PIONEER
TECHNICAL SERVICES, INC.

Comments and Recommendations Related to EPA's Draft Adaptive Management Site Strategy Alternatives for the Bonita Peak Mining District Superfund Site

December 27, 2019

This paper presents Pioneer's concerns, recommendations, and observations related to the EPA's proposed Site Management Strategy Alternatives for the Bonita Peak Mining District (BPMD) Superfund Site (November 2019) and provides recommendations for beneficial changes to the draft strategy. These comments and recommendations are based on Pioneer's extensive experience and expertise working at large mining sites addressed under CERCLA throughout USEPA Regions 8 and 10, and successfully building projects at dozens of abandoned mine sites and mining complexes. This experience is summarized in Attachment A.

The following are Pioneer's comments and recommendations for the primary issues noted in the EPA strategy:

1. Foremost is the fact that untreated releases of mining influenced water (MIW) to Cement Creek is not addressed as the clear and obvious highest priority. Approximately 867,000,000 gallons of untreated MIW has been discharged to Cement Creek from the recognized adit discharges in the time period between the commissioning of the Interim Water Treatment Plant (IWTP) in October 2015 and December 2019.
2. The fact that these well-documented MIW sources in Upper Cement Creek contribute the largest metals loads in the BPMD site is not readily apparent from EPA's presentation slides. A site-wide working conceptual site model (CSM) should be developed to help the public visualize and understand the geographic location and magnitude of these sources. This will allow the public to provide better informed input on the proposed strategy.
3. All proposed site strategy alternatives should first acknowledge and include the need for long-term treatment of MIW from these Upper Cement Creek adit drainage sources. The acknowledgment that the MIW sources in Upper Cement Creek are the largest sources impacting the Animas River is critical. This fact is stated in some alternatives, but this key point is often glossed over or buried in the EPA's list of pros and cons. For example, treatment is ongoing for one of the primary Upper Cement Creek sources at the IWTP, will be required for the foreseeable future, and by extension treatment should be the presumed remedial action for all other major sources within the upper Cement Creek drainage, with this being the overarching primary initial site strategy to reduce metals within the BPMD.
4. There may be ways to reduce or regulate the amount of water requiring treatment (e.g., possible additional bulkheading to enhance in-mine storage to optimize flow control options), optimize the treatment system operations, or replace aspects of the IWTP with better technology in the future, but these would become true adaptive management options for the site.
5. We believe that a worst first strategy is appropriate. The Cement Creek MIW sources are by far the largest sources in the BPMD and should be addressed first. Any residual opportunities for remediation would be unlikely to result in comparable additional reduction in metals loading. Addressing the Cement Creek MIW sources, moreover, would allow evaluation of water quality below A-72, followed by a reasoned assessment of whether or not any further remedial action would be necessary.

6. The most obvious and readily implementable first step to reduce metals loads from the BMPD overall would be to route as much MIW from the upper Cement Creek drainage to the existing IWTP as feasible.
7. If for any reason the IWTP is no longer capable of operating at capacity, the IWTP should be rehabilitated such that it can treat the major Cement Creek MIW sources. In any event, the IWTP should be operated at full capacity to treat as many sources as possible throughout the RI/FS period to provide immediate, measurable benefits to water quality.
8. Monitoring of the site conducted once the IWTP is being operated at full design capacity would then be used to measure benefits to water quality in Cement Creek and all downstream reaches, which would make a reach-by-reach assessment of the relative contributions of other potential source areas clearer and make it possible to prioritize any additional actions on a reach-by-reach basis (see also the comments on CAG PG Alternative 2b).
9. Running/rehabilitating the IWTP can be implemented through non-TCRA or expedited response actions before finishing the RI/FS, PP, etc., and, can then be incorporated into the ROD or an appropriate IROD. This technique was used successfully at the Butte Priority Soils Operable Unit (BPSOU) of the Silver Bow Creek/Butte Area NPL site where many TCRA, non-TCRA, ERAs, and voluntary actions were undertaken to address obvious and worst-first sources (including the capture and treatment of MIW), and many of these actions were subsequently incorporated into the BPSOU ROD.
10. The IWTP should be run at full capacity in order to address the most critical site needs while any additional targeted actions are developed, refined, and implemented in accordance with any of the potential final site strategies.
11. The timeframe for this portion of the strategy can be linked to the anticipated lifespan of the rehabilitated IWTP. Furthermore, the IWTP could be upgraded or replaced in the future and it is possible that newer technologies may emerge or that the volume of water may be reduced through selective bulkheading, in-mine storage, or other measures, but this gives time to complete any additional analyses and implement any other effective actions while reducing the metal loading to Cement Creek in the meantime.
12. Option 2b proposed by CAG/PG appears to be the best overall strategy of those presented. However, the lower Cement Creek, Reach 2, Reach 3, and Reach 4, portions should be pushed to the future in the timeline to allow monitoring, assessment, and development of truly adaptive site strategies and reach-by-reach prioritization in keeping with the reach-by-reach worst first approach stated in the title of this alternative. This worst first approach should clearly focus on the draining adits in Cement Creek. During the period of time that SGC ran its water treatment plant at Gladstone at full capacity, the data clearly showed zinc concentrations at A-72 being below the CDPHE's zinc target value.[1] If EPA were to operate its IWTP at capacity and similar results were achieved, the need and efficacy of other work in the lower reaches of Cement Creek would be obviated.
13. All site options would require a suitable repository, such as potentially Mayflower Impoundment No. 4. Blending and co-disposal of the WTP sludges and mine waste sources should be considered to stabilize materials and thereby reduce the vigor of the repository liner and cover designs.

[1] Evaluating the effectiveness of Sunnyside Gold Corporation's reclamation, San Juan County, Colorado, USA. Mine Closure 2019 - AB Fourie & M Tibbett, 2019 Australian Centre for Geomechanics, Perth, ISBN 978-0-9876389-3-9 https://papers.acg.uwa.edu.au/p/1915_99_Lange/

Other Issues:

1. After addressing the worst MIW sources in Cement Creek, efforts could be first focused on any smaller adits and solid mine waste areas identified in the HHRA that have potentially unacceptable human health exposure risks, followed by any areas that are demonstrated through the ongoing monitoring to be contributing to surface water impairment. All of these actions should be subject to a cost benefit analysis and completed only if sampling and monitoring demonstrate they are needed and that the additional actions will result in measurable improvements to water quality.
2. It will be much easier to identify any potentially significant sources and quantify the magnitude of such sources after the main Cement Creek MIW sources are addressed.
3. Most of the EPA alternatives have several concurrent activities that will limit the ability to adapt the site strategy and modify the approach as needed to fully realize the benefits of the adaptive management strategy. The schedule should be adjusted to implement critical measures first, and to then collect data and implement any additional measures incrementally and opportunistically as needed.
4. The compressed and concurrent steps identified in the strategy do not allow a true "adaptive management" approach to the site and limit the potential for new technologies and techniques to be identified and applied.
5. Data collected throughout the implementation process can demonstrate the effectiveness of actions performed and the progress toward goals. The data can also be used to support other potential remedial components commonly applied via adaptive management such as institutional controls (ICs), Technical Impracticability (TI) waivers, alternative water quality standards, etc., that will most likely become necessary components of any final remedy for this site.

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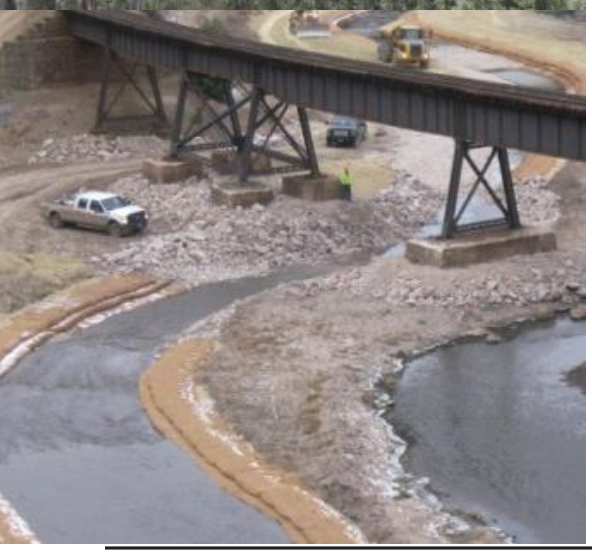
Engineering and Environmental Services for Abandoned Mine Land, NPL/Superfund and Reuse and Revitalization Projects



Remedial planning and oversight. Site management. Remedial investigations. Design work. Feasibility studies. Community interactions. Construction oversight. Long-term monitoring and maintenance. These are all components of the engineering skills that Pioneer has performed over the last 26 years in completing Abandoned Mine Land (AML) reclamation projects, National Priorities List (NPL)/Superfund remediation projects, and reuse/revitalization projects associated with restored mine lands.

About Pioneer

Incorporated in 1991 in Montana, Pioneer is a 100% employee owned, full-service engineering, environmental services, and construction management firm committed to providing simple solutions to complex engineering and environmental challenges. We provide honest, responsive, and cost-effective services to all our clients. This has resulted in steady growth over the last 28 years. Currently, we have 145 employees servicing the Rocky Mountain region from full offices in Montana (Butte, Anaconda, Helena, Missoula, Billings, and Bozeman), Idaho (Kellogg), and Nevada (Las Vegas) and from project offices in Colorado and Alaska.

In 1993, Pioneer was awarded what became a cornerstone contract with the state of Montana Department of Environmental Quality (DEQ) that helped us develop into a premier abandoned mine characterization and remedial design firm. Under the contract, we completed an inventory of over 400 high priority, abandoned, hard-rock mine sites in Montana, working closely with the U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), and Montana DEQ. Work included historical and cultural resource inventories, historical records and Potentially Responsible Party (PRP) searches, screening-level mapping and characterization, and risk evaluations. Specifically, we scored and prioritized the sites via the Abandoned and Inactive Mine Sites Scoring System (AIMSSS), *a system developed by Pioneer and adopted by the state of Montana, USFS, and BLM to prioritize mine and mill sites in Montana.* The work culminated in 1995 with a 14-volume report, including a summary that became the foundation for all government agency-led abandoned mine and mill site reclamation work in Montana.

EXHIBIT A

Mine Reclamation. Since 1993, Pioneer has completed reclamation and remediation design and construction management tasks for numerous mine waste cleanup projects in Montana and Idaho. In **the last 10 years,** we worked on multiple State of Montana, USFS, BLM/Army Corp of Engineers (USACE) and State of Idaho abandoned mine priority sites completing all aspects of the cleanup process including the following:

- Comprehensive site characterization and reporting for 24 sites.
- Engineering Evaluation/Cost Analyses (EE/CAs) for 24 sites.
- Full-scale reclamation design and construction management services for 17 sites.
- Maintenance duties at 7 sites.
- Reclamation monitoring at 17 sites and stream reconstruction work at 6 sites.

These projects each involved waste consolidation and repository designs, and, in total, included removal, isolation, or stabilization of more than 7 million cubic yards (cy) of mine waste. We have designed on-site and off-site waste consolidation areas and repositories with capacities ranging from a few thousand cy to several hundred thousand cy. Each design included an analysis of long-term impacts to groundwater, surface water, monitoring, and maintenance activities. We determined the need for and type of bottom liner, leachate collection system, and final cover based on an investigation of underlying soils, depth to groundwater, waste type, and proximity to drinking water sources. Each remote site presented unique challenges such as steep terrain, wastes located in sensitive areas, impacted drainages, acid generating materials, and other hazardous materials. Our staff met those challenges though knowledgeable, creative thinking, industry know-how, and continued communications with the client. Since the mid-1990s, Pioneer has held multiple, multi-year Indefinite Delivery, Indefinite Quantity (IDIQ) contracts with the Montana DEQ, Montana Natural Resources Damage Program (NRDP), BLM/USACE, BLM (Nationwide) and USFS for remediation and restoration of public and private lands impacted by historic mine activity.

Superfund Remediation. Currently, Pioneer provides engineering and environmental services at 5 mining-related NPL sites in the northwest: Anaconda Smelter, Silver Bow Creek/Butte Area, ACM Smelter and Refinery, and Milltown Reservoir Sediments/Clark Fork River sites in Montana, the Rico-Argentine Mine Site in Colorado and the Bunker Hill Mining and Metallurgical site in Idaho. *These are some of the largest and most complex NPL sites in the country, and we have provided cradle-to-grave engineering and environmental services on many of these sites*. We also provide on-going Superfund operations, monitoring, and maintenance activities at 5 operable units (OUs) within these sites. The experience gained from working at these sites translates into realistic, on-the-ground knowledge and confidence to handle any related tasks.