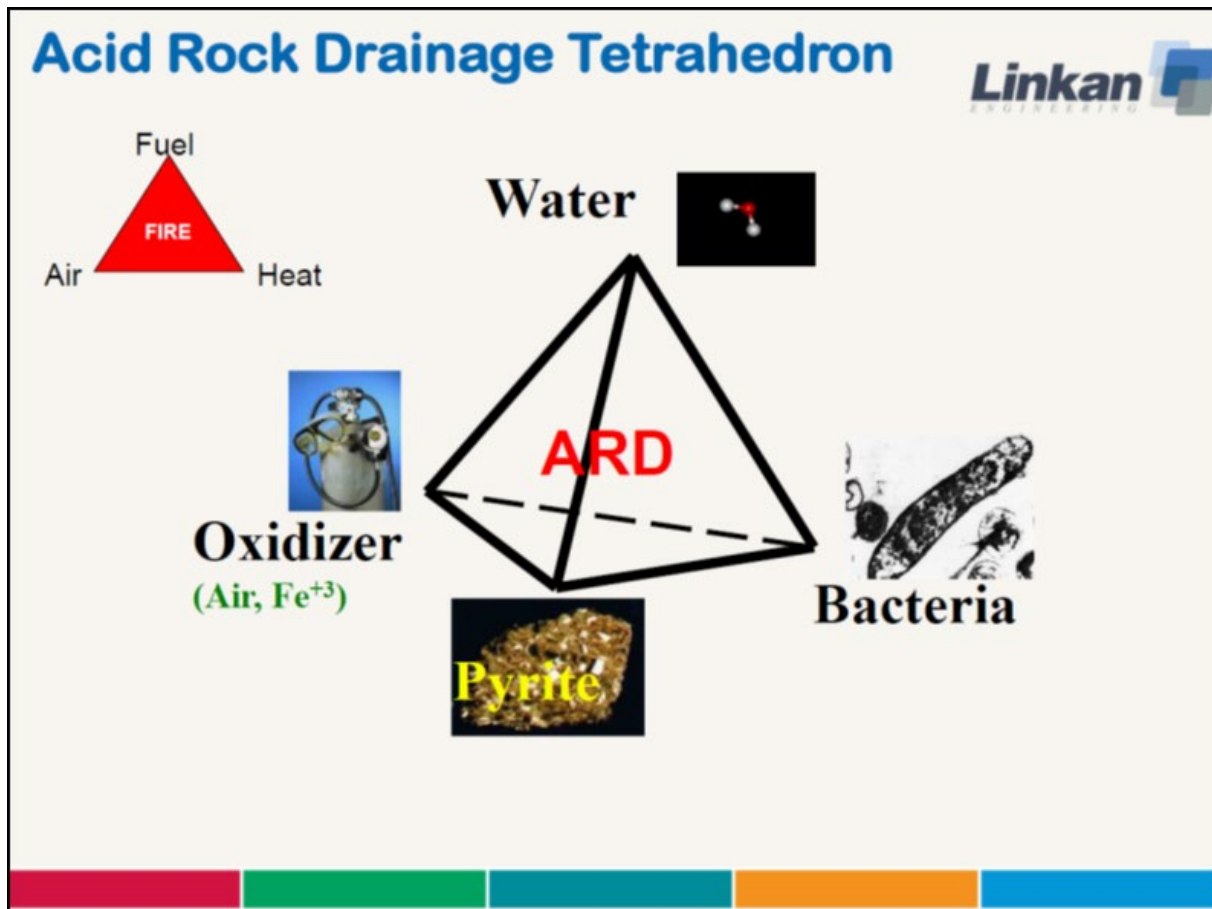


Figure 4: The Acid Rock Drainage Tetrahedron (J.Gusek, Linkan Engineering)

In summary, Mr. Gusek reiterated that an integrated ARD strategy is needed, often described with the acronym of DOS: **d**ecimate, **o**ut-compete and **s**ustain. More specifically, the strategy includes:

- ◆ Primary application of sodium lauryl sulfate (SLS) to *decimate* acid-loving bug populations.
- ◆ Application of waste milk or other organic (with inoculant) to make heterotrophic good bugs happy & *out-compete* acid-loving bugs.
- ◆ Establishing a vibrant and *sustainable* vegetative cover to keep good bugs happy for decades or longer.

INDUSTRY PERSPECTIVES ON ABANDONED MINE LANDS

Allen Biaggi – Consultant, Nevada Mining Association

Mr. Biaggi, consultant to the Nevada Mining Association (NvMA), discussed the trade group's perspectives and objectives regarding AML clean up in Nevada. Founded in 1913, he pointed out that the association is well aware of the need to address the 165 years of environmental mining legacy in the State. He reiterated statements made earlier in the day that the "Nevada mining industry of 2019 is NOT the industry it was for our fathers and grandfathers." However, he added that the industry is often "painted with the broad brush of those sins from the 1800s and early 1900s." He added that the "industry today stands ready, willing and able" to bring its resources and knowledge to the table to address this legacy, however the liability issues presented by CERCLA remain the biggest obstacle. As an example, he made reference to an unnamed site that had been mined since the 1940s. A new operator got involved but walked away from the project in 2000, leaving the State and Federal agencies "holding the bag" with significant and immediate water management problems. Other mining companies in Nevada quickly stepped up and volunteered to provide evaporation components and earth moving equipment. They were all ready to take action until the company lawyers put a stop to it because the liability exposure under CERCLA was simply too great. Over 20 years later, a problem that could have been solved relatively quickly with the industry's assistance remains a management challenge today (This unnamed site was later identified to be the Anaconda Site in Yerington Nevada by Mr. Jeryl Gardner who spoke later during the morning panel).

Allen stressed the importance of collaboration between industry, agencies, non-profit organizations and tribal communities. He followed with additional examples of how the member companies of NvMA want to partner on AML cleanup opportunities, and how some obstacles might be removed or creatively worked around.

- ◆ **Remining** – He touched briefly on how remining is a great way to address some AML problems. Companies are willing to take on liabilities at some historic sites provided there is an adequate resource present to justify such an operation.
- ◆ **Reclamation and Alternative Energy** – Last year the Nature Conservancy and the Nevada Mining Association approached the NDEP and Nevada State Environmental Commission with a proposed regulatory change focusing on renewable energy development at reclamation sites. It was well-received, passed with no opposition and is in the mining regulations today.
- ◆ **Supplemental Environmental Projects** – The NDEP has a program that applies universally across Nevada (not just the mining sector) which allows any party that has "run afoul of environmental regulations" to complete alternative projects in lieu of payment of a fine or financial penalty. As an example, an individual in northern Nevada that was facing a fine instead took his equipment south and filled in some large trenches that posed a public safety hazard in the Valley of Fire State Park.

HEADWATER MERCURY SOURCE REDUCTION STRATEGY: RESTORING ECOSYSTEM AND COMMUNITY RESILIENCY IN THE SIERRA NEVADA

Carrie Monohan, Ph.D. – Program Director, The Sierra Fund

Dr. Monohan introduced The Sierra Fund (TSF) who has been addressing the impacts of the California Gold Rush for over 10 years. When they first began, they were overwhelmed by the 47,000 physical and chemical hazards that had resulted from historic hydraulic and hard rock mining activity. By focusing only on the mercury impacts of hydraulic mining and a single contaminant of concern of mercury, they were able to develop a strategy with a more meaningful and manageable scope. Using the best available science on the fate and transport of mercury, they developed a conceptual model on how mercury moves, from which they developed four strategic targets for addressing mercury in the watersheds of the Sierras:

1. **Hydraulic Mines and Mine Features** – When TSF first started this work there was a misconception that little to no Mercury was discharging from the mine sources anymore as it had been presumed to have already all washed downstream. They soon learned that even trace amounts detected at the source can result in significant issues and health concerns further downstream.
2. **Mercury Contaminated Sediment in Reservoirs** – TSF also focuses on where the sediments accumulate which is typically in man-made reservoirs that require routine maintenance. It is in these reservoirs where trace levels of “particulate bound mercury” that may have been transported long distances from the non-point sources are deposited. By working with water purveyors, sediment that consumes valuable water storage capacity can be removed *before* the mercury moves downstream in a methylated form that bioaccumulates in the aquatic food chain.
3. **Mercury in Forest and Land Management** – By focusing on fuels reduction and forest health projects in the Sierras that invariably occur around historic hydraulic mine sites that are the original source of the mercury in the watershed, there is an opportunity to adopt practices (e.g. chipping, adding biochar, landscape recontouring, etc.) that result in multiple benefits on the landscape.
4. **Mercury Exposure** – Unlike other contaminants that present drinking water quality issues or general contact hazards, the primary exposure pathway with mercury is the fish consumption. As a result, providing communities that are consuming locally caught sport fish with the information they need to make healthy choices is a top action priority for the organization.

A technical advisory committee meets quarterly to review the regional four-part strategy in a living document that evolves as new information becomes available (Figure 5). For each target area, detailed action plans are developed that include tasks such as conducting inventories, validating the accuracy of the inventory (“ground-truthing”), assessing basic extent and degree of contamination with soil and water sampling, identifying the highest priority sites and features, and developing best management practice recommendations for future remediation work.

Next, Dr. Monohan touched upon TSF pilot projects that are improving the scientific and cultural knowledge base around mercury contamination and provided examples of how collaboration and economic recovery at abandoned mine sites can be leveraged for positive outcomes.

- ◆ At the Malakoff Diggins Humbug Creek hydraulic mine site that, now a beloved State Park, TSF measured the suspended sediment load by looking at “particulate bound mercury.”
- ◆ Using LiDAR data collected by the Tahoe National Forest for a large portion of the Sierras, TSF was able to develop an inventory of hydraulic mine sites from which they could prioritize sites for restoration using a comprehensive approach that would have a cumulative benefit. By adding overlays of fire severity indexes, sites for which ongoing forest health projects can be best leveraged are identified.
- ◆ At the Combie Reservoir Sediment and Mercury Removal project, in partnership with the Nevada Irrigation District, contaminated sediments are being removed and treated with a centrifuge to spin out liquid elemental mercury and recover gold; the clean gravel and aggregate tailings are also of commercial value.

For most of the communities in the Sierras, many of which have tribal fishing rights, fish caught in these impacted watersheds represent a significant portion of the regional diet and are often stored as a food source for the remainder of the year. The TSF publishes fish advisories, followed by surveys to validate the effectiveness of their communication campaigns.

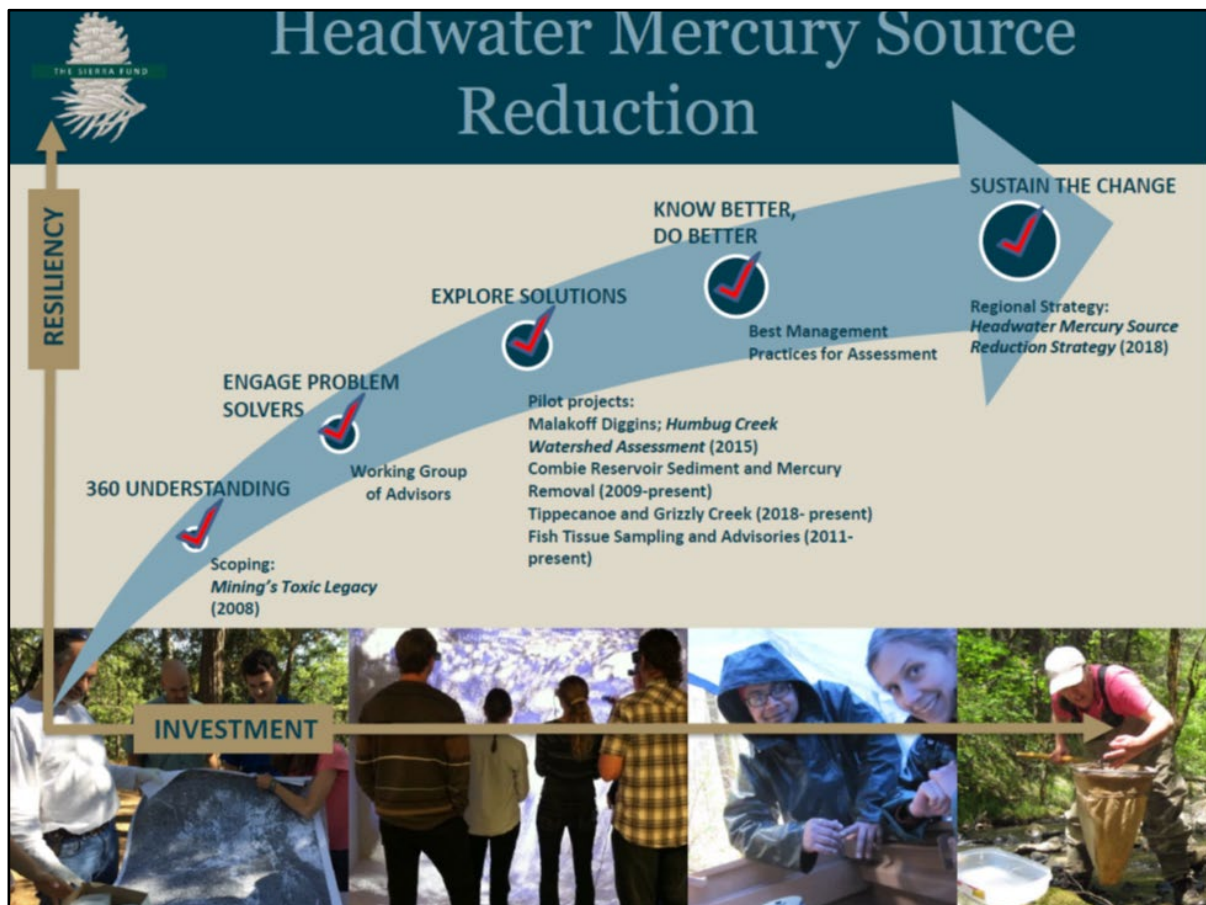


Figure 5: Headwater Mercury Source Reduction Strategy (C. Monohan, The Sierra Fund)

NEVADA DIVISION OF MINERALS AML PROGRAM: ADVANCING ABANDONED MINE CLEANUP

Rob Ghiglieri – Chief, Abandoned Mine Lands Program of the Nevada Division of Minerals

Mr. Ghiglieri provided a summary of the Nevada Division of Minerals (NDOM) efforts on abandoned mine lands. Created by the State Legislature in 1987 as a result of injuries and deaths associated with abandoned mines in the state, the program focuses solely on physical hazards and public safety. The program is funded by a portion of all federal land mining claims fees that are collected by the county. Inventory efforts in the state are estimated to be less than 50% complete, with 22,601 physical safety hazards currently identified, and 85,671 non-hazardous historic mining features catalogued.

Each year the agency prioritizes their work by ranking all 2000 USGS Topo Quads in the State using the criteria summarized in Figure 6. Where possible, the agency uses LiDAR and drone technology to assist in identifying new hazards and closure project planning. Mr. Ghiglieri discussed the importance of having proper quality control measures in place to maintain a functional database with the ability to adapt to future needs. He added that Nevada currently hosts the physical hazards database that is shared with federal agencies.

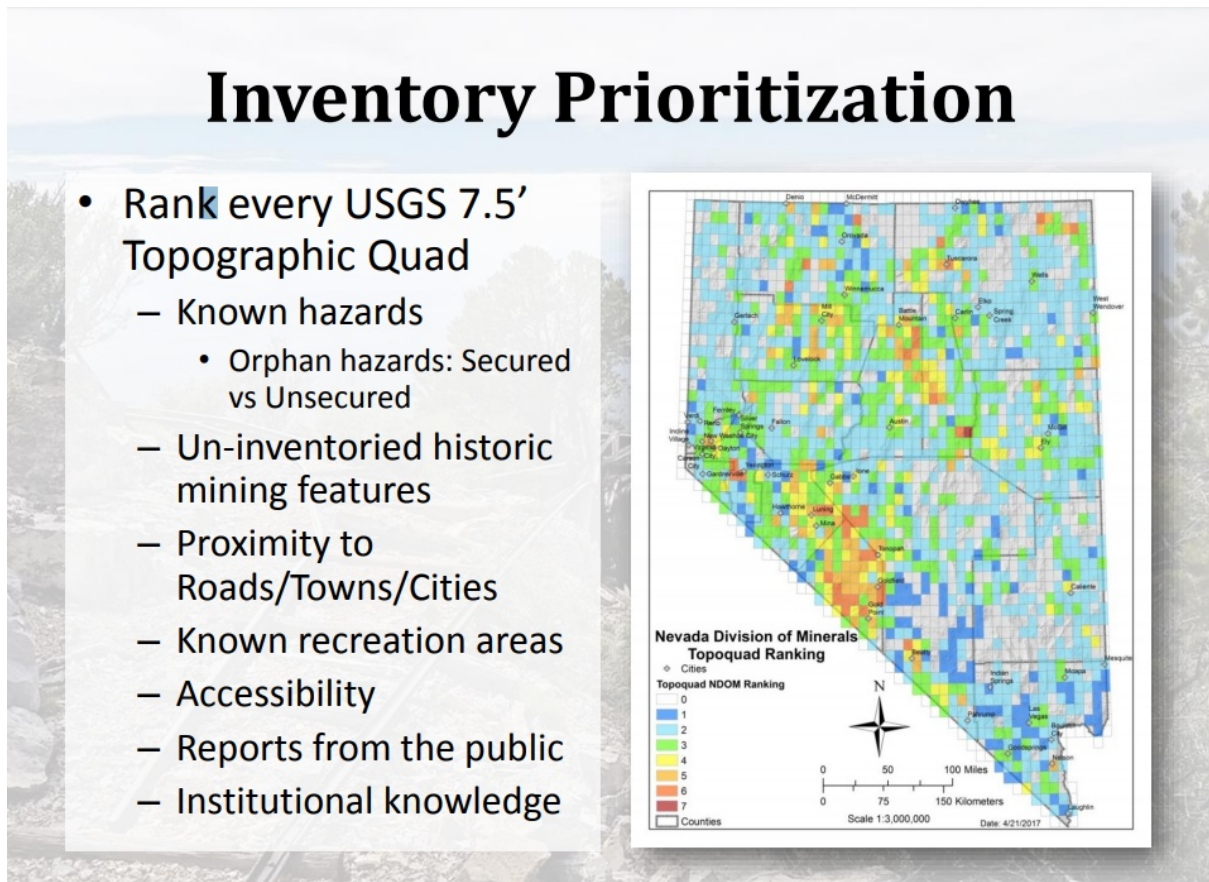


Figure 6: AML Prioritization Methodology of the Nevada Division of Minerals

Mr. Ghiglieri continued with some highlights from recent closures in the Gold Butte National Monument, the Arden Mine Complex outside of Las Vegas, and the Valley of Fire State Park that Mr. Biaggi referenced during his talk. Mr. Ghiglieri discussed the critical importance of using partnerships with other agencies and organizations who can bring in “small pots of money” to get work done.

COLORADO'S AML CLEANUPS: WHAT WORKS, WHAT DOESN'T AND CHALLENGES TO COME

Paul Jones presenting for Jeff Graves – Program Director, Inactive Mine Reclamation Program of the Colorado Division of Reclamation, Mining and Safety

Paul Jones presented for **Jeff Graves**, Program Director of the Inactive Mine Reclamation Program of the Colorado Division of Reclamation, Mining and Safety who could not attend due to scheduling conflicts. Specific and general examples of what works with regard to liability protections and implementing projects, what doesn't work in AML cleanup, and future challenges from the agency's perspective were shared.

Abandoned mine lands/inactive mines/legacy mines in Colorado are defined as those operated prior to 1977 (coal) or prior to 1980 (non-coal) and for which a reclamation bond with the State does not exist. There is no broad State level regulatory framework for AML sites, and Colorado relies on Clean Water Act (CWA), CERCLA, RCRA, State Engineer, partnerships with other federal agencies (BLM, USFS). The Inactive Mine Reclamation Program is not regulatory; it is a program with the mission to “undertake reclamation aimed at reducing hazardous situations associated with past mining activities.”

- ◆ **What Works For Addressing Liability** – Liability protections for cleanups are accomplished under memorandums of understanding between the EPA, Colorado Department of Public Health and Environment (CDPHE, and the Colorado Division of Reclamation, Mining and Safety DRMS providing time critical removals through CERCLA to address liability concerns. Clean up projects undertaken by the State avoid CWA liability by focusing only on non-point source issues and by not treating mine discharge. By developing strong stakeholder partnerships, this ensures all interested parties are at the table, including working through local communities and watershed groups to develop priorities and projects. Most importantly, these partnerships and collaborations clearly outline expectations for success.
- ◆ **What Works For Implementing Projects** – Implementing projects begins by adequately characterizing site conditions to develop appropriate remedies and expectations. Applying site specific designs is critical as there is not a “one size fits all” solution for AML sites. Using proven Best Management Practices (BMPs) is crucial, while balancing remedy selection against possible operations and maintenance (O&M) requirements. Pragmatic approaches to project design and implementation that reduce costs while cleaning up sites is critical. In other words – “a best bang for the buck mentality” is paramount. Success is measured based on implementation of BMPs in establishing performance criteria that should not be limited to just chemical criteria downstream.
- ◆ **What Doesn't Work** – From the State of Colorado's perspective there are four things that do not work with respect to AML cleanup: 1) treating water without incurring CWA liability, 2) measuring success merely by downstream water chemistry, 3) setting up a cumbersome or complex process to implement work or provide liability relief and finally 4) unrealistic expectations regarding cleanup goals.
- ◆ **Future Challenges** – Four challenges were identified by the State: 1) the willingness of EPA to provide liability protection through time critical removals or other adequate means, 2) significantly improving AML impacted watersheds without addressing mine related point sources, 3) inherent uncertainty and risk associated with AML cleanups and 4) potential cost of AML cleanups.

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION PERSPECTIVES ON AML CLEANUP

Jeryl Gardner, P.E., C.E.M – Supervisor Professional Engineer, Abandoned Mine Lands Branch of the Nevada Division of Environmental Protection

Mr. Gardner provided an overview of the agency’s program. He discussed the range of partnerships they have used to complete projects and shared examples of the different technologies the agency has or will use on AML projects in Nevada. A status update on the Division’s AML Inventory was shared, followed by a discussion on the important role of collaborative partnerships.

Mr. Gardner began with an observation from his fourteen years of working on abandoned mines that there is great diversity in sites and that one technology or method that works well on one site will not necessarily work for all sites. He made reference to the Birthday Mine project that is currently in active remediation using a passive treatment system designed by Mr. Gusek who presented earlier, and for which construction is scheduled to begin this summer.

The NDEP recently completed its own AML database using funding from the Restoration of Abandoned Mines Sites (RAMS) program of the Army Corp of Engineers. For consistency, the NDEP used the same contractor responsible for the NDOM database and these two databases are connected and interlinked. The NDEP database currently includes 195 inventoried sites that range from small sites that may be a single heap leach pad, pond or waste dump to sites covering over 3500 acres. Mr. Gardner continued with discussing specific examples of AML projects in Nevada.

- ◆ At the aforementioned Birthday Mine, a remote site at a moderate elevation of 6000 feet, there is a periodic release of arsenic-laden flows to an intermittent surface water body that is killing cattle in the area. Last year in partnership with the Army Corps of Engineers, the NDEP completed a 60,000-gallon pump and treat program over a one-week period. The NDEP was interested in finding a long-term *passive* treatment system, to be distinguished from *semi-passive* treatment systems that still require some form of perpetual maintenance such as periodic sludge removal, reintroduction of bacteria, or the addition of wood chips. Beginning this summer, iron terraces designed by Mr. Gusek will be installed coupled with long-term monitoring to evaluate how the system performs.
- ◆ The Castelton tailings in Pioche and the Anaconda Mine Site in Yearington are both in active remediation today. The Anaconda site (indirectly referenced by Mr. Biaggi earlier in the session) was originally under state regulatory authority. Recognizing the limitation of its resources, the NDEP asked the EPA to take control of the site. Over the next 13 years the EPA established a network of over 350 monitoring wells both on and off site. Then last year NDEP developed a partnership with Atlantic Richfield Company (ARCO), and through an EPA administrative order on consent provided ARCO with liability protections. This allows ARCO to advance work on the site if NDEP leads the efforts instead of a federal agency. BLM is an active partner as well, but NDEP leads the cleanup work programs.

Mr. Gardner closed with the sentiment that although Good Samaritan legislation is a necessary piece of the AML cleanup puzzle, without collaborative partnerships, we go nowhere. He reiterated comments made by previous speakers that these partnerships are critical to the success of AML improvements in the state of Nevada and to taking care of physical safety and environmental hazards.

EXISTING PARTNERSHIPS IN AML ENVIRONMENTAL RESEARCH

Ron Breitmeyer, Ph.D. – Assistant Professor of Geological Engineering, University of Nevada Reno

Professor Breitmeyer provided a summary of past and ongoing research projects undertaken at the University. UNR focuses on projects and study sites that will a) educate students, b) allow for the generation of long-term datasets and c) provide opportunities to develop methods that can be utilized by the broader community on other AML sites. Ron provided highlights from two AML sites in Nevada: Perry Canyon (north of Reno) and the Castleton project (Pioche area).

- ◆ **Perry Canyon AML Project** – Since 2015, this site has served as the research basis for four graduate students in geoenvironmental and hydrogeology. They are using Unmanned Aerial System (UAS) drone flights to capture both visible and multi-spectral imagery. Currently under development is a methodology to correlate remote sensing data with chemical testing in the field. They are using high resolution digital terrain modeling to quantify surface water erosion and soil loss. Using groundwater data collected over four years they have developed chemical footprints and are also conducting geophysical studies to track water content through the waste piles. As a result of the 2018 Perry Fire, the National Science Foundation got involved and an undergraduate geoenvironmental student is collecting monthly samples to generate a history of post-burn hydrology to understand the implications of landscape-level changes on abandoned mine lands.
- ◆ **Castleton BLM Tailings** – Research by UNR at this site is focused on the large unlined tailings disposal facility, specifically on what is going on with the meteoric water underneath the tailings. A graduate student is conducting ongoing testing to build an unsaturated flow and transport model. The alluvial soils in the area are 90% carbonate and are suspected to provide natural buffering capacity; it is the charge of this project to quantify and confirm that this is the case. Interns were also used to conduct geophysical studies to outline the bottom of the ponds because no as-built drawings were available.

Professor Breitmeyer closed with reiterating that UNR is looking at these projects from an academic perspective and that they are not looking to compete with consultants. They are looking for projects of longer duration that allow for in-depth analyses, and will continue working with mining associations, agencies and other stakeholders to identify which projects are appropriate for research.

2.3 AFTERNOON PANEL SESSION

Session Moderator

Jeff Parshley, SRK Consulting

Session Objective

Share stakeholder insights on key metrics needed for successful AML cleanup. Panelists discussed perspectives on site characterization, measuring results for release, possible release mechanisms and building collaborative partnerships.

Before introducing the speakers, Mr. Parshley, having experience with the AML site south of Reno that was discussed earlier in the morning, took a moment to tell the rest of the story from his perspective. He was sitting in a Nevada Mining Association Environmental Committee meeting when word came out that the particular company responsible for part of that site had gone bankrupt. At the time the company went bankrupt, the “upset time” on the ponds was four hours, and without the pumps running, the ponds overflowed into the Walker River. The attitude of everyone in the room that day was, “we can fix this - let’s get this problem solved!” It wasn’t just a question of having the ability, there was also a willingness in the entire industry to take action until it reached up to the in-house legal counsels where it was killed very effectively. The firm Mr. Parshley worked for was contracted with the State and within a month had roughed out a plan of what needed to be done and what the engineering solution would be – it was something done in industry all the time. As was mentioned, the federal agency took over 5 years later and after 7 years of assessments and evaluation of 12 different options and multiple sub-options, the federal agency that took over came up with the same solution his firm had developed after one month. He closed with pointing out that within the United States there exists 34 years of experience dealing with the technical issues. He added that a lot of (but not all) of that experience resides in industry so there is no excuse for not addressing these legacy sites - that is why the Summit was organized and why everyone is here.

LEGAL HURDLES AND LIABILITY RELEASE MECHANISMS

Carolyn McIntosh – Partner, Squire Patton Boggs

Carolyn McIntosh provided insights to frame the day’s discussion on identifying suitable AML sites by presenting possible ways to navigate through and around the legal hurdles. She focused primarily on the liability issues derived from the CWA and CERCLA. After providing an overview of the terminology, definitions and third party/citizen lawsuit provisions of each statute, she discussed the mechanisms by which Good Samaritans may be granted liability relief within the existing legal frameworks. Highlights and key content from her slide presentation are summarized below.

- ◆ **CERCLA Definitions & Liability Issues** – Liability under the CERCLA statute is tied to the release of a *hazardous substance* from a *facility* such as acid rock drainage from an AML site. At issue is ensuring that the Good Samaritan does not become identified as a Potential Responsible Party which would open them to *strict, joint & several liability* from which there are very limited defenses. The types of individuals or entities that can be designated a PRP include a) the current *owner* or *operator* of a site, b) a past owner or operator at the time of disposal, c) an *arranger* that coordinated the disposal, transport or treatment of hazardous substances, and the d) *transporter* who accepts material for transport to a disposal or treatment facility. If the hazardous substance remains on site, all legally applicable or

relevant and appropriate standards, requirements, criteria or limitations defined at the federal or state level must be met.

- ◆ **CERCLA Citizen Suit Provision** – Under this provision, any person may sue any other person, including the government. A person may sue for an alleged violation of any standard, regulation, condition, requirement, or order under CERCLA. Plaintiffs may sue a) to ensure the standard/regulation/condition/requirement/violation of concern is enforced, b) to order corrective actions are taken, and c) to impose a civil penalty for the violation. The provision requires 60 days advance notice to the President, the State, and the alleged violator and includes award of costs of litigation to the substantially prevailing party.
- ◆ **CERCLA Protection Mechanisms** – There are some protection mechanisms under CERCLA that may or may not work for Good Samaritans. The Bona Fide Prospective Purchaser protection is available to persons not responsible for property contamination and applies to a “person that acquires ownership of a facility” that must meet a laundry list of requirements. However, since Good Samaritans do not own or acquire the property, another more appropriate avenue is to consider protections using either a conventional CERCLA comfort letter, or a Good Sam comfort letter. Both categories of letters are provided for informational purposes only and do not constitute guidance. In other words, they cannot be used to change the law. EPA does not issue “no action” assurances in their comfort letters and they do not provide release from other federal/state liabilities. The Model Good Samaritan Comfort/Status letter is based on a different provision in the statute, CERCLA §107(d)(1), which states “no person shall be liable under CERCLA for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance or advice.” The Good Sam must follow an approved project plan in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and under the supervision of an on-scene coordinator. Many third-party contractors and Good Sams, such as Trout Unlimited, have received protections under this provision. If a third party sues under CERCLA, the EPA’s “fallback position” is to enter into what is known as a Good Samaritan Settlement Agreement. These are typically lengthy Administrative Order on Consent (AOC) documents that require record retention, and possibly oversight costs and financial assurances. If the Good Sam has time and resources to negotiate, this option can offer broad release.
- ◆ **Clean Water Act Liability Issues** – Liability under the CWA statute as defined in §303 is tied to an unpermitted “discharge” of a “pollutant” from a “point-source” into “Waters of the United States” that causes a violation of water quality standards. Violations of state water quality standards are defined in CWA §303 and §305.
- ◆ **CWA Citizen Suit Provision** – Under this provision any citizen may sue any other person (including the government) for (a) an alleged violation of an effluent standard or limitation or (b) an order issued by the EPA or a State with respect to a CWA standard. The provision requires 60 days advance notice (w/exceptions) to the Administrator, the State, and alleged violator. There must be ongoing violations and failure of diligent prosecution. Similar to CERCLA, the CWA provides for inclusion of awards to cover the costs of litigation to the substantially prevailing party.
- ◆ **CWA Good Samaritan Guidance** – The EPA has adopted two guidance documents under the Clean Water Act that are directed to avoiding ongoing liability for Good Samaritans where there is continuing water discharge after the project is completed: The Interim Guiding Principles in 2007 and the 2012 Guidance. The Good Samaritan is not the entity responsible

for obtaining a CWA §402 discharge permit and must perform agreed-upon work that must meet Applicable or Relevant and Appropriate Requirements (ARARs) and Water Quality Standards (WQS). Ongoing monitoring can be required of the Good Sam. There is no guarantee that the Good Sam wouldn't be designated as an "operator."

In her closing remarks, Ms. McIntosh referenced other tools available under the Brownfields Mine-Scarred Land Initiative for AML, but none of these tools are fool-proof so site selection is critical.

DUE DILIGENCE PROCESS FOR PUBLIC ACQUISITION OF MINING-IMPACTED LANDSCAPES

Carrie Monohan, Ph.D. – Program Director, The Sierra Fund

Dr. Monohan described an ongoing issue the TSF has dealt with over the past 10 years that few non-profits were aware of in which lands were being acquired for conservation and development project mitigation with little to no awareness that those lands had been impacted by the gold rush. These lands (and naturally the associated liabilities) would then be assumed by private land trusts, cities, counties, the State of California or federal land managers. The TSF also observed that for many projects, the Environmental Site Assessments (ESA) required under CERCLA failed to detect water quality issues. In some cases, consultants were either only taking samples from undisturbed portions of the property or only collected data during baseline conditions, failing to properly capture data when contaminants are most likely to move from the site. As such, parties were grossly overpaying for contaminated properties. As a result, the Sierra Fund developed materials identifying due diligence best practices (Figure 7) that should be required before state money is used to acquire lands and bring them into the public trust.

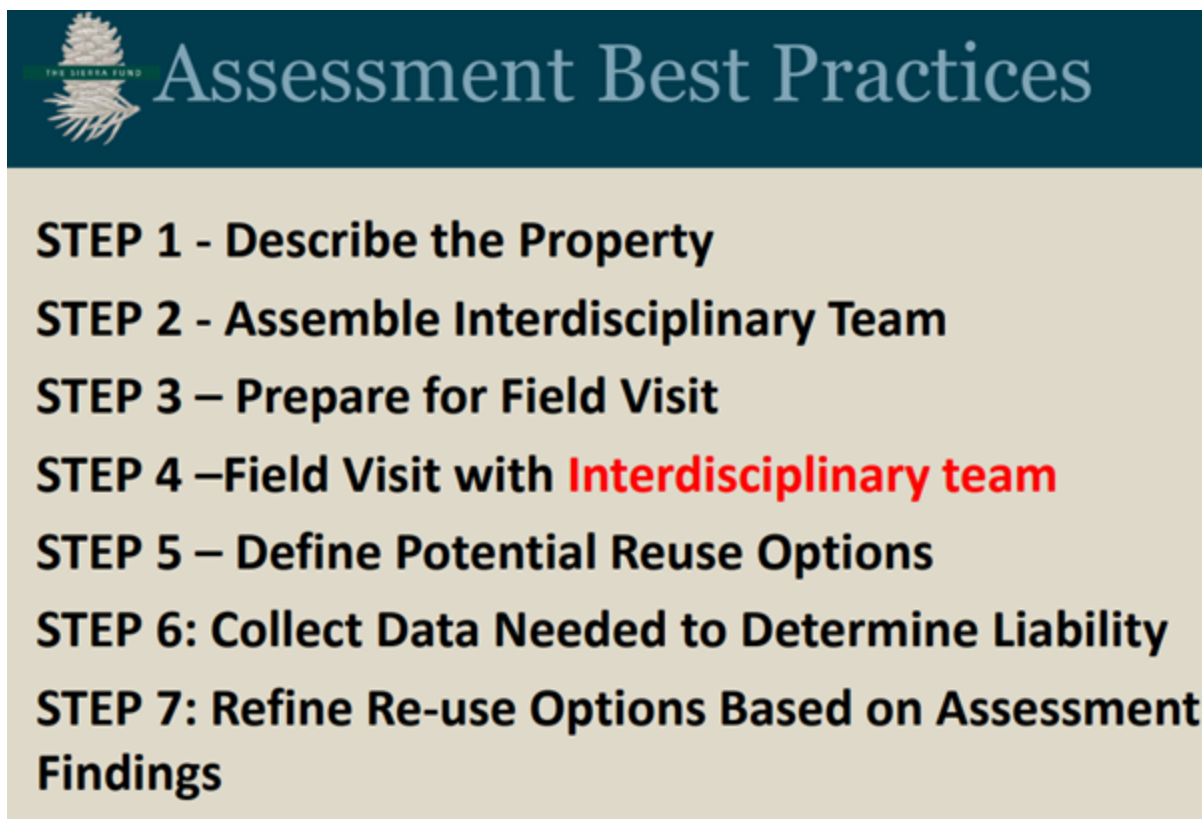


Figure 7: Due Diligence Best Practices (Source, the Sierra Fund)

Dr. Monohan emphasized that central to an effective due diligence methodology for abandoned mine lands is working with broad, interdisciplinary teams that are collectively charged with completing the following tasks: conduct historical document reviews, identify cultural resources, identify species and habitat, identify California Environmental Quality Act (CEQA) requirements, identify runoff and discharge features, research potential remediation options, and identify potential end-use options for the property. She added that it is essential that all team members conduct their site visits together as this is the only way to ensure that the archeologist, biologist, geologist, hydrologist, botanist, and other specialists can all stand around the same feature at the same time and discuss their respective concerns and issues concurrently. The ultimate deliverable is to provide the prospective landowner with a comprehensive list of all mine features, ecological features and cultural features on the property. Empowered with this information, prospective landowners and communities can make more informed decisions about the potential conservation, community redevelopment, and recreation potential for that property.

TROUT UNLIMITED'S ROLE IN MINE RECLAMATION WORK

Jason Willis, P.E. – Colorado AML Program Director, Trout Unlimited

Mr. Willis described the work that Trout Unlimited (TU) has done on abandoned mine sites, where the organization's principle focus is on watersheds that exceed State water quality standards. TU participates in grant-funded projects supported by agencies and entities such as the Colorado Department of Health and Environment (319 Non-Point Source funds), National Forest Foundation, and the Colorado Water Conservation Board. These grants are often matched with private funding and/or construction support allowing TU to better leverage funds and get more work done on the ground. Private partners have included Freeport McMoRan, Newmont Mining, and Tiffany & Co. TU has worked collaboratively on both federally and State funded projects and participates in a mixed ownership group working on abandoned mines in Colorado, filling the non-profit/non-governmental organization role. In this capacity, TU brings alternative sources of funding to projects through private partnerships and allows for flexibility in contracting.

With its engineering experience in house, TU assists in project development and oversight of construction in the field. TU and its diverse partnerships are making improvements to the watersheds by addressing non-point source facilities (e.g., tailings, waste dumps) at AML mine sites. Mr. Willis then provided specific examples of collaborative partnerships, site characterization methods, site investigations and success monitoring techniques TU has used.

- ◆ **Collaboration** – TU uses collaboration to leverage the breadth of expertise required to address the diverse complexities associated with abandoned mine lands. In order to advance landscape improvements at the Akron Mine Project, the Leavenworth Watershed, and the Mountain Pride Mine over fifteen different entities including agencies, non-profits, consultants, mining companies and landowners were involved in the planning, implementation and monitoring of these projects.
- ◆ **Site Characterization Methods** – At the Evans Gulch project located outside Leadville Colorado, the river system a) exceeded the Table Value Standards (TVS) for dissolved zinc in both the spring and summer storm seasons and b) failed to attain the Aquatic Life Cold 1 Classification, primarily due to runoff interactions with non-point source piles along the watershed.

- TU established a Sampling Analysis Plan (SAP) that identified 12 monitoring stations between different suspected sources of contamination. Over a period of two years, data at each location was collected during four monitoring events and the concentration data was fed into *loading evaluation analyses* to rank priorities for remediation. This site characterization method is useful because although one source of contamination may have much higher levels of metal content than other sources, unless it is associated with a high flow event, it might actually have a lower priority than other sources that place a greater load (e.g., pounds per day) of metal into the river system.
- The mixed-ownership nature of the site impacted the scope of the work. The most significant sources of contamination for Evans Gulch included northern streamside tailings (0.24 acres), the Valley Mine Dump (1.10 acres), the South Evans Gulch Source located in an adjacent watershed (1.23 acres) and the Famous Pile. The South Evans Gulch site included discharges coming from a natural pond created by beavers resulting in a perennial source of contamination. However, being within the Superfund Site boundary, this site presented too much of a risk and was subsequently excluded from the project plan. Although the Famous pile ranked as a high priority for remediation, TU could not get access from the landowner which impacted the project plan.
- ◆ **Site Investigations** – The original plan at the Minnie Lynch Mine was to do an adit stabilization. However, after Gold King, further investigations were undertaken to see what was behind the collapsed adit using two fabricated wells. After detecting 12 to 14 feet of head behind that adit, the final design called for a French drain to collect surface and groundwater and direct it to an engineered wetland which replaced the existing dysfunctional sediment pond.
- ◆ **Success Monitoring** – TU documents success using numerous methods including photo-point monitoring of sites before, during and after site remediation work. At one site they observed 74% reduction in bare soil coverage which was calculated using Daubenmire transects. Although this is an older coverage monitoring method, it still provided some hard numbers to show and quantify improvement at the site. At the Akron Mine they used Drone flyovers to document work completed on 10 acres in the Gunnison National Forest.

AN EQUATION THAT ENHANCES THE CHANCES OF SUCCESS OF MINE WASTE MITIGATION BY STAKEHOLDERS-DRIVEN PROJECTS

Ronald R. Hewitt Cohen, PhD – Professor Emeritus, Colorado School of Mines

Dr. Cohen discussed how one of the landmark environmental protection laws enacted by Congress in the late 1960s and early 1970s, the Clean Water Act of 1971, now stands as one of the principal obstacles for the treatment of acid mine drainage and advancing AML cleanup around the country. He suggested that the equation below identifies the key elements required to increase the potential for success on stakeholders–driven projects (Figure 8).

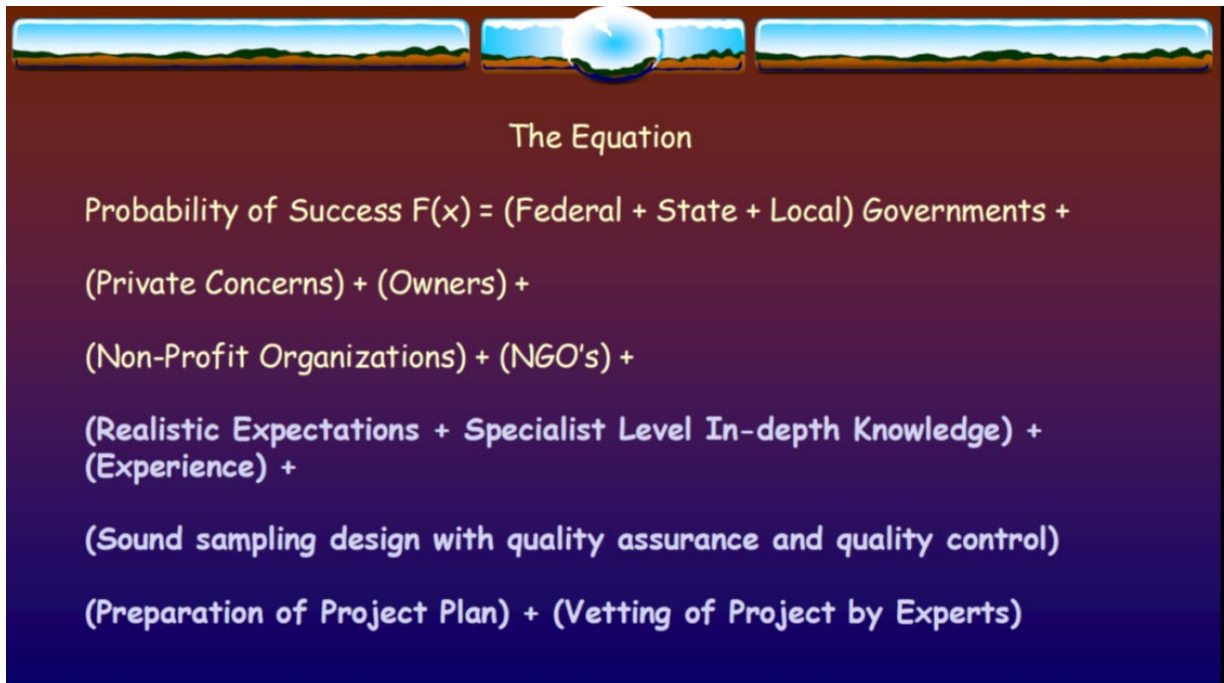


Figure 8: Equation to Enhance Successful Outcomes on AML Cleanup

Dr. Cohen qualified that this equation may not cover everything needed for a successful project. However, from his direct observations and review of many projects, he could say that all projects considered to be unsuccessful, even if well-intentioned in the beginning, were missing one or more of these key elements. He provided some additional context to each of the elements his equation:

- ◆ Diverse partnerships are needed to bring in the diversity of expertise and resources needed should include federal/state/local governments, local stakeholders, private interests (industry), landowners and non-profit organizations.
- ◆ Successful projects require sound sampling designs using best practices in quality assurance and quality control for proper site characterization and setting of realistic expectations.
- ◆ The involvement of specialists with in-depth state-of-the-art knowledge of and experience in design and construction of available treatment technologies is critical.
- ◆ A detailed project plan with realistic timelines is needed covering all site characterization, remediation design, construction, and success monitoring activities.
- ◆ Realistic expectations need to be set coupled with a proper understanding of what the different treatment systems and technologies can physically achieve.
- ◆ Finally, vetting of the project plan by experts before any work begins allows for modification before “mistakes” happen in the field.

Dr. Cohen provided examples of projects for which all eleven elements were in place including the Lion Creek, Leavenworth Watershed, and Tiger Mine projects undertaken by Trout Unlimited and a broad diversity of stakeholders in Colorado. He then called attention to “lessons learned” at the King Solomon Mine (Mineral, CO), the Jones Branch Watershed (McCreary County, KY), and a number of

projects in Pennsylvania for which having the proper expertise engaged in the project would have resulted in more successful outcomes.

THUNDER MOUNTAIN MINING DISTRICT, VALLEY COUNTY, IDAHO: A SUCCESS STORY OF A MINE THAT WAS NOT MINED

Opal Adams presenting for Jim Collard – CEO of Thunder Mountain Gold

Due to scheduling conflicts, Jim Collard asked Ms. Adams to present on his behalf as she worked in the Thunder Mountain Mining district for her Master's Thesis. There was a major gold rush into the area in 1900. In 1909, a large slide from the Dewey Reef Mine blocked the Monumental Creek and the town of Roosevelt was inundated and abandoned. In 1910 there was renewed activity and minor production followed. In the 1920s and 1930s, Mr. Collard's mother's family mined in this district. In the 1970s through the 1990s, modern exploration activities defined new resources. Coeur d' Alene Mines (CDA) permitted and operated the Sunnyside mine between 1986-1992, and after producing over 100,000 ounces, CDA reclaimed the site. Additional exploration at the Dewey Mine defined a minable reserve in the 1990s.

Thunder Mountain Gold and Dewey Mining formed a Joint Venture (JV) in the late 1990s, and advanced exploration in the high elevation district that was cherry-stemmed out of the River of No Return Wilderness. The JV commenced negotiations in 2001 with the Trust for Public Lands (TPL) and the US Forest Service for an innovative buyout opportunity for the site. TPL took the lead on the project while the USFS conducted an appraisal which was completed in 2004 based on minable reserves, timber and real estate values. The appraisal came in at \$13,000,000 based on \$400 gold (Gold price at the time was about \$260). The cash purchase price was \$5,500,000, with proceeds of the sale split between Dewey Mining and Thunder Mountain. The balance of \$7,500,000 was given as a donative tax credit. The USFS was obligated to complete all reclamation, estimated at the time of the sale to be \$750,000 (mainly the Dewey mill). The final land transfer from the TPL to the USFS was completed in 2008 using Land and Water Conservation Fund monies. Negotiations for the land sale and partial donation called for public access within the Wilderness to remain open along the cherry stem road into the historic area. The Trust for Public Lands placed a plaque at the wilderness boundary recognizing the mining history and interpretative value of Thunder Mountain (Figure 9). Included on this plaque is an excerpt from a poem written by Jim Collard's mother honoring the history and pioneers of the region.

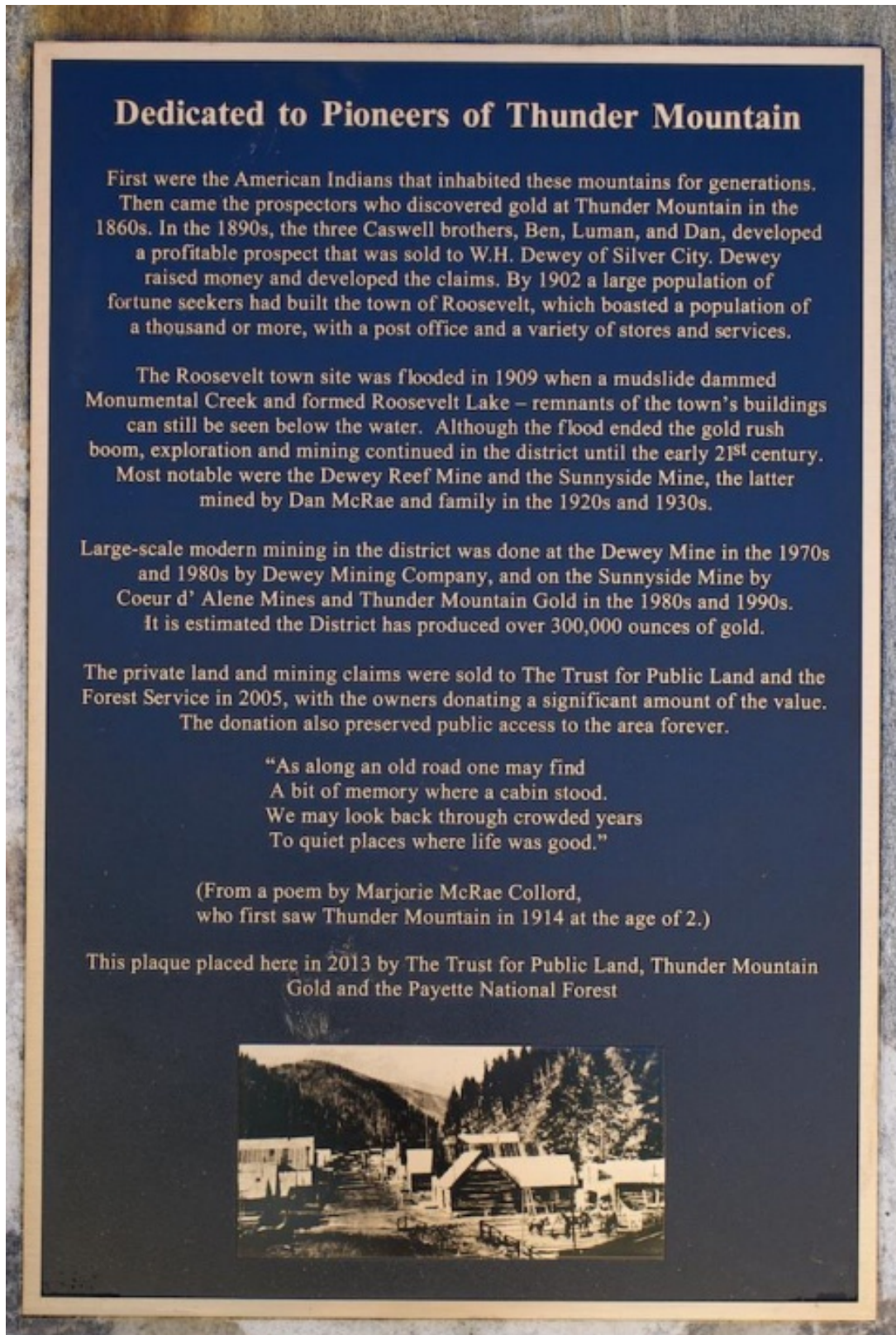


Figure 9: Plaque Dedicated to Pioneers of Thunder Mountain Mining District, Central Idaho

AN OVERVIEW OF STAKEHOLDER PERSPECTIVES ON AML CLEANUP AND GOOD SAMARITAN LEGISLATION

Doug Young – Affiliate, Keystone Policy Center

Mr. Young, having been involved in this topic since the mid-90's, including working on six different versions of Good Samaritan legislation with Mark Udall, opened with the following observation: improving watersheds and dealing with safety problems at these sites should be a "cake walk" but we sadly continue to rehash the same topics year to year. He then posed the following and intentionally provocative question: If AML project work is advancing, then why do we need Good Samaritan legislation? Why aren't we doing more already? After all, there are a lot of opportunities for industry to go out and do "dry dirt" projects today just as Trout Unlimited has done using the existing liability relief mechanisms talked about today – comfort letters, AOCs, and provisions under CERCLA §107. As long as we stay away from the "wet" sites, we can do more right now. He then offered his assessment of possible explanations as to why more hasn't been done:

- ◆ A main driver for the mining industry *not* to participate in AML cleanup is the concern of becoming a 'target' and that any work at such sites will be hyper-examined under a microscope, whereas others working on AML will not bare this same scrutiny. Industry is less inclined to do the work because of this scrutiny until more explicit Good Sam legislation is passed to protect them.
- ◆ There is a perception among some stakeholders that the mining industry is only interested in doing AML work for "remining" opportunities and to avoid more onerous mining-specific regulations and requirements.
- ◆ CERCLA is probably viewed by many as a "spooky" and "draconian" statute and even with the liability protection provisions discussed earlier in the day (comfort letters, AOCs, etc.), there are still too many places that a Good Samaritan can still be exposed.
- ◆ A lot of AML projects are tucked away, not directly affecting a lot of people. As such, it is harder to get much credit, recognition and applause for voluntarily improving these cleanups in the "hinterlands" that aren't readily visible to the general public.
- ◆ There is concern that the industry is trying to use Good Sam legislation to provide liability protections and waivers from a long list of environmental statutes beyond just the CWA and CERCLA. Past AML legislation versions have done just that.
- ◆ Likewise, the environmental community has attempted to "do too much" as well by using Good Samaritan/AML legislation as a political lever to attempt massive sweeping revisions to the 1872 General Mining Law.

After expressing his frustrations as someone who has worked on this topic for decades, he stressed that he does believe we need a statute to address the legitimate worries of all stakeholders that they will become targets without it. However, he added that we need to "jettison all the baggage" that past efforts attempted to pile on to past legislative efforts. He stressed we must continue to make a case to Congress that AML/Good Sam legislation is needed and if passed so much more work could get done than under the existing legal framework. MMSA and its AML Summits are helping to develop the champions that will be needed to advance this important message.

2.4 BREAKOUT DISCUSSIONS

SESSION MODERATORS

Ann Carpenter, Jeff Parshley, Dayan Anderson

SESSION OBJECTIVE

Divide the delegation into breakout groups and ask them to achieve the following outcomes:

1. Outline site characterization criteria, release metrics, and liability release vehicles.
2. Create a list of potential candidate pilot/demonstration sites and rank them.
3. Draft a working list of partnerships and collaborations working on AML.
4. Identify new organizations to invite to the coalition.

Participants from government agencies, congressional offices, academia, industry and non-profit organizations were in attendance. Mining and exploration companies, claim owners, and vendors were represented. Legal counsel, scientists and technical consultants with expertise ranging from geochemistry to all aspects of reclamation and mine closure participated in the forum. State agencies from Nevada, Colorado, and California were in attendance, as well as the Western Governors Association that represents 22 member states. Action oriented non-profits that have worked on legacy mine land and conservation issues for many decades were also in attendance. Individuals were assigned to one of five groups to ensure the perspectives from each stakeholder category (Figure 10) were represented to facilitate interdisciplinary discussion and broader idea exchange.

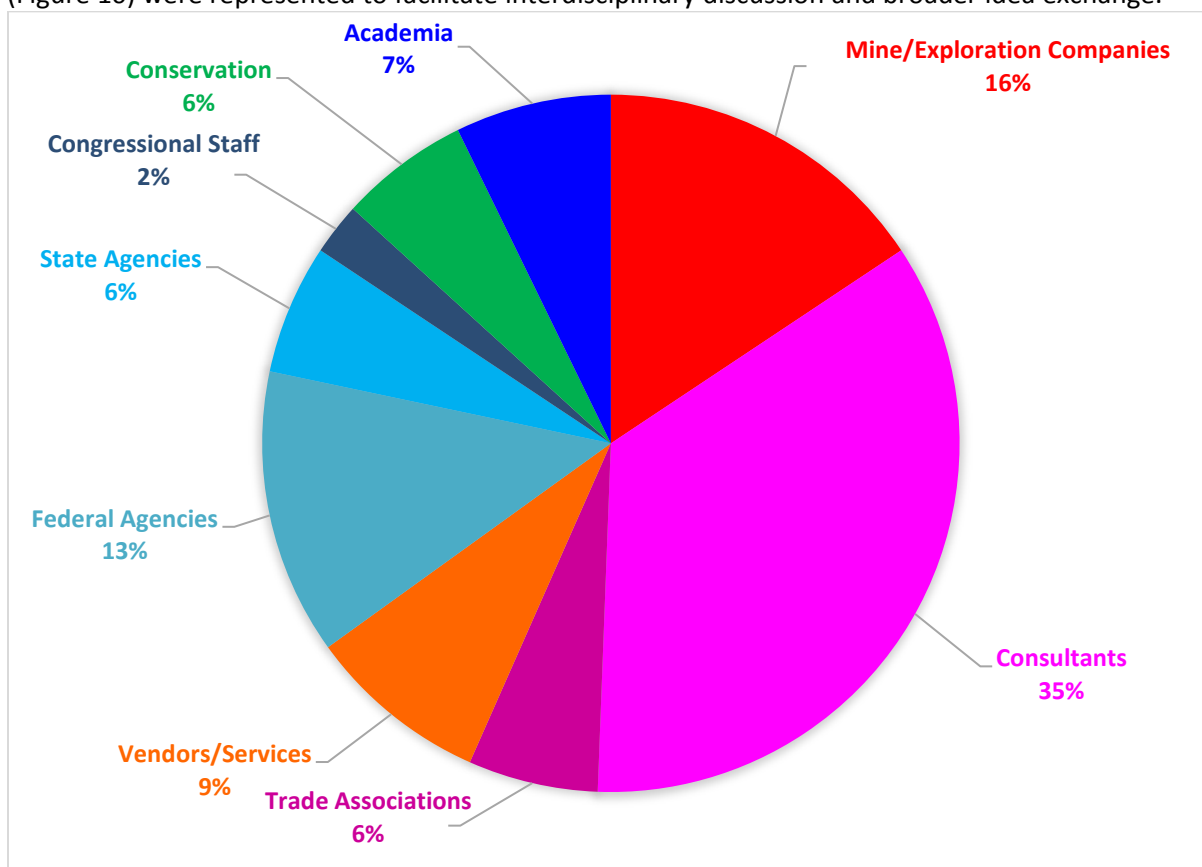


Figure 10: Participating Stakeholders by Affiliation

The delegation reconvened in the late afternoon to share the results of their discussions. A synopsis of the breakout group responses, accounting for common themes and similarities, is discussed in the remainder of this section. A complete record of all ideas presented by each group is provided in Appendix A.

QUESTION 1

The first question was posed in three sub-parts. Group five discussed at length the difficulties of pre-determining site characterization criteria and release metrics without a proper understanding of the project scope, goals and objectives for a given site. For example, before determining which aspects of a site to sample to quantify baseline conditions, and before selecting the scale and resolution of sampling necessary to appropriately measure success for future release, the desired outcomes must be identified. However, desired outcomes are often impacted by existing land-use restrictions and are highly dependent on the expectations of a diverse set of stakeholders. These inter-related dependencies aside, a broad spectrum of criteria for consideration in characterizing a site was presented as shown in Table 1. Next, a listing of quantitative and qualitative metrics for use in determining if a site has achieved measurable or observable improvements from baseline conditions is provided in Table 2. Finally, a variety of mechanisms and administrative remedies that could provide some level of liability relief are summarized in Table 3. Other observations and suggestions addressed creative means by which to improve the economics of a projects, such as:

- ◆ Provide stakeholder incentives (tax breaks, pollution offset credits and offset mitigation).
- ◆ Consider reprocessing (financial opportunity to offset costs if a permitted mill is nearby).
- ◆ Mining companies, with their expertise and equipment could cleanup sites at a fraction of the cost of third-party contractors.

Table 1: Breakout Discussion Results on Site Characterization

| Site Characterization | G1 | G2 | G3 | G4 | G5 |
|---|----|----|----|----|----|
| Detailed historical review/Sampling/Collection of Baseline Data | • | | • | • | |
| Real estate transactions (economics) | • | | | | |
| Wildlife Habitat (Threatened & Endangered Species)/Biology | • | | | • | |
| Cultural Resources/Cultural historic features | • | | | • | |
| Long-term Operating & Maintenance (no to low cost) | • | | • | | |
| Human Health Criteria | • | | | | |
| Land Use Restrictions/Historical Land Use/Future Land Use | • | • | | • | |
| Risk Assessment/Hazard Identification | • | • | • | | |
| Receptor Proximity/Pathway of exposure downstream | • | • | | | |
| No water present | | | • | | |
| Population limited | | | • | | |
| No superfund sites | | | • | | |
| Contaminants of Concern (COCs) and feasibility for treatment | | | • | | |
| Ability to make a difference (improvement to site) | | | • | | |
| Water/Hydrology | • | | | • | |
| Site Chemistry | | | • | • | |
| Soil Moisture | | | | • | |
| Stakeholder Input & Collaboration | | | • | • | |

Table 2: Breakout Discussion Results on Release Metrics

| Release Metrics | G1 | G2 | G3 | G4 | G5 |
|--|----|----|----|----|----|
| Long-term stability | • | | | | |
| Achievable improvement goals (from baseline) | | • | | • | |
| Reduced exposure & risk | | • | | • | |
| Focus on metrics OTHER than Clean Water Act Standards | | | • | | |
| Macroinvertebrate improvement | | | • | | |
| Cover frequency index for vegetation | | | • | | |
| Fish surveys | | | • | | |
| Sinuosity | | | • | | |
| Width-to-Depth ratios | | | • | | |
| Toxicity Characteristics Leaching Procedure (TCLP)/Synthetic Precipitation Leaching Procedure (SPLP) | | | • | | |
| Soil quality | | | • | | |
| State/Federal metrics and regulations | | | • | • | |
| Dust emissions/air quality from dry sites | | | • | | |
| Viable land use after reclamation | | | • | | |
| What do the Stakeholders want/ Stakeholder metrics (habitat, quality) | | | | • | |
| Engineering Evaluation/Cost Analysis & Feasibility Studies | | | | • | |
| Protect waters of the state | | | | • | |
| Remedies that protect the receptors of the site (human, wildlife) | | | | • | |
| Site specific metrics | | | • | • | |

Table 3: Breakout Discussion Results on Liability Mechanisms

| Liability Mechanisms | G1 | G2 | G3 | G4 | G5 |
|--|----|----|----|----|----|
| Blind Trust | • | | | | |
| Form a Cleanup LLC | • | | | | |
| Create an umbrella policy for NGOs, existing operators (non PRP), and 107d contractors | • | | | | |
| Comfort Letters | | | • | | |
| Administrative Orders on Consent (AOC) | | | • | | |
| Certain subsections of CERCLA (107d, 119d, 128b?) | | | • | | |
| Voluntary Cleanup and Redevelopment Program (VCUP)/ EPA comfort letter for the state | | | • | | |
| BLM/FS Action Memorandums | | | • | | |
| EPA clean water act guidance for 2007/2012 | | | • | | |
| State good Sam (PA and CA) | | | • | | |
| Contract to states | | | | • | |
| 3rd party NGO (does the work) | | | | • | |
| Mines provide funding and expertise without assuming liability | | | | • | |
| Contracting requirements/ GSA | | | | • | |

QUESTION 2

Delegates were asked to identify legacy mine sites that could serve as potential pilot/demonstration projects. In addition to identifying the specific legacy sites listed in Table 4 below, the breakout groups also presented suggestions that included specific criteria for site selection as well as proposed methodologies to identify candidate sites in each state.

Site Selection Criteria & Methods for Selection

- ◆ Combine site locations maps with precipitation records and running inventories
- ◆ Work with state and federal agencies to identify dry sites
- ◆ “Damp to dry” sites (or dry portions of “wet” sites)
- ◆ Urban interface areas
- ◆ Proximity to fisheries
- ◆ Stakeholder/Funder interest

Table 4: Potential AML Pilot/Demonstration Projects

| Colorado | Nevada | Montana |
|---|--|----------------|
| Atlas Eureka Telluride Valley Ford Waldorf | American Antimony American Canyon Big Ledge Bonnie Claire Bucker Rochester Mine Castleton Tailings Goldfield Looney Mine Lower Rochester Mercury Mines (Lovelock to Winnemucca) Tuscarora Twin Buttes Tybo | Flat Creek |

QUESTIONS 3 & 4

The breakout groups were finally asked to identify partners with a vested interest in improving legacy mine lands to the benefit of public safety, community well-being and healthy functioning ecosystems. The following entities were collectively identified by the delegates.

Federal & State Government

- ◆ Bureau of Land Management
- ◆ United States Forest Service
- ◆ United States Army Corps of Engineers
- ◆ Bureau of Reclamation
- ◆ National Park Service
- ◆ Department of Energy
- ◆ National Institute for Occupational Health & Safety (NIOSH)
- ◆ Environmental Protection Agency
- ◆ United States Geological Survey
- ◆ Bureau of Indian Affairs
- ◆ Natural Resource Conservation District
- ◆ Nevada Division of Minerals
- ◆ Nevada Department of Wildlife
- ◆ Nevada Department of Environmental Protection (NDEP)
- ◆ NDEP Bureau of Mining Regulation and Reclamation
- ◆ Stake Park Agencies

Other Jurisdictions & Regulatory Authorities

- ◆ City Councils
- ◆ County Government
- ◆ State Water Boards
- ◆ Tribal Authorities
- ◆ Economic Development Agencies
- ◆ Water Districts/Water Providers
- ◆ City Landfills
- ◆ Interstate Mining Compact Commission and other inter-agency collaborative efforts
- ◆ State Land Trusts

Non-Profit Organizations

- ◆ Trout Unlimited
- ◆ The Sierra Fund
- ◆ Nature Conservancy
- ◆ NV Bighorn groups
- ◆ Ducks Unlimited
- ◆ Habitat Restoration Groups
- ◆ Conservation groups for Chukar, Sage Grouse and Rocky Mountain Elk
- ◆ Faith-based Environmental Groups
- ◆ Recreation groups

Other

- ◆ Private Land Trusts & Foundations
- ◆ Mining Companies
- ◆ Landowners
- ◆ Academic Institutions
- ◆ Ski Resorts
- ◆ Chambers of Commerce
- ◆ Cattleman Associations/Ranchers
- ◆ Alternative Energy Companies
- ◆ Recreational Equipment Suppliers
- ◆ Professional Sports Teams
- ◆ Supply-Chain Companies
- ◆ Rare earth recovery companies (TESLA, Apple, Big Tech)
- ◆ Jewelers
- ◆ Eco Tourism Groups

Delegates also presented some creative ideas that could a) raise general public awareness of legacy mine land issues and b) help broaden the growing coalition of stakeholders interested in taking action to improve these impacted landscapes. These suggestions are highlighted below:

- ◆ Identify closure sites that will result in additional development that will benefit communities,
- ◆ Focus on job training opportunities created by restoration projects,
- ◆ Leverage all social media platforms to engage the public,
- ◆ Create targeted podcast programs that can be shared by the coalition to reach the growing audience that is using this medium to consume news and information.

2.5 NEXT STEPS

At the conclusion of the Summit, MMSA leadership committed to the following actions with the AML participants:

- ◆ Provide a list of attendees.
- ◆ Place all available presentations on the website.
- ◆ Survey participants and speakers for input that will guide the 2020 AML Summit objectives and help move the ball further down the field (Appendix E).
- ◆ Compile an overview of the presentations, session discussions and idea exchanges for the day into a summary report for distribution to participants, speakers and the general public.

The following prominent ideas and suggestions for possible “next steps” emerged during the formal Summit program, as well as from side-bar discussions during breaks throughout the day:

- ◆ MMSA and the growing coalition should create some “Working Groups” to tackle specific topics and issues that can be reported on at future Summits.
- ◆ MMSA should directly engage more “doer” non-profit organizations (including faith-based environmental and eco-tourism groups) by hosting a more intimate focus-group later this year, possibly in Washington D.C. where most of these groups have an office.
- ◆ Engage representatives from other industries such as renewable energy companies, water purveyors, industrial recyclers, ranching and cattleman associations, and downstream users of metals and minerals (e.g., the electronics sector, auto industry, agriculture, etc.) to participate in the next Summit.
- ◆ MMSA should invite a speaker representing tribal communities at the next Summit.
- ◆ If getting federal Good Sam legislation is “too big of a lift” right now (or at least until things settle down after the 2020 Presidential Election), the coalition should consider working to generate legislative momentum in other Western States to adopt language and programs modeled after some of the following examples that were discussed during this Summit.
 - Generating claim-fee based funding for AML programs modeled after the Nevada NDOM program.
 - Adopting statutory language comparable to that in Nevada and California that encourages and facilitates the use of renewable energy on mining sites (modern and/or historic) by recognizing it as a viable and acceptable “post-mining” land use.
 - Adopting statutory language modeled after the State of Pennsylvania’s Environmental Good Samaritan Act which allows for some “remining” provisions on coal sites.
- ◆ Recruit more champions to take a unified message to Congress by (a) leveraging all social media platforms and (b) creating targeted podcast programs to reach the growing audiences that use these mediums to consume news and information.

APPENDIX A – SESSION Q&A AND BREAKOUT GROUP NOTES

Time was reserved at the end of each session for questions and dialogue between panelists. Following is a summary of questions and issues discussed at the end of the presentations during each session. Slide presentations, if provided, are available on the AML Summit Page of the MMSA website.

QUESTIONS AND DISCUSSIONS FROM THE KEYNOTE SESSION

QUESTION 1

Elizabeth Zbinden: My question is for Gary and other entities working on AML. The Nevada Division of Minerals gets local fees to address safety abatement in Nevada.

Gary Lawkowski: Yes, there are a lot of people, states and entities working in this space, and the BLM is actively engaged with people to address these things.

Debra Struhsacker: Elizabeth raises a good point; we have a really good program in NV that is funded in part by local claims fee filings. They use that for a safety abatement program, limited by the amount of funds they receive. Does anyone from NDOM want to talk about this?

Rob Ghiglieri: I'll be doing a presentation on this later.

Debra Struhsacker: Perhaps an idea that we can advance from this summit is that other states could model an AML program based on what we do here in Nevada.

Gary Lawkowski: There are of course other federal programs, such as the Office of Surface Mining (OSMRE) that has an abandoned mines program that has a different funding stream than the BLM, there are also state grants, etc.

QUESTION 2

Carolyn McIntosh: My question is for Mr. Mahmud. Can you give us the name of the project in CA? Given that the project was dealing with water issues, how did you deal with the "exigencies of the circumstances" and is there a way we can model this behavior at other sites?

Shahid Mahmud: The AOC for that project just got signed, and the water board for that project passed a resolution for calling the work a "pilot study." Because of that resolution the EPA was able to adjust the language in the AOC to address the exigency issue you were talking about, so we could make environmental improvements instead of meeting strict water quality standards. During our meeting next week people will be on the call to talk about this. We had a model consent decree that was re-worked slightly. Since we can't change the Clean Water Act and because the water board passed that aforementioned resolution *and* changed the use designation of the tributary so the quality standards could be changed, we could adjust the AOC. Now is there a time criterion for the pilot project? I'll have to check; it's the first AOC out of the gate where we adjusted the language, and this is a site-specific determination. I'm not sure if you can use this approach across the board. If we can use that as a model for providing flexibilities, then we're game to see how we can get this done. Two items that we need to explore with the

states during next week's meeting is the 2015 regulation that provided for water quality standard variances (for 5 years) and the changing of use designations of waterways.

Carolyn McIntosh: What is the name of the site?

Shahid Mahmud: Corona Twin Peaks...it had mercury and nickel as the contaminants of concern.

QUESTION 3

John ???: One of the more obvious uses for many AML sites would be development, but many of these sites are prohibited from exploration due to the liability. While many of the companies don't have AML sites, they certainly have closure sites and it's hard to go back into these sites that are in closure. Barrick, Kinross, Newmont have closure sites, but no geologist would ever propose a budget to re-explore them because of the liability associated with this which is similar to abandoned mine sites. So how can legislation address this redevelopment issue?

Debra Struhsacker: Thanks John, you raise an excellent point and the liability considerations pretty well chill the ability to look at those sites where the very best solution could be re-mining or the development of a new mine at the old site. If so, the remediation from the past existing problems from unregulated mining could be integrated into a modern mine plan. I think that is a really important goal of legislation, but that part has been really elusive because as Mark said, legislation is the art of compromise. Typically, the NGO Community has been very leery of the industry's involvement where there is the potential for somebody to make a buck at reclaiming an abandoned mine. It is really unfortunate that is the mindset - I don't know if I have many good suggestions for overcoming that obstacle but I would ask that those here that are not in the mining industry like Trout Unlimited, Nature Conservancy, and other like-minded organizations that understand solving this problem involves a broad array of solutions; you could play a really important role in helping us to get to that table and come up with creative ideas for industry-funded AML investigation and re-mining that doesn't involve the finger-pointing that unfortunately has typically gone on in the dialogue to do just that. There are a lot of obstacles that need to be overcome, and it will be great for us to work on some creative ways to do that.

Shahid Mahmud: The idea for redevelopment and reprocessing is a good one and we're working with a company in Region 7, Madison County Mines. They want to mine cobalt in a big lead belt covering Region 6 and 7. It helps us out because they do the exploration and it does the site investigation work for us as well. We are doing that under CERCLA. At the Gilt Edge mine in South Dakota we have a company doing exploration. And of course, at the Haile project in South Carolina there is an ownership issue for Brewer Gold that we don't get into, but we do want to look for creative ways to get things done. Midas gold from Kinross and Laura Sawyer will be at the meeting next week. Doing things environmentally responsibly and looking at reprocessing those (historic) piles while expanding the mine (because often the ore body is still there where mother nature put it), I agree with you. If it's on federal lands you have to go through the federal process, same with the states; it all depends on the jurisdiction. We are trying to explore different flexibilities within our 0.1% of our sites in this whole universe of sites that are Superfund. So, we are trying to be flexible and creative and if somebody wants to make a buck, then make a buck.

QUESTION 4

Doug Young: Carolyn’s question for Shahid was a good one and that conversation was a good one and I thought we might pose the same question for Gary. On your sites that you have done is it right that you were using your CERCLA authorities? And if so, were they of mixed land ownership, or were they primarily federal land? Were you able to attract people to do work because, for lack of a better way of phrasing it, you the federal land agents are “on the hook.” And because you’re the owner, were you able to attract good Samaritans to come to your property because you ultimately retain that underlying liability, and in a way you are shielding them from doing that work? I’m just trying to understand how the liability questions were dealt with from your agency’s point of view. For example, do you have AOCs, do you have agreement documents and comfort letters that the EPA requires? I’m just trying to figure out how land agencies like the you and the Forest Service do projects that attract that?

Gary Lawkowski: It depends on the project; for some we work with the EPA. For BLM the concern is that they do have the liability once it’s done. We need to work with the parties to figure it out. That is one of the reasons the BLM is focusing on the safety projects, because there are fewer liabilities with that. The focus is more on safety than environmental because of the liability issues.

Shahid Mahmud: I think the Kerber Creek project in Colorado was a mixed-ownership site. I think for the 17 miles of creek, some was on BLM lands and private lands and they came up with a good EA which the EPA used to develop the action memo. I’m curious for BLM or FS or other land management agencies, have they been approached by Good Sams to do projects on federal lands? Or, is there some hesitancy on BLM and Forest Service lands that EPA will come after you for some liabilities because you’re the owner of the land?

Gary Lawkowski: I think on the BLM side there’s been some hesitancy that not necessarily the EPA, but maybe some of the citizens could come after us. That is the hesitancy on the BLM side.

Debra Struhsacker: One issue that we really haven’t talked about today is land status. Land status at these sites is complex, if they are old mining districts chances are there’s a core of patented claims (private land) that may or may not have an owner surrounded by public land. So, land ownership is another complexity to be considered in developing a remediation plan, so it is site-specific.

QUESTION 5

Ann Carpenter: I have a couple of questions

1) The first is from Jim Gusek who is on the phone and will presenting later this morning asks. Is there a possibility to use the Pennsylvania coal remining as a template for remining? We know coal is managed by a different set of regulations, but it’s still an idea that is already working.

2) A question for Gary and others on the panel is about streamlining. Some believe this is a front for rolling back regulations, can you briefly explain streamlining and how it can be applied to AML and that it basically is NOT a rollback, it is maybe something else.

Gary Lawkowski: I will start with the question if streamlining as a rollback or not as a rollback. I think you have to look at what the purpose of NEPA and these other laws are and that is to allow

decision-makers to have the appropriate information to understand what the impacts of their decisions are. So, when you have these NEPA processes that go on for 20 years resulting in multi-volume, multi-thousand-page documents (and a lot of the information is not necessarily relevant), are they useful in giving decision makers what they need? The core is understanding that if we do X, what will be the effect on Y? How is it going to impact the environment? So the NEPA streamlining is a way to get back to the fundamentals of what the law is about and not getting bogged down on too many tangents. NEPA streamlining is not a rollback, it is a way to focus the agency and get things done in a timely manner and do these things and have a positive effect, while still providing all the useful and relevant information so we can understand the impact of the actions and make an informed choice.

Debra Struhsacker: I would add that the concept of a rollback and a Good Samaritan are completely incongruent. The whole crux and focus of the Good Samaritan cleanup is to improve existing conditions. It is not to meet existing regulatory standards. And so, I think those two ideas are mutually exclusive. A Good Samaritan should be held to a standard that demonstrates they have a reasonable likelihood of success in improving the environment and that is not a rollback. I don't know much about the PA remining program.

Shahid Mahmud: Pennsylvania and their watershed groups have developed some tool kits, that we would like to mimic in some way. PA does allow for reprocessing and think there are some liability protections under it. I think the Interstate Mining Compact and others might know more and be able to better answer that question.

Jason Willis: I'd like to address a couple of the previous questions and have one of my own.

To Doug's question: TU as a Good Sam has been working with the FS and BLM for several years on 10-15 projects in CO under CERCLA. So, TU will come in and we'll manage the engineering evaluation and cost analysis for a removal action, then the agency will draft an action memo naming TU as either a "response action contractor" or an entity "rendering care and assistance" under the National Contingency Plan at the direction of an OSC (on-scene coordinator). We've done about 10-15 in CO alone.

To Debra's question: TU has been in some discussions with a few mining companies on innovative reprocessing techniques for Cu heap leaching that are 70% more effective at certain sites. It hasn't really gone anywhere but NGOs are talking about potential to remine at some sites where it might be more effective to get those minerals out and put that money back into reclamation costs. I think it is a topic that is happening, and we'd like to continue that dialogue which is why I think a lot of us are here. For the Kerber project, I've been working on that since 2008, that AOC took about 6 months and the one with Snowbird too. There is a lot of conversation around using AOCs now to get this work done. It's an effective tool.

Question for Shahid: Funding has been one of the biggest challenges given the complexities of many of these abandoned mine sites and you mentioned the EPA 319 program. I think a year ago that was proposed to be cut, and I was wondering if that is still the case because it's big funding source for NGO's like TU that want to do this work.

Shahid Mahmud: I don't know the status of that cut. A lot of cuts were proposed, and I am not sure if it is still on the chopping block or how much might be cut. You are right that the 319 Grant Program has been good for these projects. We'll have Jeff Graves with the DRMS and people from water that work on 319 grants on the call next week, and one person from brownfields/mine-scarred lands too. We're not increasing the funding, but I'm not sure we can earmark something for Good Sam projects; you might want to bring that up at the meeting. Funding is a very important issue, so we need to look at existing funding sources. Jason, I'll have to go back and ask those people to see if we want to make that cut or not.

QUESTIONS AND DISCUSSION FROM THE MID-MORNING PANEL SESSION

QUESTION 1

Thom Seal: What percentage of mercury have you been able to take out of the dredging process?

Carrie Monohan: Closed system test results in 2009 hasn't happened yet. It said 93% of the liquid elemental mercury was removed by the centrifuge, but key is to understand mercury exists in many forms. It goes from a sediment treatment process to water treatment process to treat the sludge. It's a two-step process. It's a pilot project, so dredging component will start this season.

QUESTION 2

Ron Cohen: In the early days of using the surfactants, not only did they not last long enough to keep the microbes down, but also some of the surfactants were more toxic in the aquatic system than the metals were. Can you comment?

Jim Gusek: Absolutely, that was why the folks at US Bureau of Mines (Kleinmann and Erickson) developed a screening test to figure out how much of the surfactant is actually consumed in applying it. You can't think like a miner when you are applying surfactants who tend to think if 1 pound is good then 2 pounds is better. In this case you can apply too much of a good thing, and not only will you devastate the aquatic environment, you risk wiping out the good bugs that you're trying to nurture. You need to find the sweet spot and one size does not fit all. That's a good point.

Ron Cohen: When you "milk-ify" them, how does that work? Does that make any contribution to consumption of oxygen in the water? Have you found that to be less noxious?

Jim Gusek: The milk products are really interesting because what will happen is that the casein protein in the milk is pH sensitive. You can try this at home, if you add vinegar to milk you get curds and whey. So, when you apply milk to a mine waste dump you will preferentially coat the pyrite surfaces in the mine waste surface that are low pH with basically a cheese ball. The left-over whey protein and sugars will keep going and they actually support sulfate reducing bacteria that are hungry for that type of nutrient. You don't hit a waste rock dump with full strength milk, and I believe Jason Willis is in the audience. We were messing around with some mine waste at the Tiger Tunnel near Leadville with a 1% strength milk application (not 1% fat milk, but 1-gallon milk to 99 gallons of water). At this concentration on a pilot-test scale, you'll find that the milk does get consumed and there's very little loss or percolation. And if that percolation does occur, it'll be neutral pH and anoxic. So, you might not want to do this treatment next to a stream, but if you do, you can do it very carefully, say with drip irrigation. Again, getting your vegetation going

would certainly facilitate things. Very valid concerns but I think the milk approach has a lot of promise. Right now, the whole country is in a glut of milk, there's a lot of it now and frankly I think the farmers would love it.

QUESTIONS FROM THE AFTERNOON PANEL DISCUSSION

QUESTION 1

Susan Wager: My question is for Carolyn and Doug, concerning citizen lawsuits. It seems to be that the citizen lawsuit is not so much about the citizens actually suing, but a vehicle for some lawyers to use the citizen lawsuit as a vehicle for them to make money via the lawsuit.

Carolyn McIntosh: You're absolutely correct. We are aware of at least one organization, an NGO, heavily populated by lawyers, whose business model is to use the citizen suit provisions under CWA and CERCLA as their job. You may have noticed in my run through of the citizens suit slides that the successful party gets their attorney fees paid. So, this is a means for some organizations to earn a livelihood. So, if one is taking that perspective, they are not good for the environment, they're not averting safety issues. It is difficult for the constituencies that we represent in the room to be trusting of the citizens suit provision. That is one of the reasons why we want to get rid of it. The other side should not have that motivation. We should all be talking about how to make improvements.

Doug Young: I don't want to be devil's advocate, I almost feel like I need to defend it but I am not sure I can defend some citizen's suits. But we all know the history as to why those are in there. I don't know that I am going to respond and comment any more on that other than to say that I worry again as I said at the podium about doing too much. In the years I've been working on this we've had to thread the needle to find the sweet spot. There are strong political factors at work if we were to try to sweep away the citizens suit provision. It would draw a target that would result in us not passing some Good Sam legislation. And that is an issue that unless we are willing to make some concessions and thread the needle on it, we are not going to be successful in getting something through. I am not disagreeing with Carolyn at all. All I am doing is bringing a political cast to this and saying that we understand the citizen suit, it's a hindrance for us to get stuff done, but if we go so far as to say that citizens suits as a concept legally should be stricken and that we are going to use Good Samaritan legislation to make them not available in the Good Sam context, then that creates a target and philosophically and we are not going to get the environmental community to support that. I'm not disagreeing, but I'm being realistic politically. We do have to address the citizens suit provision because it is one of the reasons why people aren't doing projects, but there ought to be a way that we surgically deal with that and only have it dealt with in *this* context and not take the big ball of wax and the whole concept of citizen suits. I think that is one of the reasons why we haven't gotten anything passed in 25 years.

Jeff Parshley: I question your statement that none of the environmental groups would get on board. This actually goes to the question I wanted to ask Jason and Carrie. It's pretty easy to group people into *doers* and *suers*. Fortunately, we have representation from the doers here and we see what can be accomplished. My question to both of you and I know there is at least one representative from the Nature Conservancy here, do you guys worry about citizens lawsuits when you take on these projects? Is that something that concerns you?

Carrie Monohan: Yes, there are doers and there are suers and we are not suers. However, the CWA citizen lawsuit provision is really key to accountability in our country and I can't see getting rid of it. Though I don't think suing people is a way to get things done but I will tell you that I have worked on projects where they have looked at me and said "if you would just sue us we could get the funds that you need to do the work what we want to do." So, I think that is a great question and the agencies can't always get internal general funds distributed towards remediation unless there was a lawsuit. So, I've been begged the other way and we've refused and we have done it the harder, slower way.

Jason Willis: With regard to non-point source projects, or dirt moving projects, I don't think we've had much concern on the threat of lawsuits, but when you start bringing on water and water treatment, those are things we've been averse to doing. How many citizen suits have there been for point-source treatment at abandoned mine sites? I don't think it's a lot in numbers. There's a grey area...it's about ranking the risk and seeing what you can do. We try to take on these projects that we don't feel have as much of a risk of a suit and that we have a good workplan and supporting documentation in place that will hold up and support the work that we do. For the most part, no is the short answer for the questions, for non-point source.

Jeff Parshley: So, you look at low-risk projects and make sure you've done all your work right, to mitigate the risk. To clarify, I don't think anyone here is talking about removing citizens suits from CWA, we are talking about relief for a Good Sam for just Good Sam projects.

Carolyn McIntosh: Jeff, thank you for that clarification that is precisely what I meant...under the Good Sam legislation that there would be exceptions to the citizen suit provisions that are otherwise maintained in both the statutes. But the EPA in the various comfort letter and AOC provisions that I identified as tools that can be used to promote certain projects, a good portion of the negotiations, the language included, the time and cost of putting that together are designed to protect against citizens suits. I think that alone speaks to the citizens suits in this context are not helpful.

QUESTION 2

Shahid Mahmud: Carolyn, I missed your talk as I had to catch a call but there are O&M requirements compliant with Chapter 27 Title 47 of California requirements for surface water monitoring. There is substantial baseline monitoring, during monitoring, after monitoring, and long-term monitoring because we want to see what the water treatment is doing when we're treating it with these different chemicals being injected into a stretch of creek at the pilot project in California. I wanted to comment on realistic expectations because that's exactly what we need to be talking about, even on dirt projects. We've moved "X" amount of dirt, we've had 50%-60%-70% loading reduction, or some sort of eco-stuff that has revived. We've come up with a list of metrics that it would be worthwhile for our groups to talk about. We won't talk about it next week but going forward with projecting success and the outcomes we get from this is important. The risk communication and communication of successes we have is important. We want to get credit for these projects! There's a lot of things Jason and TU and others have done, maybe we should be giving more credit and I'm not sure what the structure is or if it is a website or whatever. We should be recognizing the successes, what was the goal, what did this project accomplish. If it's not communicated, then no one knows what's going on in Left Hand Canyon or Evans Gulch or whatever. These things should be recognized.

Carrie Monohan: Some of the most creative solutions that we've ever come across have come from industry and I can't see not working with industry on all of these different projects, so definitely wanted to put that out there. The idea of a pollution offset credit program, we've often wanted to look at especially around mercury. So, say have discharges in the California Bay Delta that have an NPDES permit at that location. What they would like to get credit for is cleaning up some of the mercury sources upstream. That is a difficult program to try and set up and it's wrought with issues, but it's still a darn good idea and I really think that figuring out ways to get industry credit for taking on these problems is a great way to incentivize them moving forward.

Jason Willis: I want to follow on Shahid's comment that the success of a lot of projects gets lost in translation, mainly because being short staffed (NGOs and agencies) it doesn't get done. My colleague and I cover all of Colorado so whenever we finish a project, with all its complexities you drop it and move onto the next one and prepare all your permitting and water quality and just keep going. It's not my strong suit to share the successes and we've been trying to do that with the agencies, and we call them the "show and shine" reports, at least that what the Regional Environmental Engineer with the Forest Service likes to say. He can make the call and bump them up the chain to Washington to make the Forest Service look good, but it's more of an afterthought. It's definitely something that needs to be addressed.

QUESTION 3

Jeff Parshley: On this topic of realistic expectations and how good is good enough. Jason you mentioned that on one of the sites you worked on it wasn't meeting the Cold Water Fisheries Category 1, and I know that Carrie in your comments this morning and this afternoon regarding mercury loads. When you take on one of these projects, what do you use for an expectation? What are your targets for these exercises? That's one of the key things we need to talk about.

Jason Willis: For Evans Gulch, the goal was to get that stream de-listed and achieve Table Standard Values – that was an overarching goal. We'll evaluate that in post project monitoring. It depends on what metrics we set up. Our Kerber Creek project is 8 years old. We had an improvement in macroinvertebrate indices, improvement in cover frequency index, reducing bare soil coverage, improving water quality, improving sinuosity including width to depth ratio on the degraded streams. So, we monitored these things on Kerber Creek specifically and reported on them in final report. It depends on what metrics you decide on for project development.

Jeff Parshley: So, if you think you can't make table values would you still take on the project, you know if you thought you could improve it but not get all the way there?

Jason Willis: Yeah, remember these are non-point source projects so we are not going to have an NPDES permit and we are not doing point-source treatment. It's overall watershed health that we are going for. So yes, we take on those projects...we don't always get to table values. It's incremental improvements. At the Kerber Creek Watershed in 1985 it was orange and didn't have any fish. Now it has a reproducing trout population. We worked with agencies, ASARCO, EPA, forest service and TU that made that a reality.

Carrie Monohan: I'll just add that there's an exposure pathway issue here. The response would be variable that we'll use to measure success. For our reservoir projects the goal is improving public health and wildlife health which means reducing fish mercury levels so the fish can be

consumed by people and wildlife without deleterious effects. The delisting from a 303(d) list, that is a great step towards that but we'll know when our approach works when we start seeing reduced fish mercury levels.

QUESTION 4

Debra Struhsacker: So, I want to return to Doug's "provocative" side since you set that tone and first of all want to thank the three *doers* that are here. Are there any other *doers* here? Are there any *suers* here? Well as you see the *suers* aren't here and they aren't going to be here. I want to disabuse the group of the notion that we can work with them. Carolyn hit the nail on the head. Some of them are in business to sue us. They are not in business to take this issue away. Un-reclaimed AML issues are a poster child for them that they use very effectively to foment concerns about modern mining. They point to environmental problems in old mines and say, 'we shouldn't have this mine in Minnesota, or Wisconsin or California or wherever it is, because it is going to cause problems just like that site over there.' They are never going to be here in good faith to have this dialogue. They know the citizens lawsuit provision is a deal cutter, so that is the entrenched position they are going to take. I'd like to ask Carolyn and Doug is there a way to constrain that citizens lawsuit provision in the context of Good Samaritan, so that it is limited to gross negligence?

Doug Young: My answer is yes. Over the years I have been involved in this, I proffered about 6 or 7 different ways to slice this. But the operating and beginning assumption that I have always had, and I think you have to. One is that you can't eliminate it completely – I just think that is a non-starter. And I know how passionately people feel about this topic, but you just won't get it through Congress if you eliminate it completely. There are ways you can have it remain in there, like you just described, where it applies only under these contexts. And the one that I've been pushing lately is that the citizen suit provision remains, and the typical reasons you can sue, such as the EPA is not enforcing, a violation of a permit, or there is gross negligence is still there. But the real issue preventing people to get at water projects is the long-term liability of a continuing ongoing release that doesn't meet water quality standards. That is the rub. So, I have been trying to suggest we have legislation that specifically says a citizen's suit is not allowed related to an ongoing release for a good Samaritan effort that improved water quality. In other words you cannot come in and file a lawsuit that would require the Good Samaritan and anyone involved in the site (landowner, agency, contractor, etc.) to go and get an NPDES permit for a point-source to maintain water quality standards *in perpetuity*. Let's just narrowly say you cannot file a suit to force someone to hold an NPDES permit for that ongoing release. So, the very short answer without getting into all the technical weeds, I think absolutely there is a way we can thread the needle here. But what happens, sorry to be repeating myself here, frustratingly is that it gets caught up in the larger agenda items about whether people like citizen suit provisions, or why most people sue and use that provision. And I want to make sure I clarify that I was not suggesting anyone was saying anything about getting rid of it. My point only is it's hard to find the "sweet spot" on narrow things that can work because we get wrapped up in these arguments. When you guys go into the breakout sessions this afternoon, the title today is can we do more cleanups with or without a Good Samaritan statute. If the answer is 'we want to do more with a Good Samaritan statute' than I am asking all of you to think hard about what you really HAVE to see in a Good Samaritan statute. Or whether you can come part way to the EarthWorks folks...they will continue to be who they are and they have influence with some people in Congress so we have to work with that. If we can do more with Good Samaritan legislation, what is your side of the table willing to look at to surgically doing this kind of thing?

What would you look at by way of reprocessing or remining – how would you be willing to make some concessions in that direction? We've been working at this for so long that we ought to be able to figure this out.

Carolyn McIntosh: I have a shorter answer and that it is going back to the word collaboration. If there is a willing agency partner...as the example from this morning. An AOC was developed for a project that didn't entirely meet water quality standards using statutory language relying on the "exigencies of the circumstances" to not meet those standards. So, if EPA felt like they had back-up, or backing if they were subject to criticism, they could go farther in the model language that they currently have, both in their comfort letters and the AOC. And if the AOC was made a little more flexible, so that it didn't have to be rewritten every time you go to a different site, I think a lot more projects could be done easier still within our current framework. So, I think it is feasible, but I feel like right now EPA doesn't feel like there's much support for going further than they currently are.

Jeff Parshley: Since we're on Doug's provocative comments...you made the statement why doesn't the industry want to do all these little projects out there? It's not that we don't want to, it's that the mining industry thinks big. So, Jason you talked about 600 yards you moved on that one site, that's about 20 minutes of work on a mine site.

Carrie Monohan: I got a bigger one.

Jeff Parshley: When you think about it in the context of the perspective of the mining industry...they look at these things with everything included, and they would love to take on and solve the WHOLE thing, take on the entire mine site and fix it. The problem with that is if you're not talking about a dry/slightly damp site, then you're talking about the water issues, then that becomes the sticking point with respect to CWA and CERCLA liability releases and citizen lawsuits.

Jason Willis: You bring up a good point. It's because Freeport and Newmont valued those particular little projects. That's how they're addressing the problems currently. We are working with Freeport on Mount Evans Mining Company property outside Crested Butte. The state managed the contract, we did some of hydrologic control design and the work completed on their property. Working with them collaboratively is something they like to do, but it is still small potatoes.

Jeff Parshley: Certainly, they like to do that, but they'd really like to get their teeth into some of these big ones.

Carrie Monohan: I have a few comments. The names that these mine companies worked under 150 years ago...they used to be tiny companies like Empire Star and Empire Mine that I run across in my historic document research, where are they now? Ah, they are called Newmont Mining Company. There is this concept of a PRP search and so maybe the way to approach this is lots of these little mines add up to who the big ones are now. I would absolutely love to be at the table with big industry looking at all these projects. There's a way to make money removing gravel from reservoirs. We've been working with Great Lakes dredging company and there's 123M cubic yards in one of our projects.

Jeff Parshley: I remember one project we bid on through the state of California. It was a small mine cleanup we found data showing there was a fair amount of free gold in the tailings. We proposed putting running tailings through a small gravity mill and moving it to an offsite repository. We determined we could do the project for nothing and still make money. We proposed that to the state, but they said ‘NOPE... you can only move it and put it into a repository. We are not allowed to let a contractor make money.’ True story.

Carrie Monohon: Another idea is that gold would have been from an environmental cleanup and one thing that Californian’s just love is these alternative products like “conflict-free diamonds” and a Prius, anything that can make an environmental difference. That was a very special kind of gold, environmentally friendly type of gold. We’ve worked with ethical metalsmiths who would love to make us an entire line of jewelry with gold from a mine remediation project.

QUESTION 5

Dennis Anderson: The title of the Summit is “With or Without Good Samaritan Legislation” and we haven’t answered that yet. There are a couple foundational questions I have: (1) What is the cost of going with the Good Samaritan route? Is it \$2000, \$5000, \$300,000? (2) What is the time it takes to obtain a Good Samaritan criterion? Is it 6 months, 2 years? 5 years? What is the tail on monitoring that project? 15 years? 30 years? (3) What size project would warrant the Good Samaritan rule and what are the criteria for that? Is it environmental, water, air, human receptors, how close are they? These are questions that I came to hear answers on, but we haven’t talked about cost, time, size of the projects.

Doug Young: I’ve been to so many of these conferences...you see the great work that people are doing, and they all work under a schedule and budget. I’d like to see more, we’ve been calling them “dirt projects”, there’s a lot of ability to do those projects now, you don’t need good Samaritan legislation to do those. The question is, and Shahid will be addressing those in the meeting next week, how can we make the existing process for dirt projects more efficient, less costly, less bureaucratic, more streamlined, not so long. Without a Good Samaritan statute there’s a lot of work we can do, we’ve heard about a lot of ways today on how streamline that. Where you need Good Samaritan is where people want to get at the bigger projects that people want to tackle head on, not just with source removal but with direct water treatment and there are a number of projects throughout the country that would fit that. But people are staying away from those like the plague because of the liability issues, citizen suit provisions, NPDES permits and long-term in-perpetuity requirements. For me it’s always been that Good Samaritan legislation is about going further. We are doing some great work without it, but we want to do more...and the more is going to be those. We haven’t had good examples to point to yet for those (because we can’t) so that is why we’re looking at Good Samaritan legislation through the lens of pilot projects. We can see how to devise things and sort through those costs and time schedules.

Carolyn McIntosh: I also think that it is a *time value of money* equation. If Jason says he has 2 staff people to do projects and if part of that workload is getting approvals up front and negotiating a Good Samaritan AOC that today requires a year minimum, then that’s one year’s effort not being spent in the field doing activities. It’s also a matter of going from incremental improvements as Jason described to getting closer to achieving the water quality standard

sooner in one project, rather than doing it incrementally in small projects and having the success realized over 8 years or decades later.

Ann Carpenter: I wanted to make a couple of comments. We're fixated on large projects, but we still make a lot of impact on the smaller ones. There are several mining companies in the room that have the appetite to go out and start cleaning up. They're right adjacent to old mine sites and old mining districts that need cleanup and could use a little love and they have equipment and people sitting on the sidelines, but don't want to do anything because it would trigger a liability (and onerous permitting time). So, in that case we're not looking at large projects, we're looking at optimizing peoples time and equipment to go and get blemishes that we look at every day from the mine site and think, 'gee I wish I could round them out, reseed them, stabilize it and all that.' The water aspect is what triggers the heaviest liability...there is an appetite for the EPA to work on "damp to dry sites", where "damp" is slightly sweaty. Even if they're small we can illustrate a lot of good collaborations together and get some work done to help motivate the frustration of not getting Good Sam legislation. It would be a motivator to get the legislation through and get things done at a larger scale. Shahid, we need the liability release mechanisms. So, I want to focus the room as we migrate into the breakout sessions that we want to talk about "damp to dry" sites. Yes, the big headaches are the wet ones, but there are opportunities from the good work that others have done on wetter sites on how we can advance that forward.

Carolyn McIntosh: Ann you make a good point about the appetite for mining companies to do these projects. But if a mining company directly goes out to do a project, they will have a target on their back. So, the structure that Trout Unlimited uses is the mining company funding the work for the NGO to do the work, or the NGO is doing work in partnership with state/local agencies – that is the structure that enables utilizing several provisions under CERCLA. You are either using an EPA contractor that gets protection, or you're using the provision of "rendering advice" which also gets protection. There are similar provisions under CWA...there are ways to navigate it through the collaborative partnership. Unfortunately, it means the mining company is not out there with their employees on their equipment moving dirt, but they can certainly fund that activity.

QUESTION 6

Erinn Shirley: I am with BLM out of the Washington Office. I have been at this for 10 years and we are often asked to help with this topic. Our AML program is based on collaboration. I'm wondering if in those early days if it was ever discussed if there was a fund to be put together?

Doug Young: Yes. The original bill from Mark Udall included a funding provision. In order to create a fund in legislation you have to have a funding source. For historical edification for everyone, the funding provision was patterned after Nevada's fund that you heard about earlier. So, the language we drafted and brought to Congress in 1990 was a fee-based formula on all BLM claim fees, precisely patterned after Nevada's State fund. We got absolutely nowhere with it. So, in the next version we had to split those out and have the Good Samaritan permitting and regulatory liability provisions and have a fee under a separate provision because it got no traction. So, the idea of how to finance and get the funding for these projects has been around since the topic began. Other proposals have been to create a reclamation fee, to include Good Sam in 1872 Mining Law Reform...it's been a big topic for lots of folks.

Erinn Shirley: I was thinking more of like how a third party could come to BLM and say here is say \$500,000 to cleanup that site. I am no lawyer but would think that would reduce the liabilities.

Doug Young: I think it is legal to do that now. You could do some legislation talking about how that fund is used and managed...you can do federal legislation to create those types of funds. If you're talking about combining different funding sources from different sources, you can do that now.

Erinn Shirley: But if our partners are willing to put forth the funding, without the Good Samaritan legislation, how else will that happen?

Carrie Monohan: The liability is based on who owns the land. So, I as the non-profit person with The Sierra Fund (so if you are looking at where to put your money to address this issue I just want to offer that), we work on remediating abandoned mine sites. The liability is with the landowner themselves and our involvement is to get that work done. The landowner has that liability now and every time it rains there is a discharge. The landowner would like to take on a project to limit their discharge and if we do the work, they still have the liability at the end but hopefully it is not as bad as it was before.

Doug Young: So, you're saying the liability is not attached to the funding, but the owner and the release.

Jason Willis: I will jump in – the way TU has been working with federal agencies is we don't give them funding; they obligate funding to us. Whenever we do work on federal land it's been through an action memorandum, not as Good Sam legislation. We are either the response action contractor, or are rendering care and assistance under the NCP, or an AOC which resolves some of the liability.

QUESTION 7

John ???: As you know in some of the major mining companies, reclamation and closure groups have been decimated - when you go to a major mining company to work in the closure group, you are working yourself out of a job. When mining companies want to do Good Samaritan work, it's not so much that they want to use their equipment, it's about figuring out how they can keep their people, plan the work with and do it for the right price and the right way. Much of that expertise is being lost in companies right now.

Jeff Parshley: ...or being un-utilized because the expertise is in the people not being used because they can't put their equipment on the sites.

John ???: Many of them have looked at even competing with consulting firms – they ask how can they keep their closure groups?

Jason Willis: With Freeport they sent out a lot of their folks from AZ from their closure group to Colorado to give technical advice and expertise on how we should close the site. That is not lost in translation whenever we do reclamation actions; they want to see their money well spent and done appropriately. I'll take all that I can get and get as much technical knowledge that I can. We

really appreciate it when they send their technical folks out. They might not send equipment, but the technical expertise is there.

Carolyn McIntosh: For any of these projects in order to get statutory protection you must have a work plan and you have to have a monitoring plan. So, if there is a group like Hydrometrics or a group that is already eligible for EPA contractor status or operating under the advice provision of the statute, they would be eligible for that protection from liability as well, as long as that is how EPA approves the project.

QUESTION 8

Debra Struhsacker: Are any of the panelists familiar with some the projects along the Colorado Front Range, the Denver area, where there are water providers treating mine water as a source of municipal water? I would just throw that out as a broader example. Are water providers in the thirsty urban west our best potential Good Samaritans for addressing the complex sites with water issues? Where you would have an incentive for a water user to have an active water treatment system and basically a perpetual need for clean water? Does anyone know of those sites?

Doug Young: I know of one, I think it is the Eagle Mine where there is a water provider that is attempting to go into the mine works and divert the water from flowing through the mine works and picking up the acid mine drainage. They are trying to capture it up way into the works so they can divert it and use it as a water source...or as augmentation water to use it somewhere else. It's probably a Superfund site. They're not doing treatment, but by moving the water away from having flown through the site it's not picking up contamination and not putting it into the watershed. It's a proposal that they're still trying to get through the regulatory regime. I think your point is a good one that there are other non-traditional allies and partners to consider.

Carolyn McIntosh: For the most part those water providers want the water, they want nothing to do with the actual AML, they're not touching the land, they are just taking the water.

NOTES AND QUESTIONS FROM THE AFTERNOON BREAKOUT SESSION

Group 1

Cami Prenn /MDA
Kelsey Sherrard /Terraphase
Carrie Monohan/TSF
Doug Young/Keystone Policy Ctr
*Gary Lawkowski/DOI
*Nate Pepe/BLM-NV
Jeryl Gardner/NDEP
Jeff Parshley/SRK
Adam Stellar/Coeur

- I. Site Characterization Criteria**
 - SAP – Targeted Sampling
 - QA/QC
 - Real estate transaction – economics
 - Receptor proximity
 - Water, water, water!
 - Wildlife, Threatened & Endangered (T&E)
 - Cultural
 - Long-term operating & maintenance (O&M) – no to low cost
 - Detailed historical review
 - Stakeholder incentive – Tax break, credits and offsite pollution offs mitigation

- 2. Day/Damp Sites**
 - Twin buttes
 - Big ledge
 - Mercury mines – Lovelock to Winnemucca

- 3. b./c.**
 - Site specific criteria
 - Limit risk to zero
 - Human health criteria
 - Future land use risk assessment
 - Liability vehicles
 - Clean up LLC
 - NGO3
 - Existing operator
 - PRP research
 - 107d contractor
 - Umbrella policy

- 4. New Partners**
 - Tribes
 - Local officins/Gov't.
 - Local chambers
 - Local NGO3
 - Water providers
 - Renewable energy
 - USACE
 - USGS
 - NRCS
 - RAC3

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- Ranchers
- Faith-based environmental groups
- Foundations
- Podcasts

Group 2

Nick Graham/The Sierra Fund
Jette Seal/ Owner/Operator
Thom Seal/ Prof. UNR
Paul Jones/Retired
Dee Lloyd/BLM, AML
Ellie Maley/Jacobs Eng.
Mike Medina/Testing Lab
Josh Fortmann/Consultant

1. **Site Characterization**
 - Historical land use
 - Hazard identification (baseline)
 - Pathway of exposure?
 - Metrics for release
 - Long-term stability
 - Achievable improvement goals met and reduced exposure
 - Liability Vehicles
2. **Potential Pilot Demonstration**
 - Combine Site location map with precipitation records and inventory
3. **List of partners**
 - Gov. - BLM, DOM, USFS, NDEP, USACE, USGS, DOC, BMRR, NPS, County, City, DOE, NIOSH
 - NGO – Trout Unlimited, The Sierra Fund, NSF
 - Private – Landowners, academics
4. **New Partners**
 - Water districts
 - Tribal organization
 - Alternative energy companies
 - Recreational tax incentives, equipment supply
 - Social Media – Engage public
 - Cooperate incentives (tax break)
 - Professional sports team
 - Inter-agency collaborative efforts!!

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Group 3

Ron Cohen – CSM
Jason Willis – TU
Mark Compton – AEMA
John Callan – BLM
Leonard Santisteban - FMI
Carolyn McIntosh - Squire Patton Boggs
Kenneth Tullar – Nevada Explorations
Tom Callicrate – Nevada Mineral Exploration Committee
Kurt Miers - BLM
Shahud Mahmud – (EPM)

Note: Poster pages were illegible. Following is based on handwritten notes.

Criteria for AML

Site chemistry
Risk evaluation
No water present
Historical data
No Superfund site
Contaminants of Concern (COC) and feasibility for treatment
Ability to make a difference
Repurposing financial opportunity and
Stakeholders
\$ funding

Metrics

State or federal specific
Cover frequency
Fish support
TCLP/SPLP
Soil quality
Dust and air quality
Land use area reclamation

Liability release vehicles

Site specific water standards

Group 4

Jaine Moan – TNC
Andrew Harley – Durafast
Jack McPartland – MLI
Susan Wager – Geologist & MMSA
Jonathan Zittel - NDEP AML
Dave Davis – BLM, NV State
Annelia Tinkelberg – Intera

1. **Site Characterization**

- USGS Criteria, screening composite recoveries, handheld data or
- Sampling plan
- Cultural historic features
- Biology
- Hydrology
- Chemistry
- Soil moisture
- Land use restrictions
- Collaboration – stakeholders
- Any available baseline studies, disturbed baseline

Release Metrics

- Looking for improvement from the baseline as determined by monitoring of site characteristics
- Stakeholders
- Engineering Evaluation & Cost Analysis (EECA) & feasibility studies
- Risk assessment
- Geological, health, receptor pathways
- Protect waters of the state
- Receptors, human and wildlife
- Select a remedy for a site that meets or protects the receptors of the site
- Site specific
- State agency regs
- Stakeholder metrics (habitat qualifications)

Liability vehicles

- Contract to states
- 3rd party NGO
- Mines provide funding and expertise w/o assuming liability
- Contracting requirements / GSA
- Higher rates for work (mining company with their expertise and equipment could clean up with a fraction of cost needed to retain approved contractor)

2. **Candidate Sites**

- There is no comprehensive list
- States have lists, NGOs
- Put lists together
- Different agencies have different mandates, NDEP environment, safety
- Damp to dry
- Urban interface areas
- Tybo tailings
- “Lower Rochester” Mercury
- Adelaide
- Goldfield
- Need to work with state and fed agencies to identify dry sites
- Bonnie Claire
- Twin Buttes

- Tonopah
 - Castleton tailings
 - American antimony (near Winnemucca)
3. **Partnership/Collaboration “New Organizations”**
- Chucker or Rocky Mountain
 - Habitat restoration groups
 - Sage Grouse
 - Recreation groups
 - State agencies, NDOW, NDEP, NDOM
 - Bureau of Indian affairs and Tribal entities
 - Job training opportunities
 - Federal agencies, BLM, EPA, USGS, USACE, BOR
 - Communities (Chamber of commerce, Economic Development Agency)
 - Counties
 - Nature conservancy
 - Closure that leads to additional development

Group 5

Rob Ghiglieri - NDOM
Deborah Struhsacker – Struhsacker Consulting
Honore Rowe - RESPEC
Marge Memott - Broadbent
Elizabeth Zbinden – Independent Consulting Geologist
Ian McIntosh – SRK
Erinn Shirley – BLM

Site Ox – Yes, but know your goals.

Pilot sites-

Looney Mine
Twin Buttesm NV
Tuscarora, NV – Hg – Tourists
Pershing County, Bucker Rochester Mine

Municipal Water Authorities
Interstate Mining Commission
Rocky Mtn Elk Foundation
NV Bighorns
Ducks Unlimited

Counties
State Agencies – Parks
Recreation Groups
Alternative Energy

APPENDIX B – TERMINOLOGY AND DEFINITIONS

| | |
|-----------|---|
| AEMA | American Exploration and Mining Association |
| AMD | acid mine drainage |
| AML | Abandoned Mine Lands |
| AOC | Administrative Order on Consent |
| ARD/ML | acid rock drainage/metal leaching |
| ARAR | Applicable or Relevant and Appropriate Requirements |
| ARPA | AML Reclamation Partnership Act (H.R. 2937?) |
| AWAR | Advance Work Authorization Request |
| BLM | Bureau of Land Management |
| BMP | Best Management Practice |
| CEQA | California Environmental Quality Act of 1970 |
| CCWF | Clear Creek Watershed Foundation |
| CDPHE | Colorado Department of Public Health and Environment |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CMC | Colorado Mountain College |
| CSM | Colorado School of Mines |
| CWA | Clean Water Act |
| CY | Cubic Yards |
| DRMS | Colorado Division of Reclamation, Mining, and Safety |
| EE/CA | Engineering Evaluation and Cost Analysis |
| EPA | Environmental Protection Agency |
| FWS | Fish and Wildlife Service |
| GS | Good Samaritan (“Good Sam”) |
| MMSA | Mining and Metallurgical Society of America |
| MOU | Memorandum of Understanding |
| NCP | National Oil & Hazardous Substances Pollution Contingency Plan (or National Contingency Plan) |
| NDEP | Nevada Division of Environmental Protection |
| NDOM | Nevada Division of Minerals |
| NEPA | National Environmental Policy Act |
| NTF | Nevada Trust Fund |
| NFF | National Forest Foundation |
| NGO | Non-governmental organization |
| NMA | National Mining Association |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| O&M | Operations and maintenance cost |
| PRP | Potentially Responsible Party |
| QP | Qualified Professional |
| RAMS | Restoration of Abandoned Mine Sites (program of the Army Corps of Engineers) |
| RCRA | Resource Conservation and Recovery Act |
| SHPO | State Historical Preservation Office |
| Superfund | See CERCLA |

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| | |
|-------|--|
| SPLP | Synthetic Precipitation Leaching Procedure |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TSCA | Toxic Substances Control Act of 1976 |
| TSF | The Sierra Fund |
| TU | Trout Unlimited |
| USFS | U.S. Forest Service |
| USGS | U.S. Geological Survey |
| USMIN | USGS mineral deposit database project |
| VCUP | Voluntary Cleanup and Redevelopment Program (Colorado) |
| WGA | Western Governors Association |
| WOTUS | Waters of the U.S. |
| WQS | Water Quality Standards |

RCRA Definitions*

- **Disposal:** Discharge, deposit, injection, dumping, spilling, leaking, or placing of solid or hazardous waste into or on any land or water so that it or any constituent may enter the environment, including groundwater (RCRA §1004(3))
- **Solid Waste:** Garbage, refuse, sludge, other discarded material, including solid, liquid, semisolid or contained gaseous material, excluding domestic sewage (RCRA §1004(27))
- **Hazardous Waste:** A solid waste or combination of solid wastes that because of quantity, concentration, physical, chemical or infectious characteristics may cause an increase in mortality or serious, irreversible illness or pose a substantial hazard to human health or the environment when improperly managed (RCRA §1004(5))
- **Storage:** Containment of HW that does not constitute disposal (RCRA §1004(33))
- **Treatment:** Any method, technique or process to change the physical, chemical, or biological character of any HW to neutralize or render the waste nonhazardous, safer to transport, amenable to recovery or storage or reduced in volume (RCRA § 1004(34))

*The RCRA definitions are taken from Carolyn McIntosh's April 2018 AML Summit presentation.

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APPENDIX C – SUMMIT PARTICIPANTS

| First Name | Last Name | Company | Category 1 | Category 2 |
|------------|------------|--|------------|----------------------------|
| Behrooz | Abbasi | University of Nevada, Reno (UNR) | Academia | Academia |
| Opal | Adams | OAR, LLC | Industry | Consultants |
| Dayan | Anderson | MMSA; Onyx Mining & Sustainability Services | Industry | Consultants |
| Dennis | Anderson | NSM | | |
| Britta | Beckstead | Western Governors' Association (WGA) | Government | State Agencies |
| Allen | Biaggi | Nevada Mining Association (NVMA) | Industry | Trade Associations |
| Ronald | Breitmeyer | University of Nevada, Reno (UNR) | Academia | Academia |
| John | Callan | Bureau of Land Management (BLM) | Government | Federal Agencies |
| Tom | Callicrate | Mountain Gold Claims, LLC | Industry | Mine/Exploration Companies |
| Ann | Carpenter | MMSA, SRK Consulting/Remote Energy Solutions | Industry | Consultants |
| John | Churchill | Geological Society of Nevada | Industry | Trade Associations |
| Ronald | Cohen | Colorado School of Mines (CSM) | Academia | Academia |
| Mark | Compton | American Exploration & Mining Association (AEMA) | Industry | Trade Associations |
| David | Davis | Bureau of Land Management (BLM) Nevada | Government | Federal Agencies |
| Richard | Delong | EM Strategies, Inc. | Industry | Consultants |
| Kurt | Englehart | U.S. Senator Catherine Cortez Masto | Government | Congressional Staff |
| Thomas | Feehan | Boart Longyear | Industry | Vendors/Services |
| Josh | Fortmann | Broadbent & Associates, Inc. | Industry | Consultants |
| Alan | Frank | Boart Longyear | Industry | Vendors/Services |
| Jeryl | Gardner | Nevada Division of Environmental Protection (NDEP) | Government | State Agencies |
| Rob | Ghiglieri | Nevada Division of Minerals | Government | State Agencies |
| Nick | Graham | The Sierra Fund | Non-Profit | Conservation |
| Garry | Gray | Western Environmental Testing (WETLAB) | Industry | Vendors/Services |
| William | Green | Geochemistry Consultant | Industry | Consultants |
| James | Gusek | Linkan Engineering | Industry | Consultants |
| Andrew | Harley | Duraroot Environmental Consulting, LLC | Industry | Consultants |
| Janine | Hartley | J Bar K Consulting LLC | Industry | Consultants |
| Christine | Hauts | Lode-Star Gold Inc. | Industry | Mine/Exploration Companies |
| Mellisa | Hurt | McClelland Laboratories, Inc. (MLI) | Industry | Vendors/Services |
| Paul | Jones | Mining & Metallurgical Society of America (MMSA) | Industry | Trade Associations |
| Travis | LaChapelle | U.S. Senator Jacky Rosen | Government | Congressional Staff |
| Gary | Lawkowski | U.S. Department of Interior, BLM | Government | Federal Agencies |
| Dee | Lloyd | Bureau of Land Management (BLM) WO | Government | Federal Agencies |
| Gregg | Loptien | Agnico-Eagle USA Limited | Industry | Mine/Exploration Companies |
| Ken | Maas | U.S. Forest Service | Government | Federal Agencies |
| Thomas | Mackowiak | Geo-Logic Associates, Inc. | Industry | Consultants |
| Ellie | Maley | Jacobs | Industry | Consultants |
| Taurus | Massey | Quaterra Resources Inc. | Industry | Mine/Exploration Companies |
| Ian | McIntosh | SRK Consulting | Industry | Consultants |
| Carolyn | McIntosh | Squire Patton Boggs | Industry | Consultants |
| Jack | McPartland | McClelland Laboratories, Inc. (MLI) | Industry | Vendors/Services |

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| | | | | |
|-----------|-------------|--|------------|----------------------------|
| Mike | Medina | McClelland Laboratories, Inc. (MLI) | Industry | Vendors/Services |
| Margo | Memcott | Broadbent & Associates, Inc. | Industry | Consultants |
| Kurt | Miers | Bureau of Land Management (BLM) 1340 | Government | Federal Agencies |
| Jaina | Moan | The Nature Conservancy | Non-Profit | Conservation |
| Manoj | Mohanty | University of Nevada, Reno (UNR) | Academia | Academia |
| Shahid | Mahmud | Environmental Protection Agency (EPA) | Government | Federal Agencies |
| Patsy | Moran | Practical Geochemistry LLC | Industry | Consultants |
| Carrie | Monahan | The Sierra Fund | Non-Profit | Conservation |
| Cy | Oggins | California Division of Mine Reclamation | Government | State Agencies |
| Jeff | Parshley | SRK Consulting | Industry | Consultants |
| Kathleen | Pastor | Ser Mines Inc | Industry | Mine/Exploration Companies |
| Sergio | Pastor | Ser Mines Inc | Industry | Mine/Exploration Companies |
| Nate | Pepe | Bureau of Land Management (BLM) Nevada | Government | Federal Agencies |
| Cami | Prenn | Mine Development Associates a RESPEC Company | Industry | Consultants |
| Honore | Rowe | RESPEC | Industry | Consultants |
| Leonard | Santisteban | Freeport-McMoRan | Industry | Mine/Exploration Companies |
| Jette | Seal | Owner/Operator | Industry | Mine/Exploration Companies |
| Thom | Seal | University of Nevada, Reno (UNR) | Academia | Academia |
| Kelsey | Sherrard | Terraphase Engineering Inc. | Industry | Consultants |
| Erinn | Shirley | Bureau of Land Management (BLM) WO | Government | Federal Agencies |
| John | Smoot | 4D Geo Viz, LLC | Industry | Consultants |
| Adam | Stellar | Coeur Mining, Inc. | Industry | Mine/Exploration Companies |
| Lisa | Stillings | US Geological Survey (USGS) | Government | Federal Agencies |
| Debbie | Struhsacker | Struhsacker Consulting | Industry | Consultants |
| Ken | Tullar | NV Exploration Inc. | Industry | Mine/Exploration Companies |
| Tom | Temkin | Lode-Star Gold Inc. | Industry | Mine/Exploration Companies |
| Annelia | Tinklenberg | Intera Geoscience & Engineering Solutions | Industry | Consultants |
| Kip | Tonking | T&T Exploration LLC | Industry | Mine/Exploration Companies |
| Ben | Veach | Stantec Consulting Services, Inc. | Industry | Consultants |
| John | Vermillion | Environmental Products & Applications (EP&A Envirotac, Inc.) | Industry | Vendors/Services |
| Susan | Wager | Mining & Metallurgical Society of America (MMSA) | Industry | Trade Associations |
| Richard | Wanty | US Geological Survey (USGS) | Government | Federal Agencies |
| Gregory | Reller | Burleson Consulting, Inc. | Industry | Consultants |
| Spencer | Whitman | University of Nevada, Reno (UNR) | Academia | Academia |
| Jason | Willis | Trout Unlimited | Non-Profit | Conservation |
| Mark | Willow | SRK Consulting | Industry | Consultants |
| Nancy | Wolverson | Paramount Gold | Industry | Mine/Exploration Companies |
| Ryle | Yopps | Broadbent & Associates, Inc. | Industry | Consultants |
| John | Young | Great Basin Environmental Services, LLC | Industry | Consultants |
| Ashlee | Younie | SWCA Environmental Consultants | Industry | Consultants |
| Doug | Young | Keystone Policy Center | Non-Profit | Conservation |
| Elizabeth | Zbinden | Independent (Consulting) Geologist and Geochemist | Industry | Consultants |
| Jonathan | Zittel | Nevada Division of Environmental Protection (NDEP) | Government | State Agencies |

APPENDIX D – SPEAKER AND MODERATOR BIOS

Allen Biaggi, Consultant, Nevada Mining Association



Allen Biaggi is a third generation Nevadan from Douglas County and graduate of the University of Nevada, Reno with degrees in Hydrology and in Architectural Engineering Design. Mr. Biaggi was the Director of Nevada’s Department of Conservation and Natural Resources, a cabinet level position, under governors Guinn and Gibbons and was the Administrator of the Nevada Division of Environmental Protection under governors Miller and Guinn. During his tenure with the State of Nevada, Mr. Biaggi served on numerous boards and commissions including The Commission on Workplace Safety, the Governor’s Climate Change Committee, the Lake Tahoe Bi-State Fire Commission and sat on the Governing Board of the Tahoe Regional Planning Agency (TRPA) for six years, including three years as its chairman. Mr. Biaggi retired in 2010 after 31 years of public service. He is here representing Nevada Mining Association as a consultant.

Ron Breitmeyer, Ph.D., Assistant Professor, University of Nevada Reno



Dr. Ronald Breitmeyer is currently an Assistant Professor of Geological Engineering at the University of Nevada, Reno. He possesses a B.S. and M.S. in hydrogeology from the University of Nevada, Reno, and earned a Ph.D. in Geological Engineering from the University of Wisconsin-Madison. Dr. Breitmeyer has been at the University of Nevada for six years since leaving Exponent, Inc. where he worked as an environmental consultant specializing in financial and legal liabilities associated with environmental contamination and remediation. Dr. Breitmeyer’s research focuses on hydrologic contaminant transport from and containment of domestic, industrial and mine waste sites. Dr. Breitmeyer’s current research focuses on addressing environmental and natural resource risks associated with abandoned mine lands and development techniques for rapid and inexpensive site characterization and data collection. He currently has partnerships and collaborative projects with the State of Nevada Division of Environmental Protection Abandoned Mine Lands Branch, the Bureau of Land Management and private sector stakeholders in AML issues and is also finishing a National Science Foundation funded project investigating the interaction of wild fire and AML stability.

Ron Cohen, Professor Emeritus, Colorado School of Mines



Ronald R. H. Cohen, Ph.D. is Emeritus Professor of Civil and Environmental Engineering at the Colorado School of Mines and also has held an appointment as Professor Extraordinaire, Northwest University, Potchefstroom, South Africa. His expertise includes treatment and remediation of mine wastes, environmental site characterization for the mining industries, and remediation of America’s nuclear weapons sites. Dr. Cohen has worked on mining related uranium remediation in a South African watershed. He has consulted, served as an expert witness and lectured on mining and the environment in or concerning South Africa, India, Nepal, Brazil, Mali, Chile, Venezuela, Canada, China, England and in the USA. He received a Certificate of Special Recognition from the US Congress for remediation and restoration of nuclear weapons facilities in the USA, shared in the 1991 First Prize for Environmental Projects from the American Consulting Engineers Council for development of treatment systems for mining influenced water and received

the graduating class “Outstanding Professor of the Year” award for 12 consecutive years. Dr. Cohen has been interviewed about the Gold King Mine spill and the issue of abandoned mines with the NY Times, Wall Street Journal, LA Times, NPR, Colorado Public Radio, International Business News, The Guardian UK and US, Smithsonian, National Geographic, Al Jazeera, and local TV Stations.

Jim Collord, Chief Operating Officer, Thunder Mountain Gold, Inc. (Opal Adams presenting)

Jim has over 45 years of minerals experience in Nevada, Idaho and other western states that includes exploration, mine management, project construction, mine reclamation and project permitting. He worked in industry for about 30 years for large mining companies (Freeport and Placer) before migrating over to the Junior exploration sector. His permitting successes have included three mine environmental impact statements, numerous environmental assessments and associated mine-related state permits. His reclamation accomplishments include the management of site assessments and closure of several heap leach projects, waste rock dumps, tailings facilities, mine roads and other facilities. His work has resulted in a number of state and federal awards, including the USFS Forest Supervisor’s Award, recognition of the Big Springs Project as the first USFS “Hardrock Showcase Mine” in the United States, and the State of Nevada’s Excellence in Mine Reclamation (2004) award. Jim has been active in mine community sustainability efforts throughout his career and was instrumental in the formation of the Northern Nevada Partnership, a region-wide effort at looking at mine site assets during closure to provide ongoing economic viability to the rural communities. Since 2005, Jim has been managing Thunder Mountain Gold’s exploration efforts, overseeing the acquisition of South Mountain Mines in 2007, a high-grade base/precious metal deposit located in Owyhee County, Idaho. Exploration on the project has brought it to a pre-development phase, and an agreement with BeMetals to further develop the mine was inked in February 2019.

David Ellerbroek, Ph.D., Executive Director, Western Alliance for Restoration Management

David Ellerbroek and The Western Alliance for Restoration Management (WARM) is a nonprofit Colorado corporation, governed by a seven-member Board of Directors, most of whom come from Colorado higher education institutions and all of whom share experience in and passion for the challenge of cleaning up abandoned mine sites. Successful remediation requires broad interdisciplinary collaboration among geologists, chemists, botanists, public participation specialists, engineers, legal title experts, environmental lawyers, engineers, wildlife experts and other stakeholders and experts.

Jeryl Gardner, P.E., C.E.M., Supervisor Professional Engineer - Abandoned Mine Lands (AML) Branch, Nevada Department of Environmental Protection



Mr. Gardner has 20 years of experience working in the environmental industry. Mr. Gardner holds a BS in Environmental Science/Chemical Engineering from South Texas State University, and an MS in Hydrology from the University of Nevada Reno. Mr. Gardner has been a Nevada licensed Professional Engineer in Environmental Engineering for 11 years and is a Nevada Certified Environmental Manager. Mr. Gardner has been with NDEP since 2001, and *ten of those years, he has focused on complex environmental issues and solutions* associated with Abandoned Mine Lands (AML). The AML problems and solutions involve soil and water quality degradation, investigations, remediation, site closure and cleanups, and managing complex environmental/social/political/ economic issues associated with many AML sites across Nevada. Mr. Gardner is the NDEP, Bureau of Corrective Actions, AML Branch Supervisor and has been the NDEP project manager for the Anaconda Copper Mine Site (Site) for the past six years. He is also a lead

organizer for the interagency Nevada Abandoned Mine Lands Environmental Team, and is an active participant in the interstate groups, the National Association of Abandoned Mine Lands Programs, and the Interstate Mining Compact Commission.

Rob Ghiglieri, Staff, Nevada Division of Minerals



Rob Ghiglieri is a native Nevadan who received a Bachelor of Science degree in Geology from the University of Nevada. While attending the University, Rob, was a BLM wildland firefighter for four seasons where he was able to explore much of the Nevada landscape while on fire assignments. After receiving his degree, he worked as an exploration geologist for Rye Patch Gold. In 2012, he took a position with the Nevada Division of Minerals as a field specialist, and in 2013 became the Chief of the Abandoned Mine Lands (AML) Program. With the Division, Rob has performed AML inventories and closures in all 17 counties. Currently the Division's AML closure program continues to expand every year and new partnerships are being made nearly every project. Rob is Nevada's delegate for the National Association of Abandoned Mine Land Program. Rob is also a part of the Nevada Minerals Education Committee which performs two earth science workshops annually to educate K-12 teachers about the practical use and importance of mined materials, and the role that mining plays in our everyday lives.

Jeff Graves Director, Office of Active & Inactive Mines, Colorado Division of Reclamation, Mining, and Safety (Paul Jones presenting)

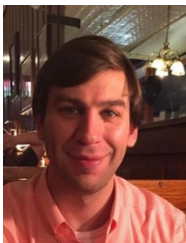
Jeff Graves, Director of the Colorado Inactive Mine Reclamation Program for the Division of Reclamation, Mining and Safety. Has been with the state of Colorado for 17 years designing and implementing abandoned mine reclamation projects throughout the state. Has a Bachelor of Science in Geology from the University of Colorado, and a Masters of Engineering, in geological engineering from the Colorado School of Mines.

Jim Gusek, Senior Project Manager, Linkan Engineering



Jim is based in Golden, Colorado. He graduated from the Colorado School of Mines in 1973 with a B.Sc. in Mining Engineering. He specializes in the design of passive treatment systems for mine influenced water. Since 1987, his work with acid rock drainage prevention and passive water treatment systems has included about 100 projects throughout the U.S. and internationally. He is on the steering and mitigation committees of the Acid Drainage Technology Initiative - Metal Mining Sector (ADTI-MMS). He joined Linkan in February of this year. He is a founding member and former president of the Denver Professional Chapter of Engineers Without Borders.

Gary Lawkowski, Deputy Assistant Secretary, Land and Minerals Management of the US Department of the Interior



Gary Lawkowski is the Deputy Assistant Secretary for Land and Minerals Management. He was previously the Counselor to the Solicitor of the Interior, a position in the Immediate Office of the Solicitor. The Counselor to the Solicitor provides various "legal services to different client-representative bureaus and offices within the Department, while reporting to the Deputy Solicitor and the Solicitor... and provide[s] legal counsel and representation to the Secretary, the Assistant Secretaries, and the Bureau Directors." Gary Lawkowski has worked for various conservative groups. After graduating from law school at the University of Virginia in 2011,

he was a “volunteer associate” at the Republican National Committee. He then went to work for the Federal Election Commission, first as counsel to current White House counsel Don McGahn, and then as counsel to Lee Goodman. Beginning in August 2015, Lawkowski was counsel to the Freedom Partners Chamber of Commerce, a Koch brothers-backed group.

Shahid Mahmud, Team Leader, EPA National Mining Team, US Environmental Protection Agency



Shahid Mahmud is the Team Leader for the United States Environmental Protection Agency's (EPA) Abandoned Mine Lands Team and the co-chairperson of EPA's National Mining Team and National Lead Sites Workgroup. He has over 18 years of experience with EPA in developing regulations and policies on environmental control and remediation of waste sites in EPA's Solid Waste and Superfund programs. Mr. Mahmud's areas of expertise include developing policies and guidance on mining and lead contaminated sites, Superfund remedy selection process, managing and implementing regulatory programs, and coordinating large projects between federal, state, and industry stakeholders.

Carolyn McIntosh, Partner, Squire Patton Boggs (US) LLP

Carolyn McIntosh counsels clients on complex environmental compliance matters and environmental, natural resources and commercial litigation. She has decades of experience in the extractives industry sector, including copper, gold, silver, iron, potash and lithium mining operations and asset purchase, lease and sales transactions – in the US and internationally. Her work includes due diligence, environmental compliance, leasing, permitting, reporting, remediation, financial assurance bonding, endangered species impact evaluation, and closure. Carolyn's public lands experience includes mineral leasing, claim staking, right-of-way acquisition, regional management plan development, mineral material sales, and NEPA and ESA issues. Carolyn is a partner with Squire Patton Boggs (US) LLP in Denver, Colorado, and serves as a Trustee of the American Exploration & Mining Association and a Trustee-at-Large of the Rocky Mountain Mineral Law Foundation.

Carrie Monohan, Ph.D., Program Director, Sierra Fund and Adjunct Professor CSU Chico



Dr. Monohan is a research hydrologist with over 10 years of experience designing and directing projects that address the impacts of the California Gold Rush. Her work on assessment techniques and prioritization efforts on mine scared lands in the Sierra Nevada have helped shape statewide efforts to address mercury contamination. In her combined role as TSF Program Director and CSU, Chico Professor Dr. Monohan integrates graduate student research into the projects that she directs. Her research projects include work at Malakoff Diggins, once the largest hydraulic mine in the world, and Combie Reservoir Sediment and Mercury Removal project. She has expertise in monitoring stream and groundwater conditions, measuring carbon sequestration, calculating sediment and mercury loading, sampling for trace metals during storm flows, measuring erosion and deposition rates, determining shallow groundwater well redox conditions, and identification of mercury and other heavy metal contamination sources. In addition to her research projects, Dr. Monohan participates in numerous collaborative efforts to implement regional strategies and incentivize multi benefit projects around mine remediation and reservoir sedimentation.

Debra Struhsacker, Environmental Permitting & Government Relations Consultant



Debra Struhsacker is a hardrock mining policy expert with over 30 years of hands-on expertise with the environmental and public land laws and regulations pertaining to mineral exploration and mine development. Ms. Struhsacker provides environmental permitting and government relations consulting services to mineral exploration and mining clients. She has a proven track record of successfully representing clients in legislative and administrative issues on the state and federal levels and in securing project permits for exploration and mining projects. Since 1993, she has been an active participant in the legislative dialogue to change the U.S. Mining Law. She has provided testimonies at Congressional hearings on the National Environmental Policy Act, on abandoned mine policies, and the state and federal environmental regulatory framework applicable to modern mines. Her legislative work in Nevada includes playing a key role in repealing a special state tax on federal mining claims, helping persuade legislators to abandon a legislative proposal to tax minerals prior to severance, and convincing legislators not to raise the tax rate on mineral, oil and gas, and geothermal energy production.

Jason Willis, P.E., Colorado AML Program Director, Trout Unlimited



Jason B. Willis is the Colorado Abandoned Mine Land (AML) Program Manager for Trout Unlimited based in Salida, Colorado. He has received a B.S. in Plastics Engineering Technology from Penn State Behrend and an M.S. in Civil and Environmental Engineering from the University of Pittsburgh. Prior to coming to TU, Jason worked for 4 years at various engineering firms in the disciplines of structural, geotechnical, environmental, and civil engineering. He began working as a contractor for TU in 2011 for nine months on the Kerber Creek Restoration project in Colorado. Jason was brought on full-time to Trout Unlimited in October 2012, and focuses on restoration of mining impacted areas, in-stream enhancement, soil and water chemistry, project management and oversight, as well as stream channel morphology and river dynamics. He is currently a registered Professional Engineer with the State of Colorado.

Doug Young, Affiliate, Keystone Policy Center

Mr. Young is a Senior Project Manager with the Western Land Group in Denver focusing on land exchanges with federal land agencies. He is also an Affiliate (formerly Senior Policy Director) with the Keystone Policy Center focusing on reaching consensus solutions to environmental and natural resource issues. Prior to these positions, he was a Senior Policy Director (2011-2014) for Colorado Governor John Hickenlooper where he worked on the full range of environmental policy issues, including oil and gas development, water policy, cleanup of contaminated sites, and abandoned mine cleanups. He was District Policy Director (1998-2011) for Colorado Senator and Congressman Mark Udall, primarily working on environmental and natural resources issues such as the cleanup and closure of the Rocky Flats nuclear weapons facility, wilderness legislation, forest fire policies on federal public lands, mine waste cleanup, R.S. 2477 rights-of-way, transportation issues, and open space preservation. He was a member of the Colorado Roadless Area Review Task Force, which developed recommendations for the management of roadless areas on National Forest lands. Before working for Congressman Udall, Doug was Director of Environmental Policy (1993-1998) for Colorado Governor Roy Romer. At this position, he worked on the negotiations over the Animas-La Plata water project, reform of federal grazing policies, numerous state environmental legislative issues, and various Superfund, clean air and open space issues. Before working for Governor Romer, he was an environmental policy advisor to Colorado Senator Tim Wirth. Doug is a graduate of the University of

Colorado (degree in Political Science) and the University of Colorado School of Law. During law school, he was a Law Clerk at the United States Attorney's Office in Colorado.

CONFERENCE MODERATORS

Dayan J. Anderson, M.S., MMSA(QP), Principal, Onyx Mining & Sustainability Services



Ms. Anderson has over 20 years of diverse experience in the minerals industry including mine operations, integrated mine and reclamation planning, environmental management, stakeholder engagement and sustainable development. She holds a B.Sc. in Mining Engineering from the Colorado School of Mines and a M.S. in Environmental Studies from Green Mountain College. In conjunction with her graduate studies, she assisted Natural Resources Canada in its social and environmental performance review of the mining sector and worked with the California Department of Fish and Wildlife to develop an adaptive biodiversity management plan on landscapes impacted by mining. She has served over 14 years with nonprofit organizations focused on environmental education, conservation, and the responsible use and stewardship of public lands. Ms. Anderson is a certified California Naturalist, a Councilor-at-Large and Qualified Professional Member of the Mining and Metallurgical Society of America, and an International Fellow with the Leadership for Environment and Development (LEAD) program.

Ann Carpenter, President, Remote Energy Solutions; SRK Associate



Ann is a mineral development professional with over 35 years of experience. She has global experience in corporate and business development including mergers and acquisitions, property and corporate valuation, and strategic planning and implementation. She has project development expertise, integrating permitting, feasibility studies, and sustainability measures. Her government and legislative affairs experience provides a diverse perspective of key development challenges.

Mark Compton, Executive Director, American Exploration and Mining Association



Mark rejoined AEMA after serving six years as the Utah Mining Association's (UMA) President. Having worked for AEMA, then known as the Northwest Mining Association, from 2008-2012 as the Government Affairs Manager, he already possesses an organic familiarity with the Association, its membership, and the issues. Additionally, Mark possesses over a quarter century of government affairs experience. Prior to his tenure at UMA, he served as AEMA's Government Affairs Manager and worked as a member of Idaho Governor C.L. "Butch" Otter's gubernatorial and congressional staff, where he handled issues focusing on natural resources and economic development in northern Idaho. He has a profound appreciation for the importance of responsible resource development to our economy and our way of life. He believes that by working together, AEMA and its members can ensure the U.S. mining industry remains strong and is able to produce the raw materials on which our modern society depends. He is a graduate of the University of Montana.

Jeff Parshley, Group Chairman and Corporate Consultant SRK Consulting North America



Mr. Jeff Parshley is a SRK's Global Chairman and a Corporate Consultant with more than 35 years of environmental and closure experience in the mining industry including closure planning and closure cost estimates. In addition to planning and analysis work for mines, he has also been involved in the management of several abandoned mines and implementation of actual closure works at several mines in the western United States. He has worked with legal and policy aspects of mining projects since his early career, regularly works on World Bank and IFC compliance projects and is also one of SRK's most experienced mine closure strategists and regulatory specialists. He has contributed to the development of several regulatory guidelines for mine closure and closure cost estimating and assisted a number of clients develop corporate standards and guidance documents for closure planning, implementation and cost estimating. Jeff is a regular mine closure and closure cost estimating instructor for in-house workshops conducted for a number of mining companies and several U.S. government agencies.

Paul Jones, Principal (Retired), Sovereign Management Group Ltd.



Paul C. Jones' professional and corporate experience spans more than 55 years in the mining industry in areas of base and precious metals, copper, coal & lignite, uranium, industrial minerals and building stone in over 20 countries worldwide. He has served as a President and/or Director of several public exploration and mining companies in the U.S., Canada and elsewhere during his career. In semi-retirement he serves currently as an Adjunct Professor in the Mining Department at Colorado School of Mines. Jones has been a member of the Society of Mining Engineers since 1958 and a member and officer of the Mining and Metallurgical Society of America where he received the 2005 President's Citation for his activities as Chair of the Governmental Affairs Committee. In February 2004 Mr. Jones received the William Lawrence Saunders Gold Metal from the American Institute of Mining, Metallurgical and Petroleum Engineers "in recognition of his service to the public and the minerals industry in legislative and political as well as technical matters, exemplified by his role as chair of the Summitville Task Force." He is a member of the Society of Economic Geologists and a member of several state, regional and national mining organizations where he has served as an officer and director. He is a past Chairman of the Board of the National Mining Hall of Fame & Museum and the CMA Education Foundation. Mr. Jones has a Bachelor of Mining Engineering Degree from the University of Minnesota, is a Registered Professional Engineer and Qualified Person under Canadian National Instrument 43-101.

Susan Wager



Susan Wager is a graduate of the University of Colorado – Boulder and has over 30 years of experience working as a Geologist in the Mining, and Oil and Gas industries. She serves as a Councilor – Colorado Section - Mining and Metallurgical Society of America and is on the Abandoned Mine Lands Conference team. An active member of several professional societies, she was the 2016 President of the American Institute of Professional Geologists - Colorado Section, and served as the Rocky Mountain Association of Geologists Science Fair Awards Committee Chair for 25 years. Ms. Wager is a native of Colorado and currently resides in Pueblo. Her maternal grandfather and great grandfather (and several uncles) worked as miners in Cripple Creek and Victor, Colorado, and in other mines in the Rocky Mountain region.

APPENDIX E – PARTICIPANT SURVEY RESULTS

Summary of AML Cleanup Conference Participant Survey

A survey was sent to the participants after the April 9 Summit. The survey collected 19 responses. Five of the responses were from speakers or committee members.

Questions were posed to identify what the participants felt were the most important and valuable aspects of the conference.

- ◆ Sixty-five percent of respondents thought the conference met or exceeded expectations and the event was well organized.
- ◆ Eighty percent of the respondents indicated that the information presented at the conference was useful and relevant.
- ◆ The speakers and panels were considered the most useful and informative aspects of the conference.
- ◆ One person preferred a speaker only format as compared to panels.
- ◆ All who answered wanted to continue having AML conferences.

Open suggestions and comments regarding future conferences were solicited to help guide the future activities of the AML Committee. Several participants mentioned that they would like to have more information and discussion about Good Samaritan legislation. A selection of other comments received is provided below.

- ◆ “Since the scope is on Good Sam, have the focus expand to legislative progress and outlook, and identifying what is needed to enact legislation.” (Several participants had similar observations.)
- ◆ “Involve more of the politicians so that some progress can be made.”
- ◆ To the question of having more conferences or not, one respondent replied: “Depends on if you can get legislators to attend or not.”

The most preferred topic for a future conference was more information about liability release vehicles, although all of the topics covered in the conference were considered important.

- ◆ “I thought the conference was really well done. I would appreciate a longer conference (multiple days), but I understand the logistical issues and peoples work schedules. Some video footage from some of the panelists would be interesting to see their work in a more "active" setting than just stills. I definitely thought it was well done and informative.”
- ◆ “Presentations were well organized. Most of the presenters seemed to know what they were talking about. I was surprised that the AML legislation has been in process for ~25 years. I was disappointed that there has been so little progress made and that little or no progress is apparent in the future.”

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- ◆ “I think more attention needs to be spent on the legal aspects of this action even though the political side of things seems to be the biggest hang-up to passing legislation. I'm concerned how any new law will mesh with existing law.”
- ◆ “I'd rather hear more detail on a limited number of topics than a little bit of detail on a lot of topics.”

Reponses related to the focus for next conference include:

- ◆ “Site Characterization seemed to be a very big issue in our breakout group, so I would maybe start with that and how the legislation will have an effect on that.”
- ◆ “About 15 minutes to update the lack of progress on the legislation then how to navigate the liability resulting in successful cleanups.”
- ◆ “I would find it useful to have more successful reclamation experiences discussed. I don't see the government being a contributor (except in a negative way) to AML. Industry should (must?) step up and reach outside of their expertise to solve this problem.”
- ◆ “It would be good to get more examples of projects completed or in progress.”
- ◆ Several respondents suggested having longer a conference and more technical detail.

Another question was asked about follow-up activities after the conference. The two most desired outcomes were:

- ◆ Provide regular updates about legislation, on-ground progress with demo sites, and other AML related issues.
- ◆ Offer webinars about AML topics.

The other suggestions included maintaining blogs about the issues and legislation, provide Web page updates, and share information about any opportunities to become more involved with advancing AML cleanup. The support for these other options was nearly as strong as the top two listed above.

Overall, the survey respondents had a positive experience at the conference and want to see the continuation of these AML conferences, ongoing communications and updates on these matters, and to explore other ways to support more AML cleanup.