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October 10, 2018

Dustin Czapla
1313 Sherman Street, Room 215
Denver, CO 80203
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Delivered Via Email and Hard Copy

RE: Pride of America Mine, Colorado Stone Quarries, M-1999-058, Technical Revision - 5 to Modify Access to the Pride of America Mine, Adequacy Response 1

Mr. Czapla:

Please see the following responses to your adequacy review concerns of October 4, 2018.

1. Please describe in detail measures to be taken to control sediment from the historic eastern channel, one Yule Creek is diverted, to prevent additional sediment load to the creek downstream of the diversion.

The eastern drainage will link to the central Yule creek drainage at approximately 1,500 feet from the upstream diversion point; therefore, the potential to suspend and carry fines will be extremely minimal. Settling ponds will be constructed, the product of Rosgen Arch installation, periodically throughout the diversion to capture soil from upstream (Figure 1). Settling ponds will be monitored and sediment build up will be removed as needed. Additionally, colluvium, marble waste rock, and talus serves as the 'soil' medium above unexposed bedrock in the diversion – very little fines make up this substrate (Figure 2). Minor excavation of said material will be carefully placed outside the potential erosion zone of the diversion and barricaded by waste marble.

Timing of excavation is extremely important; excavation and creation of the diversion in late fall will minimize soil transport in low volume fall flows, snowpack from the winter months will serve to compact and cohesively seal any potential fines and loose sediment. Furthermore, any suspended sediment will quickly drop from the water as flows move downstream over steep slopes and minimal sediment loading will only occur during the first few weeks of high spring water flows through the diversion.

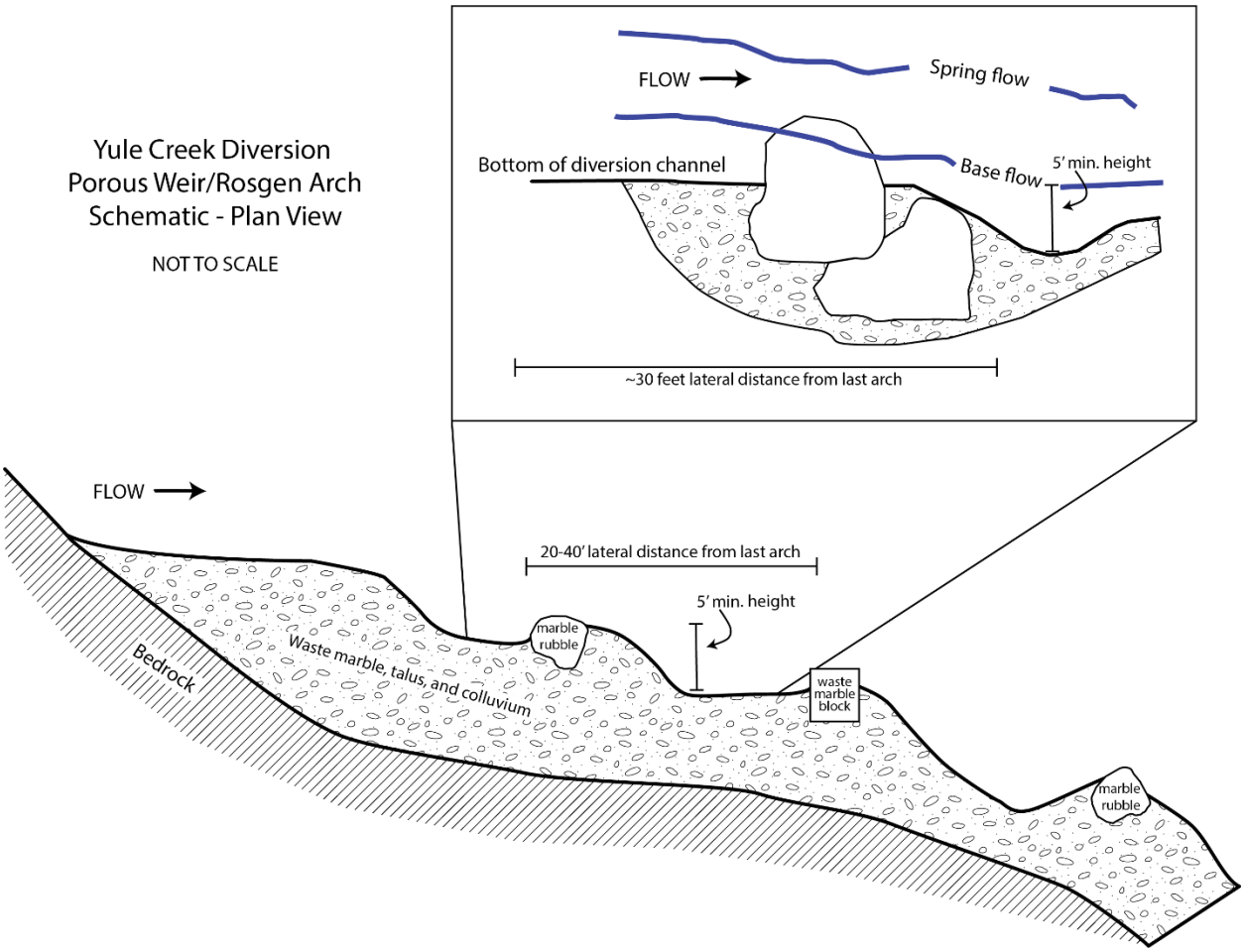

Figure 1. Rosgen Arch installation schematic. Image not drawn to scale. Figure annotated from "2004, WA Dept. Forestry, Porous Weirs: 2004 Stream Habitat Restoration Guidelines: Final Draft, Western Oregon University, Monmouth, Oregon. https://www.wou.edu/las/physci/taylor/g407/restoration/WA_Dept_Forestory_2004_Porous_Weirs.pdf"

Figure 2. Current state of the diversion approximately 1,000 feet from the point of diversion. Notice the abundance of marble rubble and exposed bedrock (grey cliff forming member) with minor soil and debris. View to the west. Photo captured 180918.

2. Please describe in detail the "Rosgen Arches" and any other stabilization features to be utilized within the diversion channel.

Rosgen arches, also referred to as porous weirs, will be installed every 20-40 horizontal feet with at least 5 feet of vertical capture space at each arch location (Figure 1). Porous weirs are the ideal solution routinely used in mountain environments to redirect flows and increase channel complexity through scour and sediment sorting. Water will flow over each arch into the next settling pond effectively slowing water flows (Figure 3). Each zone of capture, or settling pond, will be monitored and sediment build up will be removed as needed.

Porous weirs will be constructed by installing waste marble block and rubble along the diversion trend. Additional waste marble will be used to fortify the banks of each intended settling pond along the trend. Waste marble boulders and blocks will redirect flow by concentration water between individual rocks and mindful gaps will be maintained to ensure clear passage between arches for fish and other aquatic species. Arches will be constructed to form an upstream-pointing arch, in plan view, with the lowest point located at the apex of the arch. Porous weirs will also provide time and space for suspended sediment to fall out of the water column and settle within the succession of resultant arch settling ponds.

Figure 3. Example ‘pond’ structure of Yule creek just upstream of the point of diversion. Installation of porous weirs along the diversion will serve the same purpose as the metal weir in this image – to slow water flow and allow time and space for sediment to settle out of suspension. Installed weir is part of a flow monitoring for a potential hydro power project. View to the south. Photo captured: 180830.

Please do not hesitate to contact me with questions of concerns.

Regards,

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CC: Daniele Treves; Ben Miller, David Baumgartner (Gunnison County Attorney), USACE