



STATE OF  
COLORADO

Ebert - DNR, Jared <jared.ebert@state.co.us>

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## Rose Red Quarry M-2013-068

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**Katie Todt** <katie@lewicki.biz>

Fri, Dec 7, 2018 at 1:56 PM

To: "Jared.Ebert@state.co.us" <Jared.Ebert@state.co.us>

Cc: "caleb@coloradorosered.com" <caleb@coloradorosered.com>, Environment-Inc <Environment-inc@outdrs.net>, Ben Miller <ben@lewicki.biz>, David Mosch <davidmosch@yahoo.com>

Jared:

Attached please find the 5<sup>th</sup> Adequacy Response for the Colorado Rose Red Quarry (M-2013-068) AM-02 submittal. Please allow this response to answer your 4<sup>th</sup> and 5<sup>th</sup> Adequacy Reviews (December 3 and 4, 2018).

Please do not hesitate to follow up with questions or concerns. A hard copy is en route to DRMS Denver.

Cheers,

Katie Todt, P.G.

Consultant/Geologist

Greg Lewicki and Associates, PLLC

(314) 704-4505



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**Rose Red Adequacy Response 4 and 5 181207.pdf**  
471K



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December 7, 2018

Jared Ebert  
Colorado Division of Reclamation, Mining, and Safety  
1313 Sherman St, Room 215  
Denver, CO 80203

**RE: Colorado Rose Red Stone Resource, M-2013-068, AM-02 Adequacy Response 5**

Jared:

Please allow the following Adequacy Response 5 to satisfy your Adequacy Review No. 4 dated December 3, 2018 and Adequacy Review No. 5 dated December 4, 2018; no Adequacy Response 4 was prepared or submitted to the DRMS as this Response 5 addresses items in Reviews 4 and 5. The items listed below include DRMS Review 3; GLA Response 3; DRMS Review 4 or 5; and GLA Response 5. This Adequacy Response 5 information follows the most recent DRMS review comments detailed in Adequacy Reviews 4 and 5.

**Adequacy Review No. 1 – Items identified in the DRMS letter dated January 8, 2018.**

### **Rule 6.3.4 Exhibit D – Reclamation Plan**

8. The Applicant's plan to close the mine openings using welded rebar cemented into place is not consistent with the standard adit closure practices. The Division recommends installing a grated adit closure with doors to allow the landowner access or a wire rope netting closure. Details regarding the specifications, materials required and the execution of these types of closures are available on the Division's website: (DRMS link, not included here). This document is the General Bid Specifications guide that our Inactive Mine Program uses as a standard for mine closures similar to this. The Division would accept a plan for closure of the mine openings consistent with these standard practices.
  - a. **DRMS Response 3:** Please clarify, is the applicant proposing a different closure method than that was originally proposed with the AM02 submittal? If a closure method is selected from the IMP guide, please indicate which closure method will be used.
  - b. **GLA Response 3:** The Operator wishes to utilize the 'Adit backfilling – Rockfill' method as defined on page 36/132 on the DRMS General Bid Specification guide detailed in your Adequacy Review dated June 18, 2018. Furthermore, the Rose Red Quarry wishes to remove the eastern most adit from their mine plan and will now and in the future operate using the two adits currently in place – Room #1

and Room #2 openings. Current calculations for backfill adit closure are detailed in the attached hand drawn schematic, pages 6 and 7, as well as the bulleted list below.

- c. **DRMS Response 4:** The Division acknowledges the Operator is now planning to backfill the Room #1 and Room #2 Adit with rockfill. To clarify, the “Adit Backfilling – Rockfill” is described on page 2-2 (page 36 of PDF) of the General Bid Specification Documents, dated March 2009. However, please clarify, page 132 of the PDF copy of this document is the Standard Drawing No. 12 for Concrete Block Bulkhead Seal Closure which is a different closure method than currently proposed?
  - d. **GLA Response 4:** To clarify, the procedure to be utilized – 2.5.2 Adit Backfilling – Rockfill – is detailed on page 37 of 132 (PDF pages) and page 2-2 of the DRMS General Bid Specification Guide, March 2009 edition. Page 36 of 132 (2-1) begins the chapter on Adit backfill while page 37 (2-2) details the specific proposed mechanism of rockfill. In response to DRMS Response 4, page 132 of the PDF copy does appear to contain Standard Drawing No. 12 for Concrete Block Bulkhead Seal Closure; however, this type of closure does NOT apply here and was never proposed. The page value 132 was included in GLA Response 3 simply to clarify how many pages were present in the PDF utilized; the potential source of confusion: 36/132 should be interpreted as “page 36 of 132 pages.”
9. The Division has conducted a reclamation cost estimate for the site and included the cost for installing three grated adit closures with doors for access. These costs are based on costs incurred by the Division’s Inactive Mine Program for closing similar adits. The cost estimate included with the application did not take account of a cost for spreading soil material or conducting revegetation. The attached estimate includes costs for these tasks.
- a. **DRMS Response 3:** A new reclamation cost estimate is enclosed. Please indicated is the applicant concurs with the estimate.
  - b. **GLA Response 3:** See response to Rule 6.3.4 Exhibit D – Reclamation Plan #8 above for explanation of Adit backfilling – Rockfill cost estimate for two adits.
  - c. **DRMS Response:** Based on the Geotechnical Analysis, it appears the applicant now intends to move forward with the surface quarry operation. Given this, the Division has re-evaluated the reclamation cost estimate to account for the surface quarry operation and included the adit closure costs submitted with your response letter. The cost estimate is enclosed for your review. Please let me know if the applicant concurs with the estimate.
  - d. **GLA Response 4:** The applicant concurs with the cost estimate.

#### **Rule 6.5 – Geotechnical Stability Exhibit**

16. Page 67 of the stability analysis indicates an area of potential failure was estimated for the combination of Joint Orientation 6 and 7. The report shows an area where stabilization may become necessary if the excavation were extended in that direction. Please depict the location of this area on the Exhibit E-1 map. If this area will eventually be mined please indicate how this area will be stabilized to prevent failure or otherwise mitigated.

- a. **DRMS Response 3:** The Division could not located Joint 7 on the revised Exhibit E-1 Map or the strike and dip lines. Please revise the map to include these features.
  - b. **GLA Response 3:** Map E-1 is replaced by GLA Map ‘Colorado Rose Red – Gallery Map.’ Fractures within the underground workings of the site as well as along the highwall above the entrance is included on the new GLA map. Discussion of potential fracture movements in included in the attached Geotechnical report generated by GLA titled “Geotechnical Analysis of the Colorado Rose Red Granite Quarry” dated November 2018. ‘Colorado Rose Red – Gallery Map’ is located in Appendix 2 of the above listed report.
  - c. **DRMS Response 4:** Map E-1 is the Pre-Mining Map that includes all the information required by Rule 6.3.5(2). This map also provides the mining plan for the proposed surface quarry. Upon review of the new “Gallery Map,” this map appears to depict the proposed underground workings. Given this, the new “Gallery Map” should likely replace “Figure c” map that depicts the underground working originally submitted with the AM02 application and not Map E-1. Please confirm or clarify? If the “Gallery Map” is to replace Map E-1, please update this map to include all of the required information from Rule 6.3.5(2), this map should also include the details for the surface mining operation.
  - d. **GLA Response 4:** Please consider “Gallery Map” as a replacement to “Figure C” in the originally submitted AM02 Application. No changes were made to Map E-1 and no changes are proposed.
19. According to page 65 of the application the interior roofs of the ‘rooms’ were not included in the stability evaluation performed for this study. Please provide a geotechnical evaluation of geologic hazards associated with the existing and proposed underground roofs and ‘rooms.’ Based on this evaluation, where there is the potential for failure of any geologic structure caused or exacerbated by the existing and proposed underground mining operation please demonstrate that off-site areas will be protected with appropriate factors of safety incorporated into the analysis.
- a. **DRMS Response 3:** The Division will not approve any additional underground mining without a geotechnical evaluation demonstrating off-site areas will be protected with appropriate factors of safety incorporated into the analysis in accordance with Rule 6.5(3). Here are the applicant’s options:
    - i. Provide the geotechnical evaluation. OR,
    - ii. Commit to cease and desist from all underground mining operations and revise the proposed mining plan as such.
    - iii. *Please be aware that Colorado Rose Red’s underground mining operation is currently out of compliance with the approved mining plan. The Division may take enforcement action if this adequacy issue is not addresses to the Division’s satisfaction and underground mining continues.*
  - e. **GLA Response 3:** Fractures along the interior roofs of the underground workings are included on GLA Map ‘Colorado Rose Red – Gallery Map.’ Underground fractures are discussed and evaluated in the attached Geotechnical report generated by GLA titled “Geotechnical Analysis of the Colorado Rose Red

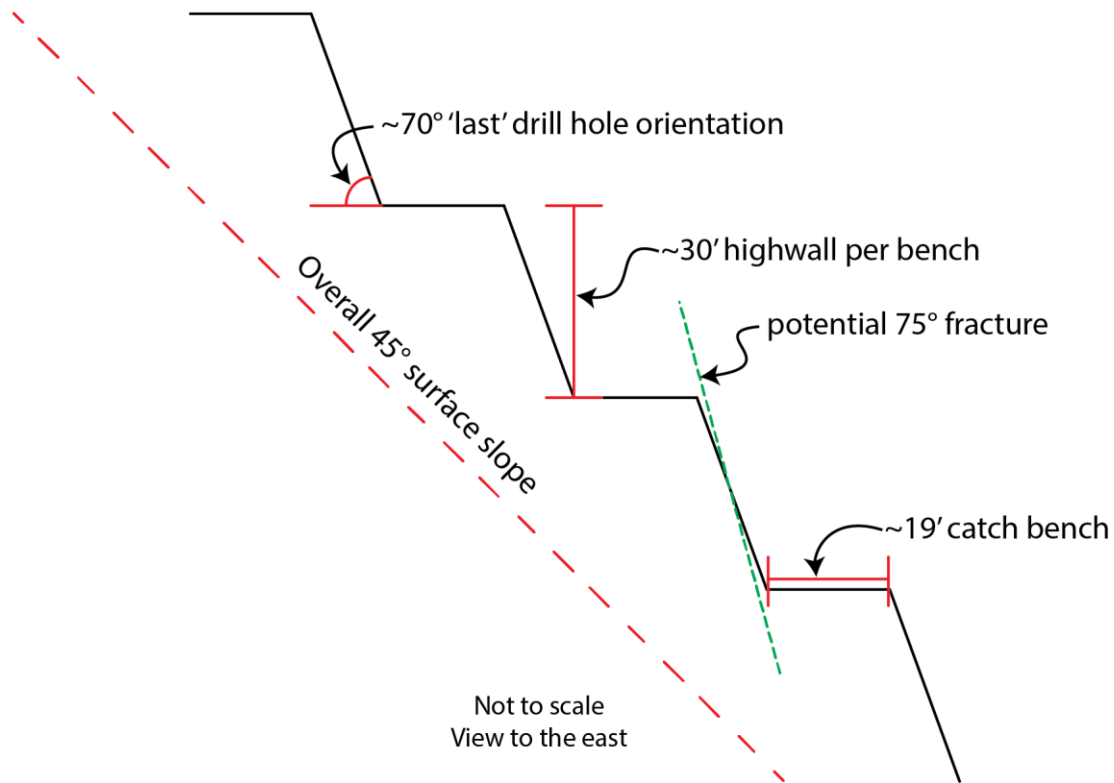
Granite Quarry” dated November 2018. See page 11 for safety factors and pillar design associated with the underground workings of the Rose Red Quarry. Additionally, see the ‘Colorado Rose Red – Gallery Map’ located in Appendix 2 of the above listed report to see changes to pillar design from the original map submission for AM-02. Changes to pillar design were required as mining has already cut into the previously designed pillar.

- f. **DRMS Response 4:** Based on your response above, if mining has already cut into the previously designed pillars, how does the applicant plan on defining and maintaining the proposed pillars and underground that are needed to maintain the proposed factors of safety? As underground mining progresses, the applicant must commit to submitting a detailed map of the location of the underground workings with the annual report.
  - g. **GLA Response 4:** Mining had cut into the previously designed pillars prior to the designs execution – this is an error in drafting the previous design and does not reflect the Operator’s ability to accurately follow the mine plan. The Operator will be able to accurately follow the new pillar design using their current mining procedures and techniques effectively maintaining the currently proposed factors of safety. The Operator commits to submitting a detailed map of the current extents of the underground workings with the annual report.
20. Regarding the proposed quarry operations (separate from the underground dimensional stone operation), the stability analysis conducted by Ground Engineering and submitted should not be used to draw conclusions regarding the stability of the proposed future mine benches and highwalls. As indicated on page 67 of the report, the evaluation may not contain sufficient information for other purposes. Given this, please provide engineering stability analysis for the proposed final reclaimed slopes/highwalls. Based on this evaluation, where there is the potential for failure of any geologic structure, demonstrate that off-site areas will be protected with appropriate factors of safety incorporated into the analysis.
- a. **DRMS Response 3:** The Division cannot conditionally approve the surface quarry as proposed. The applicant will need to provide the engineering stability analysis for the proposed reclaimed slopes/highwalls. If this cannot be done during this review process for this amendment application, please revise the proposed mining plan to remove the surface quarry operation. The applicant will need to submit a future amendment for the surface quarry operation. The Division would consider approval of a plan to finish mining in the former 111c area and surface removal of the “spill area” material as this time.
  - b. **GLA Response 3:** Surface fractures in the proposed drill and blast surface quarry are discussed and evaluated in the attached Geotechnical report generated by GLA titled “Geotechnical Analysis of the Colorado Rose Red Granite Quarry” dated November 2018. See page 5 for discussion on failure potential in the surface mining area as well as safety factors for mining in the same area of the Rose Red Quarry.
  - c. **DRMS Response 4:** The Division is currently reviewing the Geotechnical Analysis. If Additional adequacy review issues are identified, they will be

forwarded to you as soon as possible. *See Adequacy Review 5 dated December 4, 2018.*

- d. **DRMS Response 5:** DRMS is concerned about the potential for a massive block failure in the surface quarry. Table 1 in the analysis submitted indicates there is a principle joint set striking essentially east-west through the site with a dip angle  $75^{\circ}$  to the south. Our understanding is the highwall in the quarry will generally trend east-west as well, with 30-foot near vertical intra-bench highwalls. If this principle joint set were to daylight new the toe of one of the intra-bench highwalls, the potential for a massive block failure seems likely. Please provide a cross-section showing the local geologic structures and how the intra-bench highwalls will be designed and constructed to control and mitigate a massive block failure.
- e. **GLA Response 4/5:** To mitigate potential mass rock movement along the above detailed  $75^{\circ}$  south dipping fracture, the batter angle will be pushed to  $70^{\circ}$ , see the below Figure 1 cross-section. Any fractures within the pit wall cannot daylight and allow a massive block failure. The dashed green line represents a hypothetical  $75^{\circ}$  fracture – notice how rock mass above the intersection of the fracture and the face will be cleared as the final  $70^{\circ}$  batter angle is realized. Rock mass below the intersection of the fracture and the face will not experience movement as the rock mass will be contained in the catch bench. If the  $75^{\circ}$  fracture occurs along a catch bench, no failure will occur as the fracture will be constrained within the catch bench unable to daylight. By changing the batter angle to  $70^{\circ}$  the previously proposed 30 foot catch bench will now have a length of ~19 feet. This length will be more than adequate to account for mining equipment traffic. Additionally, best management practices will be utilized during every phase of surface excavation including but not limited to: highwall scaling, erection of safety berms, and potential closure of hazard areas until the hazard can be fully mitigated.

## Colorado Rose Red Quarry - Surface Quarry Bench Design



**Figure 1.** Schematic cross-section of the surface quarry operation at the Colorado Rose Red Quarry.

### Adequacy Review No. 2 – Items identified in the DRMS letter dated January 29, 2018.

#### Rule 6.5 – Geotechnical Stability Exhibit

1. As part of the additional information provided with the GE's Report, it appears that Colorado Rose Red Granite Quarry is applying to blast within the quarry. It also appears that GE's slope stability evaluation does not consider dynamic loading the Report. Please have GE reevaluate slope stability to include dynamic loading in which it may experience in the event of blasting.
  - a. **DRMS Response 3:** Similar to the items above, the Division will not conditionally approved the amendment application as proposed. The engineering/stability analysis will need to consider dynamic loading. Please either provide the required evaluation or revise the proposed mining plan to exclude the surface quarry and blasting.
  - b. **GLA Response 3:** Dynamic loading and failure thereof is the result of heavy weight applied to a surface that results in that surface's failure. Drilling and blasting, in this case, will not result in measureable or concerning dynamic loading as the rock mass to be liberated via drill and blast will remain in situ post blasting and will rest on intact granite bedrock – the exclusive bedrock and

surfaces throughout the entire Rose Red Quarry. Simply put, drilled and blasted rock will have minimal movement during blasting and a lack of fail-able material and void space beneath the blast zone precludes dynamic loading from occurring onsite. However, slope stability analysis for the surface quarry operation is discussed on page 5 of the report “Geotechnical Analysis of the Colorado Rose Red Granite Quarry” dated November 2018.

- c. **DRMS Response 4:** The Division is currently reviewing the Geotechnical Analysis. If Additional adequacy review issues are identified, they will be forwarded to you as soon as possible. *See Adequacy Review 5 dated December 4, 2018. No additional comment.*
  - d. **GLA Response 4/5: N/A**
3. Within the Report, only the results of the stability analysis have been provided. Please submit the model associated with each joint orientation analyzed in the Report.
- a. **DRMS Response 3:** For any future analysis, the Division will need to evaluate the model used.
  - e. **GLA Response 3:** See the associated appendices provided in report “Geotechnical Analysis of the Colorado Rose Red Granite Quarry” dated November 2018 for reference material and methods used in stability analysis.
  - f. **DRMS Response 4:** The Division is currently reviewing the Geotechnical Analysis. If Additional adequacy review issues are identified, they will be forwarded to you as soon as possible. *See Adequacy Review 5 dated December 4, 2018. No additional comment.*
  - g. **GLA Response 4/5: N/A**

Please do not hesitate to contact me with further questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "Mary K. Todt". The signature is fluid and cursive, with the first name "Mary" and last name "Todt" clearly distinguishable.

M. Katie Todt, P.G.  
Greg Lewicki and Associates  
(314) 704-4505

CC: Caleb Liesveld, Colorado Red Rose Quarry; Steve O'Brian, Environment, Inc.