FREEPORT-McMoRan

Tyrone Operations
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December 21, 2022

Certified Mail #70150640000476263995
Return Receipt Requested

Mr. David Ohori
Energy, Minerals and Natural Resources Department
Mining and Minerals Division
Mining Act Reclamation Program
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Ohori:

Re: Response to Comments on the Applications for Modification 22-1 to Little Rock Mine, Permit No. GR007RE; and Modification 22-1 to Tyrone Mine, Permit No. GR010RE; Freeport-McMoRan Tyrone Inc.

Freeport-McMoRan Tyrone, Inc. (Tyrone) applied for a modification to the Little Rock Mine Permit No. GR007RE on August 2, 2022. The application requested approval of the Little Rock Precambrian granite to be used as Reclamation Cover Material (RCM) at the Little Rock Mine and to terminate the USNR Test Plot Study. On August 17, 2022, Tyrone also applied for a modification to the Tyrone Mine Permit No. GR010RE for approved use of the same RCM at the Tyrone Mine.

Tyrone appreciates the combined comments on these two modifications from Mining and Minerals Division (MMD), New Mexico Environment Department (NMED), Air Quality Bureau (AQB), and NM Department of Game and Fish (NMDG&F). This letter is in response to these comments which were received on November 21, 2022.

Below are the MMD comments in italics followed by Tyrone's responses.

1. *Construction of USNR, page 3 of the Applications, states that during reclamation construction a small portion of the USNR reclamation area was too coarse at the surface for an adequate seed bed and that Tyrone hauled in "additional fine-grained RCM for a seedbed". Please state the source of the fine-grained RCM and describe*

how it was excavated, handled, and placed to provide a seedbed "at an average thickness of 4 inches".

The fine-grained cover material was sourced from a stockpile of salvaged soils that originated from the 9AX stockpile (9AX) footprint. Originally, the salvaged soil was excavated from the footprint of 9AX with a D8 bulldozer. This salvaging operation was underway at the same time Tyrone was reclaiming the USNR site. The salvaged soil was pushed into a pile by the D8, loaded into a few articulating trucks, and hauled directly to the USNR site. The articulating trucks end-dumped the salvaged soil material close to the edge of the USNR reclaimed surface (near the area it was needed) and it was pushed with a large bulldozer (either a D8, 10 or 11) over the small rocky surface that needed textural improvement. A D6 was then used to spread the salvaged soil to ensure the rocky surface was completely covered. Overall, it was a quick and simple operation.

2. *Results, Reclamation Cover Material Suitability, pages 4 and 5 states that physical and chemical characteristics of the Precambrian granite placed at the USNR Test Plots and the Gila conglomerate RCM were evaluated. The Precambrian granite waste rock excavated from the Little Rock Mine has been hauled to the Tyrone Mine and placed onto the Tyrone 9A and 9AX Stockpiles. Prior to approval of the Precambrian granite in the 9A and 9AX stockpiles as RCM, MMD requests that Tyrone performs confirmation sampling and analysis of the Precambrian granite in these waste rock piles. Tyrone shall provide a sampling and analysis work plan to MMD within 90-days for the chemical and physical sampling and analyses that will be performed.*

   Tyrone met with MMD and NMED on December 5, 2022 regarding this comment and to ask for clarification on the necessity of additional sampling of this stockpiled cover material. During this meeting, Tyrone communicated that the Little Rock overburden material has been extensively sampled and characterized for almost three decades. Numerous reports have concluded it is suitable cover material. A wide array of analyses show that it meets all regulatory requirements and the suggestions in MMD's *Guidance for Soil and Cover Material Handling and Suitability for Part 5 Existing Mines*. Via email on December 9, 2022, Tyrone provided MMD with a summary table that lists all reports documenting the analyses conducted to evaluate the cover material with respect to MMD Soil Suitability Guidelines and regulatory requirements such as the Copper Rule 20.6.7.33 F(2). MMD replied in email correspondence requesting additional time to review the reports before meeting with Tyrone again to discuss the necessity of this request.

   Tyrone would appreciate the agency's technical rationale for stating that the 9A and 9AX stockpiles require additional sampling and analysis. Much of the suitability testing was performed on samples collected from the Little Rock pit and historic overburden

stockpiles. The analytical results are representative of the material stored in the 9A and 9AX stockpiles. Tyrone followed the *Waste Rock Characterization and Handling Plan-9A and 9AX Waste Rock Stockpiles, Tyrone Mine, DP-435*. Of the 306 samples collected by 2016, only 13 contained detectable amounts of sulfide sulfur and the highest concentration was only 0.16 % by weight. Evidence such as this shows there is little risk of acid generation or metal toxicity to plants from this material.

Multiple short and long-term leaching test results support this assertion, including low extractable metal concentrations from the synthetic precipitation leaching procedure (SPLP), humidity cell testing (HCT), meteoric water mobility procedure (MWMP), and extractable constituent analyses.

Tyrone evaluated the results of the MWMP and extractable constituent analysis with respect to the MMD Guidelines for metals and concluded that the cover material from Little Rock meets the suggested targets and maximum values outlined in Appendix 1 of the guideline document mentioned above. Subsequent reports including the *Characterization and Volumetrics of Gila Conglomerate and Precambrian Granite Reclamation Cover Materials* (2020) by Golder Associates, and the *USNR Site and Copper Mountain South Pit Expansion CQA/CQC Report* (2014) by Telesto Solutions, Inc. produced the same conclusions after sampling and analyzing the in-place 9A/9AX material.

Finally, compelling information can be obtained by visual observation of the 9A and 9AX stockpiles. Vegetation is establishing voluntarily on the stockpile benches in good abundance, indicating it is a favorable growth medium. Please see Image 1 and 2 below that show this establishment on the 9A Stockpile. Photographs of the 9AX were not taken due to the inaccessibility of the stockpile.

Image 1. Seeded bench of 9A with 9AX in the background, December 2022.

Image 2. Unseeded bench of 9A Stockpile, December 2022.

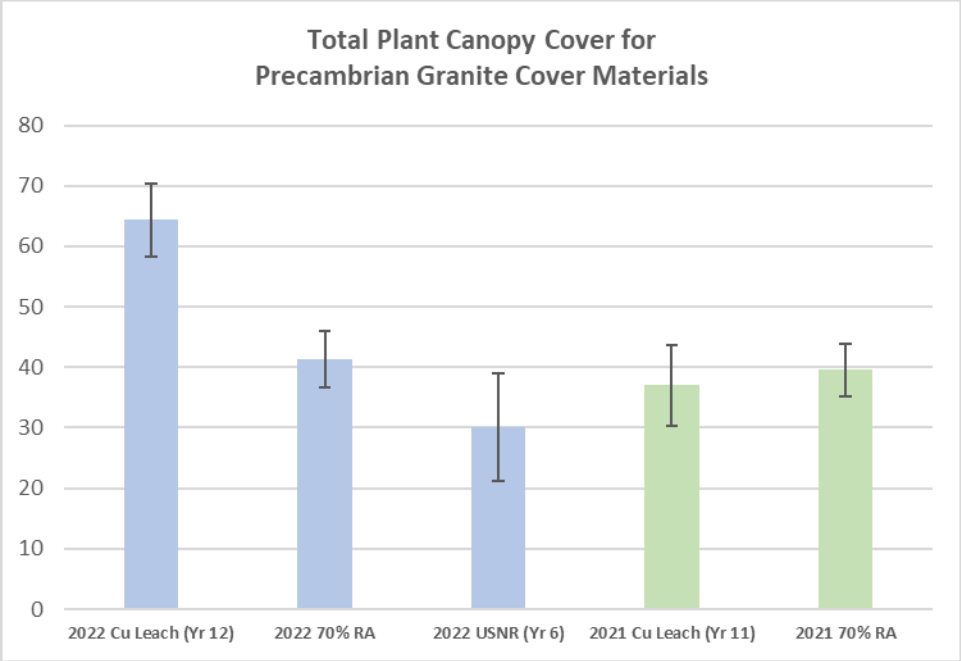
3. *Condition 8.P.1(a) of Permit Modification 17-1, for the Little Rock Mine, Permit No. GR007RE requires that Tyrone provide the results to MMD of the 2018 and 2020*

USNR Test Plot and the Tyrone reference area quantitative vegetation monitoring. MMD has received reports from Tyrone of the 2018 and 2020 quantitative vegetation monitoring results. The 2018 USNR Quantitative Vegetation and Erosion Monitoring Report for the USNR Test Plot Study, dated April 25, 2019, did not include a vegetation survey of the Tyrone reference area. Therefore, MMD requests that Tyrone performs a quantitative vegetation survey at the USNR Test Plots and the Tyrone reference area in 2023 to compensate for not performing a vegetation survey of the Tyrone reference area in 2018.

In 2018, the reference area was not sampled because this is not a standard practice in the third year of a reclamation program, nor was it performed in previous test plot studies on Gila conglomerate. Due to those factors, the survey of the reference area in 2018 was overlooked. Although this oversight was unintentional, it would not have yielded any measurable value to compare a mature ecosystem to a reclamation site with only a three-year, drought impacted growth period. Despite the drought though, the year 5 results of the USNR test plots (2020), demonstrated the site is appropriately progressing towards a self-sustaining ecosystem and did meet the performance standards when compared to the reference area.

Tyrone discussed this comment with MMD in the virtual meeting held on December 5, 2022 and expressed concern that performing another study on the test plots in 2023 would significantly delay this process as the results would not be available until early 2024. Tyrone asked for an exception to this permit condition and for conditional approval based on the results of the 2022 vegetation monitoring surveys conducted on the USNR and Copper Leach Stockpile. The USNR and Copper Leach Stockpile sites were constructed with the same cover material from the Little Rock Mine and seeded in 2016 and 2010, respectively. A summary of the 2022 surveys is provided below. It is important to note that observations from these sites are equally as important as the test plots and can serve as an alternative solution to conducting additional vegetation monitoring in 2023.

The figure below compares the 2021 and 2022 total canopy cover (± the 90% confidence interval) for Precambrian granite reclamation to the reference area performance standard. In 2021, a drought year, total canopy cover on the Copper Leach Stockpile (Year 11) was just shy of the reference area standard. Canopy cover for the reclamation at the Copper Leach stockpile (Year 12) in 2022 is significantly higher that the reference area. Year 6 for the USNR reclamation is 73% of the reference area standard in 2022 and the 90% confidence intervals overlap, suggesting the means may not be significantly different.



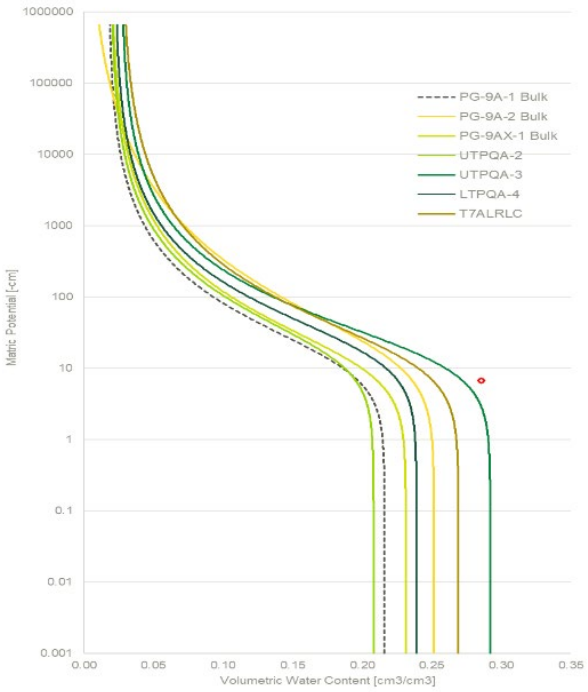
Below are the NMED comments in italics followed by Tyrone's responses.

1. *Results, Reclamation Cover Material Suitability – This section discusses Water Holding Capacity and references the March 8, 2017 Annual Test Plot Report 1 which describes how Water Holding Capacity was determined for material used at the USNR Test Plots. The report states, "(t)he water holding capacity was determined by subtracting the water held at the traditionally defined field capacity from water held at wilting point (USDA 2014). Field capacity was estimated as the water held at 100 cm (10 kPa) of suction and wilting point was estimated as the water held at 15,000 cm (1500 kPa) of suction (USDA, 2014). Because the cover materials are consistently sandy loams and generally contain between 40 and 60% rock fragments, they were considered coarse textured and field capacity was determined at 100 cm suction. The water content at field capacity and wilting point were determined numerically (rather than graphically) from the soil water characteristic curve functions developed for each sample."*
   Please note that NMED will not consider final approval of the proposed reclamation cover material until a demonstration or justification that 100 cm is representative of field capacity for site-specific material is provided.

   Tyrone understands the demonstration NMED has requested is a discussion justifying how the conventionally assigned field capacity set-point of 100 cm (10 kPa) suction is appropriate in relation to the site-specific soil water characteristic curves (SWCCs) developed for the Precambrian granite reclamation cover materials (RCM). The

RCM's fine-earth (< 2 millimeter) texture is consistently classified as moderately coarse-textured sandy loams where field capacity was set at the water held at 100 cm suction. The figure below illustrates the rock-corrected SWCCs for the Precambrian granite RCM. In all cases, the 100 cm field capacity suction for any individual sample is higher than their respective air-entry value (the matric suction when air starts to enter the largest soil pores as it desaturates towards field capacity) and falls along the slope of the unsaturated transition zone between air-entry and residual suctions. Tyrone believes the selected field capacity set points are appropriate for the Precambrian granite RCM and are supported by the site-specific data. Moreover, the set points are conservative and defensible with respect to the intent of the water holding capacity requirement specified by New Mexico Copper Rule.

Rock-Corrected Soil Water Characteristic Curves for Precambrian granite RCM



Note: red asterisk = approximate air entry value based on SWCC

2. *As stated in C109 of DP-1341, final RCM approval is subject to a demonstration that Copper Mine Rule requirements will be met, and concurrence from MMD that requirements of the Mining Act will be met. Pursuant to Paragraph (4) of Subsection F of 20.6.7.33 NMAC, a CQA/CQC plan for the final cover design shall be submitted for NMED approval.*

Tyrone is aware of the conditions cited and has provided characterization data that indicate 9A and 9AX materials meet the criteria if managed similarly to the techniques used at the USNR test plots and reclamation area.

Below are the NMDG&F comments in italics followed by Tyrone's responses.

1. *Tyrone states that test plot canopy cover and shrub density meet or exceed the Year 5 standard of 40% of the reference area. While the overall test plot vegetation appeared relatively dense, site inspection participants observed areas that contained coarse-textured materials where the vegetation was sparse. Current quality control of the proposed RCM consists of visual observation by an RCM technician to determine if the shovel load of waste rock is texturally acceptable to be used as RCM. The Department believes that improved material handling techniques, such as screening, would provide a higher quality, more uniform seed bed and would greatly reduce or eliminate areas where the cover material is too coarse to support adequate revegetation.*

   Rock was screened through Tyrone's material handling process. Tyrone presumes that the comment recommends the use of a screening plant to create a more uniform texture. The natural landscape in Deadman Canyon (surrounding life zone) is not uniform from a textural perspective. The only areas in the surrounding landscape that are erosion resistant are the areas that have adequate armoring in the form of gravel and rock fragments. From the perspective of the industry operator who is required to implement the reclamation plan, rock screening is a very un-desirable option from both a constructability and performance perspective.

   Material handling techniques such as screening all the cover material through a screening plant on a large scale is infeasible. This process also has other negative consequences, one of which is that screening plants tend to segregate the fines from the rock fragments that are desirable, causing a detrimental effect. Furthermore, the vegetation establishment results of the USNR test plots, USNR, and Copper Leach Stockpile, do not indicate that this additional process is necessary. The USNR reclamation site is performing to the standards set by MMD without the addition of topsoil, organic amendments, or use of a screening plant.

   Material screening processes used in the construction of USNR yielded a seedbed that was adequate for establishing vegetation and controlling erosion. Merely 4% or less of the area resulted in an accumulation of rock fragments at the surface that could impede seeding with the range drill. Variability in canopy cover is expected and commonly observed in the surrounding undisturbed ecosystems, as well as the reference area.

2. *The Department acknowledges that adequate topsoil was not salvaged at the Tyrone and Little Rock Mines for use across reclamation areas at both mines but does*

recommend that Tyrone consider the use of organic amendments to the Precambrian granite seed bed to increase reclamation success.

Tyrone tested and implemented composted sewage treatment plant sludge as an amendment on tailing reclamation for over 10 years and when approached on the topic for full scale reclamation, it was the New Mexico Environment Department that rejected the concept from continuing at Tyrone. More recent studies on biosolid constituents such as polyfluoroalkyl substances (PFAS), provide additional evidence in support of the department's decision. The use of cattle was also tested as a means of aiding reclamation through organic enhancement. Perhaps most notable is that Tyrone applied fertilizers on test plots without any observable improvements in plant performance. Based on these results and the following conclusions, Tyrone does NOT endorse the use of organic amendments in the reclamation process.

First and foremost, it is not necessary. Tyrone's success in reclaiming thousands of acres of "organically deficient" cover material without organic amendments cannot be disputed. Tyrone's success in adding thin, fine-grained cover over rocky areas is also proven as a technique. Secondly, the results of numerous analogous studies on overburden revegetation suggest it is highly unlikely that any long-term benefit will be achieved from the addition of organic amendments. In some cases, as found in the literature, their use results in weeds or grasses overtaking the ecosystem which could result in an overall loss of diversity. This consequence would be detrimental to Tyrone's goal of achieving a diverse self-sustaining ecosystem. The associated risk is simply unnecessary, as evidenced by the Precambrian granite vegetation performance described above. Lastly, organic matter has been shown to build up over time in Tyrone's Gila conglomerate cover systems and the same process is expected to occur in the material from Little Rock.

Please contact Ms. Raechel Roberts at (575) 956-3290 if you have questions.

Sincerely,

Thomas L. Shelley
Environmental Services Manager

TLS:rmr
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c. Holland Shepherd – MMD
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