



COLORADO
Division of Reclamation,
Mining and Safety
Department of Natural Resources

Date: February 19, 2019

To: Tim Cazier, P.E.

From: Zach Trujillo

RE: Pikeview Quarry, DRMS File No. M-1977-211
Slope Stability Analysis in Support of Amendment AM-04

Tim,

As requested I have reviewed Stantec's Pikeview Quarry Backfill Stability Analyses for the Pikeview Quarry and supplemental information. Using this information, I constructed slope stability analyses using Galena – Slope Stability Analysis System (Galena) on behalf of the Division using the slope profiles and material properties submitted in Stantec's report within Amendment AM-04. The models utilized the Spencer-Wright Method with multiple surfaces which is suitable for circular and non-circular failure surfaces. A total of six scenarios were analyzed in Galena using Sections X, Y, and Z for both static and pseudo-static conditions.

During the review, it was observed that there was a difference in material profiles in Section Y and Section Z between the Stantec's geotechnical analysis and the supplemental information. In Stantec's analysis for the above mentioned profiles, "waste rock" material was used while in the supplemental information, "mine fill" material was used. The difference in materials used to construct the profile in the stability analyses leads to a noticeable difference in the resulting factors of safety. The following table compares the results from in Stantec's analyses with the Division's results.

Section	Factor of Safety					
	Stantec Results		Division Results			
	Static	Pseudo-Static	Static	Pseudo-Static	Static*	Pseudo-Static*
X	1.82	1.71	1.93	1.79	N/A	N/A
Y	1.58	1.47	1.57	1.45	1.41	1.3
Z	1.58	1.46	1.63	1.5	1.44	1.33
*Results replacing Waste Rock with Mine Fill.						

As shown by the above table, the Division's resulting factors of safety are higher or closely resemble that of Stantec's results when matching material profiles found in AM-04 are used. When using a different material profile of "mine fill" instead of "waste rock", the resulting factors of safety are lower. However, it should be noted that all values are stable and above the minimum factors of safety for critical structures

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using strength measurements resulting from multiple tests as outlined in Section 30, “Factors of Safety for Slope Stability/Geotechnical Analyses” in the Policies of The Mined Land Reclamation Board.

Please have Pikeview/Stantec provide the following information:

- Additional clarification on the difference between “mine fill” and “waste rock” materials and the corresponding strength parameters.
- Which material profile will be used when reclaiming the Pikeview Quarry?

This concludes my review of Stantec’s Pikeview Quarry Backfill Stability for the Pikeview Quarry. If you have any questions, feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'ZTJ', is positioned above the typed name.

Zach Trujillo
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