

# STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY  
Department of Natural Resources

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## MEMORANDUM

John W. Hickenlooper  
Governor

Mike King  
Executive Director

Loretta Piñeda  
Director

**To:** Kate Pickford, Environmental Protection Specialist

**From:** Tim Cazier, P.E., Environmental Protection Specialist

**Date:** July 13, 2012

**Re:** Third Adequacy Review Animas Glacier Gravel, Permit No. M-2011-028

The Division of Reclamation, Mining and Safety engineering staff (DRMS) have reviewed Russell Engineering's Second Adequacy Review Response dated May 5<sup>th</sup>, 2012, but not received by the DRMS until June 12, 2012.

The following comments are specific to the aforementioned responses.

1. Relative to drainages associated with proposed access roads:
  - a. Revised culvert analysis – The DRMS appreciates the Applicant revising the analyses to reflect the proposed culvert designs on the drawings, but the revised analyses were not provided to the DRMS. Please provide the revised analyses.
  - b. Time of concentration overland flow path - The DRMS appreciates the Applicant revising the analyses to reflect more appropriate hydrologic parameters, but the revised analyses were not provided to the DRMS. Please provide the revised analyses.
2. Relative to drainage into Basin Creek:
  - a. Pond water management – The Applicant's response is unacceptable. Stormwater ponds must be dewatered within 72 hours. Please describe how this will be accomplished.
  - b. The stormwater conveyance response is adequate.
  - c. Retention pond design – this response indicates a significant change in the retention pond design. This May 5, 2012 response states: "The pond will not be lined, as this will allow infiltration to occur." The Original application (reference: fifth paragraph on page D-1 of Exhibit D) stated the sediment ponds would be excavated to 20 feet deep, be classified as non-jurisdictional, and lined with overburden clay "so that damage to the adjoining property will not occur or conflict with water pollution laws."

- i. Please discuss what has changed in the water pollution regulatory environment to allow the change in design.
  - ii. Drawing D-2, Animas Glacier Gravel Pit Details and Typical Sections (dated 05-04-2012) includes a dam with a clay core and no height limit.
    1. Given the change in design philosophy, are the ponds still intended to be classified as non-jurisdictional?
    2. The downstream face of the clay core is shown as vertical. How is a vertical face for the clay core to be constructed and compacted in fill?
    3. What type of material is the clay keyed into? If it is pervious, the applicant needs to demonstrate that the design head in the pond (which is not specified) will not be sufficient to cause a piping failure.
    4. The drawing shows a six inch layer of unknown size riprap on a 2H:1V slope with a geotextile filter. It is highly unlikely riprap will be stable on a 40 percent grade, even less likely on a geotextile. Please provide an analysis showing the riprap is appropriately sized to pass the 100-year peak flow. The riprap should be placed on a granular filter if the slope is greater than about 12 percent, unless it can be demonstrated to the satisfaction of the DRMS engineering staff that a geotextile filter will suffice. The DRMS engineering staff is aware of only one acceptable method for sizing riprap on slopes up to 40 percent. We therefore recommend using "Rock Chutes on Slopes Between 2 and 40%" (Robinson, K. M., C. E. Rice, and K. C. Kadavy. 1998. *ASAE Paper 982136*. St. Joseph, Mich. :ASAE). We further recommend the spillway gradient be flattened to at least 3H:1V, if not 4H:1V.
    5. Please commit to keeping the toe of the constructed embankment, or the crest of the pond (if it is 100 percent excavated) to a minimum of 250 feet from the rim.
3. Relative to the berm along the western edge of mining activity:
- a. The revised berm use response is adequate.
  - b. Despite the "grass" photograph provided with this submittal, the DRMS has little confidence in the Applicant being able to maintain a grass-lined swale except for possibly bunch grasses. The predicted 7.4 fps 100-year flow velocity will be erosive in a "bunch grass" lined swale. The flow velocity must be reduced to  $\leq 5$  fps, or the Applicant needs to commit to using a turf reinforcement mat (TRM), not an erosion control blanket (ECB) tested to withstand the 7.4 fps flow velocity and associated shear stress, or consider riprap.

If you have any questions, please contact me (303-866-3567 x8169 or [tim.cazier@state.co.us](mailto:tim.cazier@state.co.us)).