

REPORT: Notice of Inspection 3/13/18

Inspector Michael Cunningham

Division of Reclamation Mining and Safety

Response from Operator Prepared by MOORESJ, Min. Eng., CSM, BSc. Geol., Geophysics (II), Elk Creek Companies, LLLP. /S/ Elk Creek, Sand & Gravel LLC

Reviewed and Accepted/endorsed by BROCKMAN, S, PE Cave Eng. (license # \_\_\_\_\_)

Brockman Engineering Inc, Conifer CO 80433

12/7/18

#### ISSUE

Inspector notified Operator Representative on or around 3/13/18 that there was an issue relating to Inspection conducted in which Inspector indicated a concern that the bench configuration within the confines of the permitted and approved highwall design was not being followed.

The inspector indicated that he had participated in site walk-through and in that walkthrough he made a number of observations: a) signage was insufficient and did not comply with the terms of the Regulations enforced under the Division Rules, b) that a weed control plan was absent from the Operators file or not otherwise sufficient and that the Division was requiring that the Operator provide a technical revision to its permit such that this addressed and conformed to the regulatory requirement under the Rules to include an acceptable weed control plan

c) that the Inspector was unable to visually confirm that the Operator was complying with the stipulated bench configurations, particularly the bench width relative to the bench height, in order to conform to the recommendations presented under the geotechnical report filed on behalf of the Operator in 2006 (the Brierley Geotechnical and Slope Stability Analysis)

This report addresses the issue specifically of the HIGHWALL BENCH WIDTH CONFIGURATION such that the specified configuration is an 8'-0" bench no 76 degree angle of repose, and the benches are 12'-0" by 35'-0" in the perpendicular (See exhibit FIGURE 10c 2006 BEI ODP Final USES and Plan PDF) wherein the final Bench design for the highwall submitted to and accepted by DRMS Board, based upon Division recommendations, complies with the calculations and toppling or over turning moment restrictions from the 2006 Geotechnical report

#### SPECIFIC CONCERN BY DIVISION STAFF

The specific issue that was a concern raised by Division Staff is that the prescribed bench configuration as indicated, since it did not exist, would have to be implemented in order to bring the highwall into

compliance, and the Division staff inspector indicated concerns that in order to do so, it would be necessary to lay back the highwall from the existing mined the bench spacing (width) as indicated on the approved plans (2006) that the Operator would have to decline the angle (attitude) of the highwall, laying it back from its existing angle of repose and in doing so, given the offset distance between the crest of the highwall and the adjacent parcel, that the inspector was concerned that this action would impinge on the parcel, disturbing lands that were outside the approved permit boundaries.

Tus in order to do so, Operator would necessarily have to engage in pursuing a 112 permit process.

Operator was provided with a 60 day periods within which to remedy this issue to the satisfaction of division staff.

Operator was notified that the permit application process would be triggered on a 100 day window upon revocation of bond by Board members, or by the application process having been triggered by the Applicant/Operator.

#### RESPONSE BY OPERATOR

The Operator (Elk Creek Sand & Gravel LLC) hereby provides the following response to the Notice of inspection concerns as provided by written report to the Operator on 3/13/18

1. The Operator denies that it was mining out of compliance with the approved mine plan and moreover indicates that the benches are in fact in place and in compliance with the reclamation plans as provided to the Division, and by and through their recommendation, as approved by the Board in 2006 (see 2006 ODP Grading and Erosion Control Plans (3 pages BEI & Assoc., Inc., 2006) , Reclamation Plans (Falcon Surveying) an 3D wire mesh rendering (Falcon Surveying) together with Post Mining Rendering (Falcon Surveying, 2006) and Site Plan and Drainage Plans (Purrington Engineering 2006/2007).
2. Operator contends that it was mining in compliance with approved Plan and as such that the bench configuration exists.
3. Operator further contends that benches not only exist in appliance with e approved mine plan but are further, confirming to innovative specialty techniques employed by Operator in that Operator has engaged in 'staggered' blasting techniques, some alternating decoupled shots and other mechanisms during the drilling and blasting of the final row of drill holes (blast holes) closest to the toes of the exposed highwall face and that such mechanism is an innovative techniques developed specifically for this lithology locally here at this Quarry in order to present a finish highwall at the final pit limits configuration which achieves a more natural prance, a 'so fend' appearance, relative to the more traditional 'harsh and unnatural design characterized by the decoupled presplit shot.
4. Operator finally submits that in the event that Inspector/ Division determines that the Operator has, without admitting fault, failed to conform to the final pit list configuration as stipulated, that it is mining in a lithology which based on its geological and geotechnical characteristic, conforms to a geometry which can support an over steepened sub vertical highwall mechanically and thus request that should the Division find it is non-compliant, that the Division

consider a waiver under the Rules allowing for a minor modification under a technical revision supporting a more vertical highwall.

Operator submits as evidence for the above as follows:

- a) Operator provides Division Staff by electronic submittal on or proximal to 4/13/18 surface topographic detailing the contours of a drone flyover on or around September 2017. No changes to the finished highwall have taken place between September 2017 and May 2018, for the section of the highwall in question. Such flyover by Alphapixel Services Inc., Evergreen CO, was converted to surface topographic contours on a 2'-0" interval in a CAD format, however, asince Alphapixel is not certified land surveyor in accordance with State regulations, the work product could not be verified and was indeed generated at 8 degrees from vertical in the oblique. Given the potential for discrepancy and the lack of resolution on the final work product this was rejected by Division staff. Operator also requested an additional extension of 60 days' time to pursue a reasonable remedy in the alternate. (EXHIBITS 1, 2, 3)
- b) Operator pursued a second drone survey with resulting topographic survey through Falcon Surveying, Inc., Principal Jeff McKenna. The Falcon crew was mobilized in June 2018 and had mixed success in obtaining data given a wind event interrupting data collection at the site. Of the three drones employed, only one had a reasonable level of success. Following this the crew extrapolated data and developed a full size CAD rendering of the property overlain by a certified survey of the property and anchored on a state registered memorial within the CDOT ROW at the NW corner of the property. The Data was provided to the Operator in July 2018. This data employed a 5'-0" contour interval. The Operator provided the results of the survey to the State Inspector at the Division thereafter. (EXHIBIT 4)
- c) Operator submits to the State Inspector as evidence that it is compliance the following
  - 2018 TOPO Certified Survey on 5'-0" intervals (as detailed EXHIBIT 4) (Falcon Surveying 2018) – indicating 5 sets of benches (variable) in compliance with the plan as approved by State and in accordance with the Rules, given those sections where mining is complete
  - Geotechnical and slope stability report and GEOLOGIC REPORT (2006) (prepared by Alan Howard, PE., Brierley and Associates) (EXHIBIT 5) – indicates through a Mohs Coulomb curve and phi values that the slopes as indicated fall within the recommended design limits (restrictions) as provided for in the report and are thus not subject to potential overturning or toppling.
  - Geologic Report (Fox and Assis 1978) (EXHIBIT 6) – indicates values within the materials more specifically where those values are defined by the more exposed westerly weathered colluvium and other material characterized by a more decomposed feature, presenting more potential for failure and toppling. Given that this layer is given as between 5'-0" and 10'-0" thick generally speaking in those areas where it existed (along the Elk Creek side of the properties) this material has thus been mined out and no longer exist and therefore, by definition, cannot be considered to form part of the rock mass in question
  - Operators submits various annual inspections of the

Highwall ((I) 2018 ANNUAL HIGHWALL INSPECTION AND SLOPE STABILITY ANALYSIS)  
(EXHIBIT 7) and

((ii) 2018 3<sup>rd</sup> quarter MSHA DAILY WORKPLACE EXAMS – HIGHWALL INSPECTION REPORTS) (EXHIBIT 8) in conjunction with

(iii) GEOLOGIC SAMPLING DATA RESULTS (EXHIBIT 9a through 9e) made up of (I. CORE DRILL DATA, II. GEOLOGIC HAND SAMPLING, III. WATER WELL DRILLING CUTTING DATA where recovery was feasible, IV. FACE EVALUATIONS OF EXPOSED MINED HIGHWALL SECTIONS in active mining areas and V. OTHER\*\*)

- d) Operator submits their own 2018 AFFIDAVIT OF INSPECTION (EXHIBIT 10) by Independent Consultant verifying the existence of the Benches as indicated in the Topographical Survey, Bench Cross sections and other independently verified by BROCKMAN, Steve, (2018) BEI & ASSOC INC, (12/5/18)
- e) Operator submits various cross section studies and extrapolations and interpolations, and conjecturally offers the 3D rendering which none quantifiably demonstrates the highwall and bench configuration in a graphical 3D wire mesh rendering or through the use of interpolated sections to provide the viewer with a perspective of the highwall in section to include the benches. (EXHIBIT 11a through 11f).
- f) Operator submits by way of indication that a visual inspection of the highwall exposed surface from an oblique or flat angle by the casual observer can be misleading in that the areas of the exposure which are largely characterized by the foliated migmatized gneiss together with the convoluted gneissic fabric make the specific bench development difficult to discern with the naked eye. In addition the innovative blasting techniques employed by the Operator in the second and final rows of blasting against the highwall further 'confuse' a visual inspection by deliberately obfuscating the mechanical symmetry of the bench configuration, and this can mistakenly lead the casual observer to determine that there is a more upright appearance to the quarry than is in fact the case, and that can be demonstrated mathematically as the function of the crest of the highwall to the toe of the highwall is found to be 68 degrees, at its most narrow point, whereas the Brierley report indicates that the highwall is still well inside the safe operating parameters at 73 degrees, and thus well within the compliance limits. In fact in the attached ODP graphic (2006) and TOP (2018) (Falcon) the toe of the highwall is 102'-0" L.F from the crest of the highwall (offset distance) and the change in elevation from 7945 '-0" to 8145'-0" is 200'-0" resulting in a 51% highwall, substantially less than the minimum. This is further demonstrated by photographing the highwall from the side at 90 degrees to the foliation and along strike. (EXHIBIT 12) By doing so the bench configuration is more pronounced and the benches are immediately apparent. Lastly the Operator submits external corroboration of this by other inspectors where in 2008 MSHA inspectors cited the Operator under Part 46 for highwall violations, indicating that the Operator was to keep a minimum offset distance of not less than 30'-0" from the toes of the highwall, following an even that another quarry. Operator appealed decision and citation and ease successful on appeal and Federal inspectors reversed their decision when Operator was able to demonstrate that the highwall was significantly more stable than commensurate quarries of its type locally and elsewhere and would not experience the same type of failure that precipitated the event elsewhere; this action confirming engineering calculations by Operator and consultant that demonstrated the competency of the highwall configuration and ability to stand almost vertical with a better than 96 degree of confidence. (r-squared coefficient of correlation)

- g) Finally Operator submits that, as evidence in the attached, the pre-existing condition of the property with the exposed mine face was such that in a number of areas the sections are approaching 90 degrees. Where this is evidenced by the attached survey by Falcon Surveying (2003) which indicates that the shallower section of the preexisting highwall had been over-excavated to approximately 79.87 degrees and that the contour interval in the survey demonstrated a concentration of contour lines on a 2'-0" ft. interval such that the contours tend to coalesce and obstruct a clearer view of the structure and components of the topography in the map. This data demonstrates that some of the highwall sections were already in a preexisting condition such that Operator was restricted in their options in pursuing an optimal solution such as declining the angle of repose on the highwall for these sections and thus was confined to pursuing the best alternative remedy in such cases.

#### EXPLANATION

I have reviewed (leave this up to Steve to add change etc.)

\*\* ENDORSED AND STAMPED BY PROFESSIONAL ENGINEER, Steve BROCKMAN, BEI # \_\_\_\_\_

12/6/18 \*\*\*\*

ATTACHMENTS/ EXHIBITS

Surface TOPO (Falcon Surveying 2018) indicating current surface conditions and indicating the location of concerns by Staff

2013 Forest Agricultural Plan scan (PDF)

2006 GRADING AND EROSION CONTROL ODP BEI Shaffers Crossing Property

2016 10/13/16 Grading & Drain Violations (2 EA) issued to Rodger Moores scan (PDF)

2017 10/1/17 Oct 2018 planned Forest Ag Work Plans indicating roadwork

2017 9/14/17 Grading & Drain Violations (2 EA) issued to Rodger Moores scan (PDF)

2017 9/24/17 cease and desist all work arising from Forest Ag grading activities per County

2018 April Forest Ag Inspection decertification indicating removal from eligibility certification to participate in Forest Ag Program work arising from failure to complete roadwork (Notification of suspension of roadwork by County Feb 2018)

2018 Nov RESOLUTION and agreement between parties to terminate violation conditions arising from the grading activities associated with Forest logging road: stipulation outlying and authorizing work/conditions to terminate violation conditions

2018 11/26/18 inspection terminates erosion control violations from grading activities (email G Bennetts JeffCo Highways and Trans)

2018 12/6/18 grading permit terminates grading violation arising from grading activities (forest Ag logging road) (BEI & Assis Inc., at County Planning Review as of 12/6/18) (copy plan attached)

Soil Report: Jefferson Soil Conservation District (1978 corroborated by site visit from Jefferson Soil Conservation District 2/12/18)

Drainage district report (CDOT 2010)

Drainage calks contributing quadrants (1978)

Drainage calks detention pond (1978)

Purrington Engineering Site Plan (2006)

Purrington Engineering Drainage Plan Shaffers Crossing (2006)

(Ground) Water Quality and Runoff (Drainage) Study (2006) the water quality lady

Ariel Map Wells (2006) (State Water Engineer Colorado)

Sheet 2 of the 2006 ODP graphic (BEI) indicates the accepted BMP practices and uses of erosion control techniques, materials employed in mitigating erosion control issues (these techniques and BMPs are being employed with respect to the disturbed areas indicated)

Pictures of logging trail/disturbed areas, erosion control measures implemented,