

January 31, 2023

Mr. Clinton Chisler
Uranium Reclamation Coordinator
Mining Act Reclamation Program
Mining and Minerals Division
New Mexico Energy Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

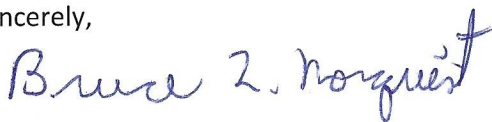
RE: Comments on the Application for Revision 22-1, Permit No. CI002RE, Mt. Taylor Mine, Rio Grande Resources Corporation

Dear Mr. Chisler,

Rio Grande Resources Corp. (RGR) received a letter, dated November 21, 2022, from the Mining and Minerals Division (MMD) of the Energy, Minerals and Natural Resources Department requesting responses to comments made by the New Mexico Office of State Engineer (NMOSE) and the New Mexico Department of Game and Fish (NMDG&F). The comments from these agencies were made upon RGR's Revision 22-1 application for the Mt Taylor Mine Mining Act Permit No. CI002RE. The application for a revision to the Mining Act Permit CI002RE, dated June 13, 2022 was submitted by RGR to MMD. At the request of MMD, NMOSE reviewed the revision application and supplied comments to MMD, by memorandum dated November 15, 2022. Likewise, NMDG&F supplied their comments to MMD by letter dated September 12, 2022.

RGR requested an extension of time, until January 31, 2023, to make its responses. MMD approved the extension of time. This letter contains responses by RGR to those comments made by NMOSE and NMDG&F. If you have any questions, please contact me at (505) 287-7971 or by email at bruce.norquist@ga.com. A hard-copy of this document is also being sent by regular mail.

Sincerely,



Bruce Norquist
Facilities Manager, Mt. Taylor Mine
Rio Grande Resources Corporation

Responses by RGR to NMOSE comments in memorandum of November 15, 2022

NMOSE's comments are in **bold font**. RGR's responses are provided in regular font.

1. Introduction and Conclusions

On July 14, 2022, the Mining and Minerals Division (MMD) of the State of New Mexico Energy, Minerals and Natural Resources Department (EMNRD) requested the New Mexico Office of the State Engineer (NMOSE) Hydrology Bureau (Hydrology) review and comment on the Revision 22-1 application (Revision) for the Mt. Taylor Mine (Mine) Mining Act Permit No. CI002RE from Rio Grande Resources Corporation (RGR, 2022). The permit Revision presents an updated Closeout/Closure Plan (CCP). This Revision differs from the original in that it includes—but is not limited to—an expansion of Waste Rock Pile/Disposal Cell (Disposal Cell), an alternative shaft cap system (“plug”) design, and a change in primary post-mining land use from a water supply project to grazing and light industrial. Several CCP activities described in the Revision could potentially affect groundwater and alluvial aquifers associated with surface water. Thus, the purpose of this document is to evaluate hydrogeologic aspects of the CCP, including:

1. **Plugging of Mine conduits and shafts,**
2. **Plugging of Mine wells, and**
3. **Potential erosion of waste disposal cells and channelized drainages.**

RGR's response to the first paragraph of Section 1. Introduction and Conclusions:

RGR would like to take this opportunity to clarify the proposed changes in its approved shaft cap design. The shaft cap presented in the 2022 CCP is essentially the same as the conceptual shaft cap plan approved in the Mine Permit CI002RE, Rev 13-2. In the 2022 CCP, RGR has proposed to change the construction materials from “I-beam and concrete” to “reinforced concrete”. The reason for this proposed change is that upon analysis, the steel I-beam and concrete design was not sufficiently robust.

Comment Summary (Pages 1 and 2, NMOSE Memorandum)

Mine Shafts and Conduits

- **Two shafts (fourteen ft and twenty-four ft in diameter) penetrate several aquifers to a total depth (TD) of approximately 3,300 feet below ground level (ft bgl). As outlined in—but not limited to—19.27.4.29, 19.27.4.30.A (Annular seal), and 19.27.4.31 New Mexico Administrative Code (NMAC), the shafts do not conform to NMOSE codes to 1) prevent commingling or inter-aquifer exchange of groundwater, 2) prevent loss of hydraulic head between hydrogeologic zones or units, 3) prevent unintended flood waters, surface water, or groundwater from entering the shafts and contaminating the aquifer, and 4) prevent the flow of contaminated or low-quality water.**

- **The Administrative Code requires 1) preventing the commingling or inter-aquifer exchange of groundwater, 2) preventing the loss of hydraulic head between hydrogeologic zones or units, 3) preventing unintended flood waters, surface water, or groundwater from entering the shafts and contaminating the aquifer, and 4) preventing the flow of contaminated or low-quality water. Thus, the Westwater Canyon Member of the Morrison Formation (Westwater Canyon) should be sealed off to prevent groundwater with elevated uranium and radium-226 from migrating to other hydrogeologic units. As-is, Hydrology considers the shafts abandoned in-place without a permit. If RGR does not want to plug the shafts from the bottom up to seal off the Westwater Canyon, a variance will need to be submitted through NMOSE per code 19.27.4.37 NMAC. As part of a variance, a Shaft Monitoring Plan would be needed that describes how RGR will demonstrate compliance with the above referenced codes, given the potential for concrete shaft liners break down over time and create leakage paths.**

RGR response to NMOSE bullets 1 and 2 under “Comment Summary” for Mine Shafts and Conduits, pages 1 and 2, NMOSE memorandum:

If RGR decides not to plug the shafts from the bottom up, it will submit a variance per 19.27.4.37 NMAC, including a shaft monitoring plan, as required.

Bullet 3 Under “Comment Summary” for Mine Shafts and Conduits (Page 2, NMOSE Memorandum)

- **The Administrative Code also requires that:**
 - **The near-surface seep in the fourteen-foot shaft be sealed off,**
 - **Construction debris does not free-fall into shafts,**
 - **RGR propose a surface completion protecting the PVC vent in the proposed shaft “plugs” from potential migration of surface runoff (19.27.4.29.L NMAC), and**
 - **Steel utility conduits be plugged per NMAC 19.27.4, RGR submits a request for variance to use proposed grout design, and RGR proposes an approach ensuring grout does not flow out of the bottom into Mine workings during tremie operations.**

RGR response to NMOSE bullet 3 under “Comment Summary” for Mine Shafts and Conduits, page 2, NMOSE memorandum:

Sub-bullet 1: RGR intends to seal off the near-surface seep in the 14-ft diameter manway shaft at the soonest opportunity, once plan approvals are obtained.

Sub-bullet 2: RGR will perform shaft work such that construction debris does not free-fall into the shaft.

Sub-bullet 3: RGR will propose a surface completion that protects the shaft monitoring pipe and plug to prevent surface runoff from migrating into the shaft. It will be incorporated into the plug construction plan.

Sub-bullet 4: RGR will submit a plugging and abandoning plan for approval, including grout mix, that complies with OSE regulations before the conduits are plugged and abandoned. RGR will propose a

method to ensure grout does not flow out of the bottom of the conduits into the mine.

Bullet 4 Under “Comment Summary” for Mine Shafts and Conduits (Page 2, NMOSE Memorandum)

- **Hydrology requests the following information from RGR:**
 - **Results of tests evaluating the sulfate-resistance of cement, if conducted, in addition to water quality analyses for sulfate, chloride, and hardness of groundwater in the shaft to evaluate shaft liner-groundwater compatibility,**
 - **Results of effectiveness testing of the grout curtain (i.e., “an “after the fact” evaluation of grouting efficiency...”), if conducted, to understand how effective the grout curtain was in reducing the inflow of groundwater to the shaft and to characterize the rate at which groundwater was flowing into the shaft during post-dewatering Mine operations,**
 - **An explanation of what type of joint was used to construct the shaft liners to understand the potential for groundwater inflows through shaft liner joints,**
 - **Shaft liner concrete permeability: results of any permeability tests would help to understand the potential for flow of groundwater through shaft liner concrete, maps of groundwater potentiometric surface for all monitored aquifers for two different time periods (current and pre-dewatering conditions, or the earliest data available), and a narrative interpretation of each map to understand inferred vertical and horizontal groundwater flow conditions and the potential for groundwater inflows to the shafts,**
 - **Groundwater quality contour maps for all monitored aquifers for two different time periods (current and pre-dewatering conditions, or the earliest data available) for sulfate, radium-226, and uranium, in addition to a narrative interpretation of each map. In conjunction with mapping of potentiometric surface described above, groundwater quality maps would assist in understanding the potential for 1) shaft liner degradation from interaction with sulfate and 2) the migration of low-quality groundwater, and**
 - **What method will be used to keep grout from flowing out of the bottom of the conduit.**

RGR response to NMOSE bullet 4 under “Comment Summary” for Mine Shafts and Conduits, page 2, NMOSE memorandum:

Sub-bullets 1-4: RGR will provide all available historical data requested, if it exists. RGR requests a 4-month period to adequately search its records. Should RGR be unable to locate records on shaft concrete properties, it may consider retrieving shaft concrete core samples for analyses, to address OSE’s concerns.

Sub-bullet 5: RGR will provide contour maps of the potentiometric surfaces and groundwater quality of monitored aquifers using current and available historical data. Narratives will be provided.

Sub-bullet 6: A description of the proposed plugging method to prevent grout from flowing out of the bottom of the conduits will be included in the plugging plan.

Bullet 5 Under “Comment Summary” for Mine Shafts and Conduits (Page 3, NMOSE Memorandum)

- **Hydrology is concerned about:**
 - **The observed trend of decreasing radioactivity of radium-226 with decreasing shaft depth (Table 2.1 in RGR 2022),**
 - **Elevated (but below New Mexico groundwater standards) total radium (radium-226 + radium-228) in Point Lookout wells DW-2A and DW-3 (Table 2.2 in RGR 2022), and**
 - **The cause of the decrease in uranium values of the samples collected at 855-ft bgl in the fourteen-ft and twenty-four-ft shafts, compared to samples collected at greater depths (Table 2.1 in RGR 2022).**

RGR response to NMOSE bullet 5 under “Comment Summary” for Mine Shafts and Conduits, page 3, NMOSE memorandum:

RGR will continue to study the water quality of the groundwater and shaft water, including geochemistry of uranium and radium, and an assessment of stratification of the water column in the shaft. RGR will provide the information to OSE once it completes its studies. Before these studies can begin, RGR will first need to clean out and redevelop the wells, which will depend on plan approvals.

Groundwater: Wells near the Mine and Abandonment of Mine wells (Page 3, NMOSE Memorandum)

- **The Administrative Code requires wells in the CCP to be plugged in accordance with 19.27.4 NMAC and the Well Plugging Plan, which RGR will submit to NMOSE for approval.**
- **Hydrology requests:**
 - **Construction details for shallow monitoring, remediation, and dewatering wells, and**
 - **An explanation of how long-term monitoring wells will be plugged when monitoring is complete and, how well integrity will be tested and, if necessary, wells repaired during long-term monitoring.**

RGR response to NMOSE bullet 1 under “Comment Summary” for Groundwater: Wells near the Mine and Abandonment of Mine wells, page 3, NMOSE memorandum:

RGR will plug and abandon all wells in accordance with OSE regulations and in consultation with OSE. RGR will submit a well plugging plan, for approval, of those wells to be plugged and abandoned.

RGR response to NMOSE bullet 2 under “Comment Summary” for Groundwater: Wells near the Mine and Abandonment of Mine wells, page 3, NMOSE memorandum:

Sub-bullet 1: RGR will provide construction details for the requested wells to OSE, along with the other requested data, once the record search is completed. RGR requests approximately 4 months of time to complete the records search.

Sub-bullet 2: All long-term monitoring wells will be plugged and abandoned in accordance with OSE regulations and in consultation with OSE, when no longer needed. RGR will rely on its consultants and

licensed drillers to provide the explanations of how each of the long-term monitoring wells will be plugged. When the wells are to be plugged, plugging and abandonment plans and permits will be submitted.

Sub-bullet 2: Periodic well integrity testing of the long-term monitoring wells may be performed using a cement bond log, natural gamma log, camera survey, pneumatic tests, or other appropriate techniques. Well repairs, when deemed necessary, will be performed by licensed drillers, guided by drilling consultants.

Bullet 3 Under “Comment Summary” for Groundwater Wells Near the Mine and Abandonment of Mine Wells (Page 3, NMOSE Memorandum)

- **Hydrology is concerned about:**
 - **Groundwater with elevated concentrations of uranium, nitrate, and other analytes potentially moving off the Mine and impacting nearby public water supply wells,**
 - **Protecting public water supply wells near the Mine from potential contamination, and**
 - **How remediation system monitoring well and PMCP well integrity will be assessed to demonstrate a competent seal.**

RGR response to NMOSE bullet 3 under “Comment Summary” for Groundwater: wells near the Mine and Abandonment of Mine Wells, page 3, NMOSE memorandum:

Sub-bullet 1: Shallow ground water is currently being regulated by the Mining Environmental Compliance Section of the New Mexico Environment Department (NMED) through RGR’s approved Stage 2 Abatement Plan. With regard to potential migration of contaminants from deeper aquifers, RGR is working with NMED on approval of a deep aquifer monitoring plan.

Sub-bullet 2: RGR’s proposed groundwater modeling study is anticipated to provide insight as to groundwater flow paths, quantities and contaminants. The results of the modelling should identify risks to public water supply, if any, and possible solutions to minimize the risk of contaminants reaching those wells. As part of this assessment, RGR may propose additional monitoring wells at its property boundary, if needed.

Sub-bullet 3: Well integrity testing will be based on recommendations by drilling consultants. This may include cement bond and natural gamma logging, camera surveys, pneumatic testing, among others.

Surface Infrastructure: Waste Disposal and Channelized Drainages (Page 3, NMOSE Memorandum)

- **Hydrology is concerned about:**
 - **The source(s) of contaminated groundwater identified in wells MW-1M and MW-11A,**
 - **Potential disposal cell leakage and how unintended leakage might be detected, and**
 - **Potential mobilization of contaminated sediments from stormwater runoff in channelized drainages and how any such erosion would be remediated.**

RGR response to NMOSE bullet 1 under “Comment Summary” for Surface Infrastructure: Waste Disposal and Channelized Drainages, page 3, NMOSE memorandum:

Sub-bullet 1: The source of contamination found in wells MW-1M and MW-11A is believed to be from waste rock pile material and the former sewage lagoon buried in the waste pile, both located in the vicinity of these wells.

Sub-bullet 2: With regard to potential disposal cell leakage, RGR intends to conduct a study to evaluate the risk of potential releases and possible mitigation actions. The study will involve numerical modeling of groundwater and may include installation of sentinel wells, if recommended. RGR will monitor water infiltration of the disposal cell through the use of Lysimeters, soil coring, or other appropriate methods.

Sub-bullet 2: The disposal cell design focuses on minimizing water infiltration into the contained materials. The approved disposal cell, as designed and constructed, diverts all surface water towards the toe and then is channeled to the Southwest Stormwater Pond. A compacted clay-liner was first installed for the purpose of impeding downward migration of contaminants in the cell. Next, the contaminated materials filling the cell were placed in an unsaturated state and compacted. A compacted clay cover was then constructed over the contents of the cell, to minimize water infiltration. Lastly, RGR placed a vegetative growth media layer over the clay cover to protect it from erosion. Because the contaminated materials filling the cell are unsaturated, they would be a highly unlikely source of leakage.

Sub-bullet 3: With regard to the mobilization of contaminated sediments from stormwater runoff in channelized drainages, once Closeout/Closure is complete, there will be no more contaminated sediments exposed around the site to mobilize to surface water. Erosion control structures have been and will be designed for 100-year runoff events.

Sub-bullet 3: Once Closeout/Closure is complete, there will be no more contaminated sediments remaining in the vicinity of the North Diversion Ditch. Until Closeout/Closure is complete, site grading and substantial berms constructed along the length of the North Diversion Ditch minimize the risk of contaminated sediments or impacted surface water from entering it.

Sub-bullet 3: The South Diversion Ditch is protected from stormwater runoff and any mobilized sediments from the disposal cell and other adjacent impacted surfaces by an access road, drainage ditch and substantial berms. These were reconstructed in 2018 as part of RGR’s approved reactivation project. Stormwater runoff impinging on the disposal cell flows into the drainage ditch (rip-rap lined) at the inside of the access road, and is direct to the South Storm Water Pond (SSWP). The access road is canted towards the drainage ditch, ensuring water flows into the ditch and towards the SSWP. This access road and accompanying berms and ditch will be extended as the disposal cell is expanded in the future.

Sub-bullet 3: Should erosion of the disposal cell occur, RGR will mitigate any mobilized sediments and repair any significant erosion. Mitigation and repair will involve placing the contaminated sediments into the disposal cell and reconstructing the clay cap and growth media soil layers as needed.

Sub-bullet 3: The risk of erosion of the disposal cell is reduced by way of its design and construction. A mid-slope bench has been constructed, which reduces the erosion potential of long slope-lengths. Hay mulch and rock armoring of the slopes is also considered. Once vegetation is established, further protection from erosion will be provided.

Sub-bullet 3: RGR is working with a channel design engineer to reconstruct the South and North

Diversion ditches. Per standards, the diversion ditches will be designed for a 24-hour, 100-year storm event. Reconstruction of the diversion ditches will improve their condition and capacity to convey stormwater, thus reducing the risk of significant erosion. RGR will repair any significant erosion when it develops, including the possible use of armoring or other bank and bed reinforcement techniques.

RGR Concluding Response:

RGR is planning a staged response to OSE's comments and concerns, as data is acquired and plans are approved. RGR will endeavor to locate and provide to OSE, all of the shaft/grout-curtain related construction information and other historical information being requested (e.g., drawings, studies, records), if they exist. This information requires a record search that RGR estimates will take approximately 4 months to complete.

RGR has proposed and is in the process of constructing a site groundwater model. Once necessary data are obtained, it is hoped that through this modeling, RGR will be able to sufficiently address OSE's comments and concerns. The groundwater model will be utilized to address data gaps in the event that a search of the records is unsuccessful at finding requested information. The groundwater model will also enable RGR to develop plans for remediation and monitoring. The model will help guide the location of new monitoring wells, if needed. Completion of the groundwater model and subsequent use of it is expected to take up to 2 years, depending on plan approvals for data acquisition activities (i.e., well pumping tests, well cleaning, rehabilitation and development, and sampling).

Responses by RGR to NMDG&F comments in letter of September 12, 2022

NMDG&F's comments are in **bold** text. RGR's responses are provided in regular text.

- 1) **RGR is no longer proposing to retain the production shaft headframe in place as raptor and raven nesting habitat. In order to avoid any potential conflicts with nesting ravens or raptors, demolition and removal of the headframe is scheduled to occur in the fall of 2022. If the planned demolition of the headframe cannot occur outside of the primary breeding season (1 March-1 September), the structure should be thoroughly surveyed for active nests prior to demolition. If any active nests are found, demolition of the headframe should not occur until all young have fledged.**

RGR scheduled the removal of the Production Shaft headframe for mid-November, 2022. The actual date of removal was November 21, 2022. Prior to removal of the headframe, RGR contacted NMDG&F to verify if the planned removal was outside of the primary breeding season. The reply was affirmative. Prior to the removal activities, RGR inspected the headframe and found no active nests.

- 2) **An inactive, 24-inch diameter Treated Water Discharge Pipeline will also be removed. The pipeline extends 4.3 miles from the Mine Water Treatment Unit (MWTU) area to the outfall point in San Lucas Canyon, north of the mine. This pipeline crosses mostly private land, except for**

approximately 0.75 mile leased from the U.S. Forest Service. If pipeline removal activities must be conducted during the breeding season, the area should be surveyed for active nest sites (with birds or eggs present in the nesting territory) and avoid disturbing active nests until young have fledged. For active nests, adequate buffer zones should be established to minimize disturbance to nesting birds. Buffer distances should be ≥ 100 feet from songbird and raven nests and 0.25 mile from most raptor nests. For nests of golden eagles (*Aquila chrysaetos*), ferruginous hawks (*Buteo regalis*), prairie falcons (*Falco mexicanus*), and peregrine falcons (*Falco peregrinus*), a buffer zone of 0.5 mile should be established. Active nest sites in trees or shrubs that must be removed should be mitigated by qualified biologists or wildlife rehabilitators. Department biologists are available to consult on nest site mitigation and can facilitate contact with qualified personnel.

RGR will consult with NMDG&F before any treated water discharge pipeline removal activities are initiated. RGR intends to utilize qualified consultants, specializing in biology, to assist with this project. Before construction begins, RGR will perform a survey of flora and fauna in the project area. If construction activities occur during the breeding season, the area will first be surveyed for active nest sites. Buffers will be established, where necessary, and in consultation with NMDG&F staff biologists. RGR is focused on preserving as much vegetation as possible during the project, which will benefit RGR in final reclamation. If any trees or shrubs need to be removed, all active nests found will be mitigated by qualified biologists or wildlife rehabilitators.

- 3) Table 4.4, "Reclamation Seed Mix", includes "Other (Perennial flower mix) as available". The following non-native species are listed: African daisy (*Arctotis stoechadifolia*), cornflower (*Centaurea* spp.), baby's breath (*Gypsophila paniculata*), sweet William (*Silene armeria*), blue flax (*Linum perenne*), Shasta daisy (*Leucanthemum superbum*), sweet alyssum (*Lobularia maritima*), corn poppy (*Papaver rhoeas*), and Siberian wallflower (*Erysimum marshallii*). The Department recommends that RGR use only native plant species and design the reclamation seed mix to enhance local pollinator habitat. Only certified weed-free seed should be used to avoid inadvertently introducing non-native species to the reclamation site. Seeds used as substitutes for any primary plant species that are unavailable at the time of reclamation should also be from native plants. When possible, the Department recommends using seeds that are sourced from the same region and habitat type as the reclamation site or from a region that represents potential future climatic conditions at this site. Department recommendations for alternative native flower species are: blanket flower (*Gaillardia pulchella*), broadbeard penstemon (*Penstemon angustifolius*), hairy golden aster (*Heterotheca villosa*), Lewis flax (*Linum lewisii*), narrowleaf paintbrush (*Castilleja linariifolia*), Nelson globemallow (*Sphaeralcea parvifolia*), prairie aster (*Machaeranthera tanacetifolia*), white prairie clover (*Dalea candida*), and wild four o'clock (*Mirabilis multiflora*).

RGR acknowledges the comment and will strive to use native plant species in its reclamation seed mix. RGR will work with MMD for approval of the final seed mix that is best suited to the site. RGR will require all seed mixes used to be weed-free. RGR will give strong consideration to the flower species recommended by NMDG&F.