STATE OF COLORADO

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Pikeview Amendment 4 Response

1 message

Warren Dean <warren@whd22.com> Wed, Oct 30, 2019 at 12:43 PM
To: "Cazier - DNR, Tim" <tim.cazier@state.co.us>

Hello Tim, Thanks for chatting with me this morning. Per our conversation, I have attached a response to Castle Aggregates' Permit Amendment 4.

I understand that I can email it to you and have standing on this matter.

Thanks for your help.

Warren H. Dean

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CDRMS Pikeview Response to Amendment 4 10.30.19.pdf
4641K

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MEMORANDUM

To: File

From: WD

Date: October 26, 2019

Re: Pikeview Permit Amendment 4 Review and Comparison to Amendment 3

Castle Aggregates (Castle) has submitted a Permit Amendment (Amendment 4) for the Pikeview Quarry in northwest Colorado Springs. Castle has clearly stated that it submitted the Amendment with a modified Reclamation Plan to reduce the cost of the reclamation and its related assurance. Castle also claims that, upon completion, remaining visible scar will be significantly smaller and less visible than under the previous plan, outlined in Amendment 3.

I have recently toured the site and reviewed the plan and hired Carl Mount, of Carl B. Mount and Associates, Inc. to review the plan and related documents. I have attached his detailed comments and concerns. Carl was a longtime employee of the Colorado Department of Reclamation, Mining and Safety. In summary, I think the plan understates the work and costs related to the stabilization of the quarry and will leave a massive, highly visible scar above a minimally reclaimed, steep hillside:

General

The Amendment lacks legible plans and illustrations large enough to easily review. For example Exhibits C-1 through C-3 have four cross-sections on one 81/2 x 11 sheet. These are supposed to provide detail for the new configuration and they are difficult to read and review. In the past similar cross sections have been much larger with legible print.

The quarry has experienced major slides in 2008 and 2015 and the Amendment needs to include data based, scientific reports which support the redesign. Castle has gathered data about the slope stability since 2008 and though it claims to prioritize site stabilization, we can see no data back up or future commitment to stand behind its work.

Mining Plan – Exhibit D

Fill materials and Slope Stability

D-2- Per the Amendment, Castle will "stabilize the mined area" and "eliminate nearly all of the highwall". However, there is no data to back up the stabilization claim and the highwalls shown on Amendment 4, though lower than Amendment 3, are still 300 to 400 feet tall.

The concept of Amendment 4 is that Castle will place fill on the site to hold back future slides and cover up much of the mined area. The previous Amendment 3 proposed the same general plan, but proposed to use much more fill and place it at less steep slopes. Amendment 4 proposes a significantly decreased amount of fill at much steeper slopes and there are unaddressed technical issues.

Where will Castle source the fill and how will Castle engineer and place it? Castle states that it will relocate fill "From grading of slopes throughout the site." However on page D-4 - Table D-1 and L-2 Reclamation Costs, describe this sourcing differently as outlined below.

- The total fill volume is 3,870,000 LCY
- 1,530,000 LCY, 40% of the amount needed for the work outlined in Amendment 4, will come from on site as described above.
- Table D-1 states that the 2,030,000 LCY balance of the fill will be imported. (It appears that this amount should be 2,340,000 to make the columns balance. L-2 refers to that amount as being 2,345,000, again possibly an incorrect number.) The 2,340,000 LCY of fill material, which will come from offsite, is 60% of the material needed.
- Where will it come from and how will the quality be verified and tested? Will undisturbed areas of the site be graded to "borrow" material for the fill? If so, the Amendment doesn't identify those areas. How will those areas be left / reclaimed?
- What will the cost be for fill imported from offsite and is it included in the Reclamation Cost, Exhibit L?
- Given the calculations outlined above and the recalculation of topsoil detailed in the Carl B. Mount and Associates memo, Castle should recalculate all quantities, detail all assumptions, and share the worksheets.

How did/will Castle engineer the fill? This is a complex, steep site with many different fill materials and all fill should be engineered and compacted to assure it will hold back the sliding material and provide a stable reclamation area. Castle should provide the applicable engineering and analysis.

- D-3 – Amendment 4 - States that there will be no compaction testing. Instead it proposes to drive over the filled areas twice with a haul truck and / or a bull dozer. Castle needs to show the engineering to prove this is sufficient.

- Will Castle stand behind its work?

Proposed "Removal of granitic material from upper portions" only uncovers or creates additional highwalls. Do they intend to create material by pushing back the existing granite walls? How high will these be?

The Technical Amendment from 2014 detailed that the quarry's west wall was still sliding, which required a reversal of the mining progression and change to mining methods. In 2015 there was a new, additional slide and six years later, Castle has reclaimed only a small portion of the mine.

- Castle should verify how they are monitoring the quarry and present the data and engineering upon which it based its plan so we can verify it.

- Is the slope still sliding?

The slopes for the upper fill areas are 2.0 – 2.5H : 1V (50% and 40% slopes) These are steep slopes and, in most contexts, prone to sliding and erosion. How will they be engineered? Will it be stable and remain that way as grasses take root?

- For comparison Amendment 3 states that the slope below the inflection point, where the fill slope meets the steep highwall, would be of 3.4 - 4.0H : 1V (29% to 25% slopes), which are much shallower slopes.

- For reference, 3H :1V (33.33% slope) is industry standard because it is inherently stable. A tractor can drive horizontally across it and not tip over. Any steeper and the same tractor would tip over.

- For additional reference, Queen's Canyon, the scar at the end of Garden of the Gods road, has a 28% slope.

- Amendment 4 proposes much steeper slopes which range from 50% to 33%.

<u>Reclamation Timing</u>

Amendment 3 presented a reclamation time line that stated that reclamation would be complete between 2019 and 2022. Though six years have passed and the quarry should be close to reclaimed, little has occurred.

- Will the same hold true for Amendment 4? Per State regulation, as long as an operator stores any gravel in a quarry, it is considered "active" and the permit holder can delay reclamation. There is currently plenty of stored gravel at

Pikeview. Will reclamation stall for a long period or is there a commitment by Castle to complete the work within a specific timeframe?

Reclamation

D-3 – Amendment 3 states that 23.78 acres will be newly disturbed and a source of 27,917 LCY of topsoil. Amendment 4 has a much lower number. Castle should explain these different numbers.

D-4 – Amendment 4 – Castle needs to describe the planned final configuration and reclamation details for the areas from which material is taken to fill the quarry.

Castle plans to reclaim all areas with six inches of topsoil. However, there is very little topsoil on site, what is there looks to be of marginal quality, and the reclamation plan details that the vast majority of topsoil will be "donated". What does this mean and how does Castle know it will find sufficient donors with acceptable topsoil?

- E-4 – Amendment states that topsoil may be generated onsite by mixing decomposed granite with wood chips and / or compost? That is not topsoil.
- What is the backup plan if donations don't materialize? If there is any cost, is that included in the Exhibit L Reclamation Costs?
- How will Castle keep the topsoil from eroding before plant material is established?
- Will Castle stand behind its performance?

How will Castle guarantee topsoil which will be clean, weed free and have sufficient nutrients to sustain reclamation growth?

- At the Queens Canyon reclamation, just to the south, Castle experienced significant problems with a high numbers of noxious weeds brought to the site with donated topsoil. It remains a problem today.
- E-7- how long will Castle use the weed control program and is the proposed program enough? As written the description is vague. This needs to be detailed.

Why are there no trees below 7250'? The natural topography has many.

The middle section reclamation between 7,540 and 7250 has only pinon junipers? Why limited variety, almost like a monoculture. Why does the plan not match the surrounding terrain and its tree mix.

When Castle refers to "trees" in the reclamation and on the highwall benches, It should clarify whether the plantings are 6" seedlings or actual trees.

The quarry slopes face east. Note that the plan calls for mimicking a south facing slope, which is relatively barren compared to a north facing slope.

- The adjacent Queens Canyon reclamation experienced significant problems with seedling and tree establishment on what is a much shallower slope than at Pikeview. Thousands of seedlings were planted by volunteers and few survived. It is clearly difficult. Castle should provide a performance guarantee for reclamation performance at a known challenging and difficult site.

Reclamation Costs – Exhibit L

These costs are general, simplistic, undetailed and appear incomplete.

Water Information

It is difficult for a layman to review the claims in the Water section. However I can remind CDRMS staff that there have been multiple slides on the site within the past 10 years and water seems to have played a part in all of them.

- Will CDRMS review the water calculations and model runs and share the results with the public?

G-3 – Amendment 4 refers to "preventing heavy sediment and storm water flows from leaving the site" with "informal detention basins." It also mentions that "depression are expected to last throughout the mining and grading phase." Why aren't these controls permanent and part of the whole water control plan?

I also note that Castle bases its work on an older storm water plan created in 1994. I think El Paso County and Colorado Springs' stormwater requirements and guidelines have evolved since then. Why is there no consideration for these downstream concerns or changed requirements?

Castle states that the quarry depression will be eliminated and that Castle will reroute water "when practical and per best management practices." Why aren't these solutions engineered and a detailed part of the plan?

Castle states that at the end "it is expected that stormwater control facilities will be maintenance free." There is no such thing, especially with regard to Colorado Springs. There needs to be an ongoing maintenance plan that Castle or subsequent owners execute.

- Example: Sediment control facilities need periodic sediment removal.

These water solutions need to be engineered, with a commitment that they will work and someone to stand behind that commitment.

Carl B Mount and Associates, Inc.

Memo

To: Warren Dean
From: Carl B. Mount
CC: None
Date: October 16, 2019

Re: Continental Materials Corporation/Castle Aggregate, Pikeview Quarry, Amendment 04 Application Review, Permit M-1977-211

Introduction

I have reviewed the Application for Amendment 04 (AM04) submitted by Castle Aggregates (Castle or operator) to the Colorado Division of Reclamation, Mining and Safety (DRMS), received on August 26, 2019 and deemed complete on September 20, 2019. If the operator published on the first day that the application was deemed complete, the last day for submitting comments to DRMS regarding the application would be close of business on October 31, 2019. I confirmed this with Michael Cunningham (Senior Environmental Protection Specialist (EPS) and lead for the team that will be reviewing AM04) on October 15, 2019. Tim Cazear has been designated as the Lead EPS for the AM04 review and all correspondence and questions of a technical nature should be directed to his attention. Mr. Cunningham can, however, answer questions of administrative process or a general nature.

For the review I have accessed and reviewed the entire AM04 document as modified to make it complete along with the Notice of Violation and Cease and Desist Order MV-2009-012 (NOV and C&D) issued on June 10, 2009 by the Colorado Mined Land Reclamation Board (Board) and related to the large slide that occurred at Pikeview Quarry on December 2, 2008, parts of Technical Revision (TR) 16 (extends time to submit amendment deadline in Board Order relating to the NOV and C&D), TR18 (change mining and reclamation sequences), TR 19 (allow clean fill importation), and parts of AM03 (increase acreage of permit area by 4.46

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acres and modify mining and reclamation plans) approved by DRMS on April 11, 2013. AM03 is large (over 500 pages) and I only accessed parts of it when it seemed appropriate to explain parts of AM04.

I have organized the following review according to general considerations and then according to page numbers for reference with the initial AM04 submittal to DRMS. Comments are numbered sequentially so numbers are not repeated. Most of the comments are arranged such that they could be directly sent on to Mr. Cazier for DRMS consideration during the review process:

General:

1. Throughout the AM04 document are many statements that indicate what the operator may or could or should do. These types of statements do not form an enforceable basis or give specifications that must be followed by the operator. While it is recognized that the operator needs some amount of flexibility while working with the unstable situation at Pikeview, enforceable specifications must be included to ensure that the final reclamation at the site is stable and will not continue to experience the highly unstable condition of the site while it is undergoing active mining. In other words, the proposed engineered cuts and fills, especially when the operator is attempting to limit the amount of fill placement to limit the bond amount and reclamation costs, must be carefully designed and implemented in the field with standard and proven methods and commitments to testing and verification as they are being built. Please ensure that there are commitments by the operator to adequately demonstrate that the engineered fill is placed in a verifiable manner and there are adequate tests to demonstrate final stability.

2. Site geologic and hydrologic conditions seem to be poorly understood. Partially this is because access to unstable areas is somewhat limited and instability at the site seems to be changing as time goes by as evidenced by site measurements. However, a continuing commitment to site monitoring and measurements of the faults and splays that are found during mining and reclamation activities must be included and reports of those measurements must be required to allow DRMS and the public valid information on which to base decisions.

Page 30 or D3:

3. In the **Upper Slope Grading** section it is stated that "Non-native slopes with existing wall angles steeper than 0.5H:1V, or overall slope angles steeper than 1H:1V, will be excavated into rock utilizing standard benching practices not to exceed 40 vertical feet." and that "The remaining highwall slopes will be left as bare rock." What studies or information indicates that the granite as exists in the upper parts of the quarry, along with any faults, fractures, or jointing, will be stable at this configuration and at these angles?

4. What is meant by "...the remaining highwall slopes..."? I would assume that this means the 30-40 feet between the benches and that benching will be carried on in whatever configuration is finally determined to be a stable one (given the as yet to be demonstrated properties of the granite) completely to the top of the disturbed area. Please have the operator clarify this statement after demonstrating the properties of the granite that ensure stability at the proposed slope and bench angles.

5. In the **Slope Backfill Grading** section an engineered backfill is proposed with fill material placed in lifts and compacted with trucks and bulldozers. Since this engineered fill is supposed to buttress an already proven unstable slope, it is prudent to include engineering practices that would provide a stable buttress and testing as construction proceeds to demonstrate that the fill has been constructed properly. To that end, at a minimum, the operator must:
    a. Test backfill material for suitability as a construction material prior to placement and set proper compaction requirements or other requirements as necessary.
    b. Place backfill in maximum lift thicknesses of one foot and properly moisturize and compact material with equipment specifically designed for compaction.
    c. Propose and establish an adequate testing program to be conducted on placed and compacted fill material with timely reporting to DRMS to demonstrate that proper placement and compaction have been achieved.
    d. Certify that the backfilled area has been properly constructed after each proposed phase of the mining and reclamation.
    e. Commit to conduct other tests or establish other procedures as approved by DRMS. Such procedures should not be implemented in the field prior to DRMS approval.
    f. Commit to long term monitoring to ensure that the backfill as placed demonstrates long-term stability.

Page 31 or D-4 – Imported Fill

6. Importing fill to the site for reclamation and buttressing of the unstable walls of the quarry is generally a good idea but needs some refinement. At a minimum, the operator must:
    a. Test backfill material for suitability as a construction material (if it is to be used as a buttressing material) when it arrives at the site and store in appropriate areas. Materials must be tested to ensure that they meet the minimum requirements of the assumptions used in the stability analysis (Exhibit 6.5). Material unsuitable for highwall buttressing must be dealt with properly and the operator must state the disposition of materials unsuitable for use since placement or elimination of these materials from the site could increase reclamation costs.
    b. Field observations for placement of haul roads may be a good preliminary idea but these roads must be properly bonded for reclamation prior to construction since haul roads generally exhibit very high compaction and require special reclamation techniques for proper relief of compaction and final reclamation.
    c. Prior to covering haul roads with reclamation or fill materials, the operator must commit to relieving the compaction of the roads so as not to create a compacted aquaclude that may create a small perched water table situation and negatively affect fill stability.
    d. Table D-1 Note 5 indicates that 87,000 Loose Cubic Yards of topsoil will be needed to provide topsoil coverage for the entire site. Topsoil as it is handled and placed by heavy equipment will generally shrink as much as 50% for diatomaceous soils to 30-35% for loess soils in the Midwest. Since this site will be dealing with mostly mineral soils, it is conservative to estimate a shrinkage factor of 20%. If topsoil is to be placed a minimum of 0.5 foot over the entire 110.3 acres (as stated in the amendment), then:
        i. 87,000 LCY x 27 = 2,349,000 LCF
        ii. 110.3 acres x 43,560 sq ft/acre = 4,804,668 sq ft to be covered 0.5 feet thick
        iii. 2,349,000 LCF/4,804,668 sq ft = 0.49 ft thickness loose
        iv. 0.49 ft thick x 0.8 shrinkage factor = 0.39 foot thick placed topsoil.
        v. 0.5 Topsoil thickness required for reclamation / 0.39 placed = 1.3 (factor that 87,000 LCY needs to be increased by.
        vi. It would seem, therefore, that approximately 87,000 LCY x 1.3 = 113,100 LCY of topsoil will actually be needed to achieve a final placed topsoil specification of 0.5 feet thick as stated in the reclamation plan.
    e. Although only the topsoil calculations were performed, it would be prudent to run the numbers for the other values in Table D-1 to ensure their assumptions and accuracy.

Page 35 or E-2 – Reclamation Plan General comment

7. AM04 proposes a backfill buttress with very steep, up to 2.25H:1V slopes with erosion protection by plant species and not protected by an upland diversion ditch or ditches. Even with upland diversion ditches, erosion control on such steep slopes is going to be expensive and difficult. The operator has not included any special plans for vegetative stabilization measures or erosion control while the vegetation is establishing. Please have the operator propose specific steep slope erosion control and stabilization measures (and the number of acres on which these will be needed) so they may be properly evaluated, included in the reclamation plan and included in the reclamation bond.

Page 36 or E-3 – Reclamation Plan

8. In the Final Grading, Slopes, and Drainage section it is stated "Surface run off from the hills above the disturbed areas will be diverted around the stabilized and reclaimed slope." It is not clear, even after looking at the map in Exhibit G, where this interceptor ditch is located, its designs, or to where it will be routed. Please have the operator provide the location of the ditch, typical cross sections and designs, ditch protection and final reclamation plans. Given that aerial photos of the site indicate severe erosion on unprotected slopes, this aspect of the reclamation plan seems critical to protect the newly placed and reclaimed steeper than 2.5H:1V slopes. It also seems critical to attempt to lessen water infiltration into the newly placed fill so such water will not encourage instability of the fill material.

9. In general, the reclamation plan calls for the planting of various species (grasses, forbs, shrubs and trees) but does not commit to any success standards such as plant diversity, total percent cover, or surviving number of shrubs or trees per acre after a certain number of years without human inputs to the trees' care and maintenance. The operator must commit to actual reclamation standards, especially since plant cover is critical to topsoil protection and because the forest service land Environmental Assessment of 2001 sought the re-establishment of a Douglas Fir – Lodgepole Pine forest. Since the operator assumes that 70% of the planted trees (43/acre) will survive, a standard of 30 trees per acre on acreage planted to trees seems reasonable prior to reclamation bond release. The operator should commit to this and designate the number of acres that will be planted with trees.

10. The same reclamation performance standards as above must be applied to areas planted to Pinyon Pine and Juniper. Please have the operator commit to a tree planting survival number per acre after a reasonable time without human inputs and designate the acres planted to trees on a map.

11. Topsoil stockpile protection methods are not specified except with quotes from the Construction Materials Rules and Regulations. Please provide details of maximum thickness of stockpiles, steepest slopes and seed mixtures, rates, timing of seeding, etc. Without details it is impossible to determine how topsoil stockpiles will be preserved and kept in a condition suitable for use in reclamation.

Page 37 or E-4

12. As noted above, a minimum of 113,100 LCY of topsoil will be needed to ensure a 0.5 foot thick lift of topsoil. Not the amount specified in the application.

Page 38 or E-5

13. Will tree planting be followed by an initial watering to saturate the roots or will it not? The operator must commit to standard practices to help enhance tree success in areas planted to trees.

Exhibit G General Comment

14. On Exhibits F-3, F-4 and F-5 approved via TR18, French Drain locations are noted yet there are no specifications included prior to TR approval. None of these are noted on any maps included in the AM04 submittal. Are these Drains needed to enhance stability of the fill? Are they now being excluded from consideration? Please have the operator clarify.

Page 44 or G-2

15. Under the **Surface Water** section it is stated "The drainage basin north of North Peak has active surface flow during most of the year, but it disappears below the surface a few hundred feet west of the quarry." Given the effect that water may have on the stability of the highwall and the steep buttress fill that is proposed with this amendment, it is curious that this constant water feed to the underground just above the highwall has never been adequately investigated. Please have the operator further explore this possible contributor to quarry highwall instability. It may be prudent to deal with this water in some way that ensures that it does not have an effect on final backfill stability. Please have the operator figure out where this water goes and specify plans for how to handle this water.

16. Neither Exhibit G-1 of AM04 or TR07 indicates where the interceptor ditch is or will be located above the quarry highwall. Given the importance of this ditch for fill stability and to lessen surface erosion of the newly placed buttress fill, it seems important to include exact location and designs for this structure. Please have the operator provide designs for a formal surface water run-on interceptor ditch.

Page 45 or G-3

17. Please have the operator specify where the "Long-term, small depressions along the eastern boundary of the mine..." will be located on the Reclamation Plan or Exhibit G-1 Map(s). What will their designs be? How effective will they be in removing sediment from surface runoff? Will they impound water in compliance with State Engineer's Office requirements?

18. In our experience, surface water control structures have never become maintenance free. They always must have sediment removed or the structures must be rebuilt to be effective. Please have the operator include plans and costs for their removal upon final reclamation. Merely obscuring them with vegetative growth is unacceptable.

Page 46 or G-4

19. It is impossible to evaluate the Reclamation Drainage Control Plan fully without specific designs for a formal upland drainage control ditch. Please have the operator supply plans and specific designs for the upland drainage control ditch.

Exhibit G-1 Water Management Plan Map

20. Given the small scale of this map, it is generally very hard or impossible to determine the runs for the Time of Concentration Flow Paths. Do the Terrace Ditch or Armored Ditch lines obscure them? Please have the operator submit a map that indicates clearly where everything is.

Attachment G-1

21. The water management plan and Sedcad runs may need to be rerun after placement of a top of quarry highwall run-on control ditch.

Pikeview Quarry Backfill Stability Analyses, Memo from Paul Kos to Jerald Schnable dated August 26, 2019

22. Assumptions are made that compaction for a fill slope will be adequate with 3 foot lifts and unspecified passes with "haul trucks" and "bulldozers". Demonstrable compaction for such a critical buttress at a site that has exhibited instability over many decades is critical to ensure stability for long term reclamation.

23. Section 3.1 explores Exponent Material Strength Properties and carefully concludes that "...the values calculated by Seegmiller are conservative for use in evaluating the slope stability." Once again, given the cost involved in constructing this buttress, the history of instability of this highwall at this site and the need to ensure long term stability for final reclamation, Unit Weight, Cohesion and Friction Angles that are the most conservative must be used for stability calculations.