FREEPORT-McMoRan

Tyrone Operations
P.O. Box 571
Tyrone, NM 88065

November 16, 2023

Via Electronic &
Certified Mail #70203160000104767750
Return Receipt Requested

Mr. Brad Reid
New Mexico Environment Department
Ground Water Quality Bureau
1190 Saint Francis Drive
Santa Fe, New Mexico 87502

Via Electronic &
Certified Mail #70203160000104767767
Return Receipt Requested

Mr. Kevin Myers
Mining and Minerals Division - EMNRD
Mining Act Reclamation Program
1220 South Saint Francis Drive
Santa Fe, NM 87505

Dear Messrs. Reid and Myers

Re: Freeport-McMoRan New Mexico Operations Response to Joint Agency Comments Precipitation Workplan Analysis for Closure Task 2 and 3

Freeport-McMoRan New Mexico Operations (Chino and Tyrone) appreciate the comments provided by both the New Mexico Environmental Department and the Mining and Minerals Division (Agencies) dated October 2, 2023. As a reminder, Chino and Tyrone accepted additional permit conditions that exceed regulatory requirements in NMED Permits DP-1340, DP-1341 and MMD Permits GR010RE Rev 09-1 and GR007RE Rev 20-1 in response to comments received on Closure Closeout Plans for Chino and Tyrone, which were finalized in 2020 and 2021. Those conditions were to evaluate "current climatological site condition data and provide forward projections, to determine the adequacy of the design of stormwater structures proposed" for the Chino and Tyrone designs to 100-year, 24-hour runoff events. In response, Chino and Tyrone submitted a Precipitation Workplan Analysis for Closure (Workplan) on May 21, 2021 which outlined 5 steps to be taken to analyze global and regional climate models, and then assess current closure designs against a reasonable projection of increased precipitation. The Workplan reflected the original mutually agreed-upon scope and intent. This Workplan was conditionally approved by the agencies on September 3, 2021.

In accordance with Task 2 of the Workplan and Conditional Approval No. 4 Chino and Tyrone met with the Agencies to review the report titled Climate Change Projections for the Chino/Tyrone, New Mexico Mine on January 26, 2023 during which the Agencies agreed that Chino and Tyrone should proceed with Task 3 of the Workplan which was to evaluate existing design criteria of closure structures against the recommended changes in the report. As stated in your comment above, that Task 2 report recommends using a 14 % increase as the 1-Day climate change adjustment for summer monsoon storms for the purposes of the Task 3 study. The Task 2 report was subsequently submitted on January 31, 2023. After receiving no comments on the

recommended 14% increase in precipitation from the Agencies on Task 2, Chino and Tyrone completed and submitted the Task 3 report on June 20, 2023.

Freeport recognizes there is complexity and uncertainty around climate change and future outcomes – especially related to flood risks in the United States Desert Southwest. New Mexico and Colorado have jointly evaluated their approach to consider risk for much higher risk structures than those considered in the Task 3 report. The Task 3 report analysis is consistent with the latest information provided by New Mexico, subject experts, and discussions with the state.

Provided below are the comments received from the Agencies on Task 3 in ***bold italics*** followed by responses from Chino and Tyrone. A closing statement is also included at the end of the comment responses. Several of the requests made in the comments from the Agencies will take additional time to complete. In addition to the responses provided below, Chino and Tyrone will submit a revised Task 3 report in 90 days. Task 4 in the approved Workplan states that Chino and Tyrone will "facilitate a working session with NMED and MMD on the current status and utility of climate models for use in local and regional planning". Chino and Tyrone suggest further discussion of the Task 3 report at that working session.

1. Table E.1, Table 6, Task 2 Report. The report recommends 14 percent as the summer 1-Day climate change adjustments percentage based on the RCP4.5 downscaling of global climate models. This represents a medium scenario of the middle of the ensemble global climate models. Given the wide range of uncertainty outlined in Section 4, the agencies recommend an approach that looks at additional scenarios to capture some of the uncertainty. Provide additional scenarios that go beyond the medium middle (14 percent) such as the medium high (27 percent) and high high (40 percent) for 1-Day Monsoon Projections.

The team recognizes the prominent role of uncertainty in evaluating and planning for climate change. It is understood that many scenarios could be evaluated as part of a climate change resilience evaluation. Increasing the NOAA Atlas 14, 100-year storm depths by 14% follows the recommended approach from our experts (AWA) based on a model ensemble approach and will continue to represent the base-case model to estimate potential outcomes under climate change. The scenario represents the most likely outcome from the reviewed climatological projections, as informed by AWA's experience and professional judgement. The selection was also reviewed and discussed with the state and is consistent with the New Mexico Bureau of Geology and Mineral Resources' Bulletin 164[1]. For example, Bulletin 164 discusses the Criteria of evaluation of global climate model (GCM) output and specifically discusses the wide bounds provided by GMCs versus the selection of possible or likely outcomes. Therefore, Chino and Tyrone suggest that this be discussed further during the Working Session in Task 4. At this time, and pending further discussion on this matter, Chino and Tyrone decline to provide the requested additional scenarios.

[1] New Mexico Bureau of Geology and Mineral Resources, 2022, Climate change in New Mexico over the next 50 years: Impacts on water resources: New Mexico Bureau of Geology and Mineral Resources, Bulletin 164.

See Knowledge Gaps section, item 2.

2. Section 2.0 Scope of Assessment, Task 3 Report. Please include Condition 7.Q.3 from Revision 20-1 to the Little Rock Mine, Permit No. GR007RE and add consideration of any potential stormwater impacts to existing reclaimed mine units and performance of associated stormwater structures for the Little Rock Mine Permit in the Task 3 Report. These considerations should include all areas of the Little Rock Mine where reclamation is to occur.

Results for Little Rock have been evaluated and are summarized below. This information will be included in the revised Task 3 report to be submitted in 90 days.

The Little Rock CCP facilities were analyzed following the same methods presented in the June 16, 2023 Closure Surface Water Conveyances Precipitation Analysis Report. The Little Rock CCP facilities were split into subbasins, and total bench channel lengths, as well as top areas, were determined to calculate a conservative flow through the downchutes. The peak flow estimates from the Rational Formula Method analysis of the CCP facilities at Little Rock are summarized in Table .

Table 1: Subbasin Geometries and Rational Method Peak Flow Estimates for Little Rock Closure Closeout Plan Facilities

Facility	Subbasin ID	Length of Bench Channels (ft)	Top Areas (ac)	Total Peak Flow in Downchute – Present Conditions (cfs)	Total Peak Flow in Downchute - Climate Change (cfs)
NRW Waste	NRW-A	8,290	14	185	211
	NRW-B	6,362	9	137	156
	NRW-C	482	0	9	10
	NRW-D	385	0	7	8
East In-Pit Waste	EIP-A	2,300	0	41	47
West In-Pit Waste	WIP-A	10,548	1	191	218

The worst-case CCP structures for Little Rock were then analyzed and found to pass the freeboard criteria of 6 inches (0.5 feet) for present conditions and positive freeboard for climate change conditions. Table 1 provides a summary of the results of the Rational Formula Method assessment of the Little Rock CCP conveyance structures.

Table 1: Summary of Freeboard Estimates for Present and Climate Change Conditions at Little Rock CCP Facilities (Rational Formula Method)

Structure	Facility	Length(ft) / Area (ac)	Estimated Flow – Present Conditions (cfs)	Estimated Freeboard – Present Conditions (ft)	Estimated Flow – Climate Change Conditions (cfs)	Estimated Freeboard – Climate Change Conditions (ft)
Longest bench channel	NRW Waste	1,824 ft	33	1.3 (riprap)	37	0.7 (riprap)
Downchute with the largest catchment	West In-Pit Waste (WP-A)	43.6 ac	191	2.5 (ACB)	218	2.5 (ACB)
Longest top channel	--	--	--	--	--	--

ACB = Articulated concrete block
-- = indicates that a structure type is not present

These results, along with additional supporting information and calculations will be incorporated into the revised Task 3 Report to be provided to the Agencies 90 days.

3. Section 3.2.6, Runoff Coefficient, Task 3 Report. The Runoff Coefficient model assumes mature vegetation with 40% cover. This assumption does not address newly reclaimed areas or areas after fires, which will be more vulnerable to erosion and high sediment loads until vegetation establishment. Provide an additional scenario that evaluates no vegetation.

Analyses related to fire and vegetation performance were beyond the scope of Task 3 in the approved Workplan and were not previously discussed with agencies; therefore, they were not included as part of the Task 3 report.

The state has set guidelines for Vegetation Success Standards and Monitoring Success at both Tyrone and Chino including 1) 70% of reference area canopy cover, 2) 60% of reference area shrub density, 3) plant diversity standards, and monitoring requirements and reporting time frames (For example, Tyrone Permit No. GR010RE, page 61 of 63). For these reasons, it is appropriate to use the 40% vegetation condition to represent long-term closure conditions.

With regards to effects of fires eliminating vegetative cover on the facilities, post-fire hydrology is an existing risk for Chino and Tyrone, and any other facility that is closed in the State of New Mexico. The post-fire catchment condition represents a transient condition that *could* occur during closure with the understanding that the facilities could be revegetated through natural succession or planting programs, as required. While it is qualitatively understood that increased temperatures under climate change could lead to more frequent wildfires, the engineering methodology to estimate post-fire runoff today or 100-years from now will use similar analysis and lacks appreciable differences in runoff calculations. At present, we are unaware of any requirement to design for post-fire hydrological conditions for these facilities.

4. Table 3, Intensity-Duration Frequency Curve Table, Task 3 Report. The second and fourth column with Chino 100-year (in/hr) data appear to be 1.5 to 1.9 times the Tyrone precipitation data for the return periods 30 minutes through 24 hours. The data in Table 3 do not match Atlas 14 tables. Recheck the data entered for Chino in Table 3 and all associated calculations that may have used the incorrect Chino precipitation intensity values.

It appears that the 5-minute duration rainfall intensities were inadvertently repeated for the 30-minute duration for both the Chino 100-year and Chino 100-year +14% values and the subsequent (1-hr through 24-hr) values are actually associated with the 30-min through 12-hr intensities. Table 3 has been updated with the correct values, and no calculations were affected by the errors in the original Table 3 (i.e., the errors were isolated to Table 3). Updated Table 3 will be included in the revised Task 3 Report.

5. Section 6.0 – Conclusions – NOAA Atlas 14 precipitation depths, Task 3 Report. The conclusion mentions the NOAA Atlas 14 precipitation values were used as the most conservative. As worded, it's unclear if the NOAA Atlas 14 precipitation values were used or whether the NOAA Atlas 14 values plus an additional 14 percent were used. Clarify the conclusion.

NOAA Atlas 14 precipitation values were used to evaluate present conditions, and NOAA Atlas 14 precipitation values plus an additional 14 percent were used to evaluate climate change conditions. This information will be added to Section 6.0 for clarification in the revised Task 3 Report.

6. Section 7.0 – Closing - REPS tool recommendation, WSP Report. The conclusion recommends using the regionally based REPS tool because the NM State Engineer's office approved it in 2019. This REPS tool purpose is for use by dam safety and operation of dam spillways in the Colorado- New Mexico region. This Closing recommendation overlooks AWA Report's discussion of uncertainty and task 2's attempt to downscale global climate model to Grant County. Moreover, Atlas 14 will be revised to Atlas 15 over the next few years. Future evaluation may still be needed if subsequent changes in the recent precipitation data merit another evaluation. Even if the REPS tool was used for the Task 3 evaluation in lieu of the Task 2 Report recommendations, the agencies require looking at various scenarios, such as middle medium, high medium, and high high to capture the uncertainties from the assumptions and

models used create the REPS tool. Consider whether the section title should be recommendations for future evaluation.

To avoid confusion regarding selection of appropriate design storms, we will remove the language recommending the REPS tool for future design work and we will include new language to stress that the appropriate extreme rainfall information will be reviewed for future design efforts – for example, the upcoming NOAA Atlas 15 documentation. Ultimately, the goal for any Freeport property will be to use the best available information in making an informed decision regarding extreme rainfall and flooding risks.

Although the language is being removed, the REPS tool is a credible source of information for extreme precipitation (for example, see the NM LEAP Study). However, the discussion of the REPS tool for designs is a separate topic independent of potential impacts from climate change as outlined in the Task 3 work.

The climate change models were used to estimate potential relative increases and decreases in precipitation and that can be applied to different design basis depths (i.e NOAA vs the REPS tool). Our study looked at both NOAA and the REPS tool and added the most reasonable projection of increase in precipitation to the higher value which is currently the NOAA Atlas 14 value. However, as stated in your comment, changing precipitation in recent years will likely result in revised numbers in the updated NOAA Atlas 15 and future evaluations may be needed if subsequent changes in the recent precipitation data merit another evaluation. That is precisely the uncertainty that makes this analysis so challenging.

7. Condition 3 of the letter titled, "Conditional Approval of the Precipitation Analysis Workplan," dated September 3, 2021, requires the Task 3 Report to include an analysis of stormwater containment and conveyance structures including, but not limited to, impoundments and pipelines proposed for use at closure and existing at the mine site to convey or contain stormwater at closure. The Task 3 Report does not include an analysis of any impoundments or pipelines proposed to convey or contain stormwater at closure. Table 5-1 of the Chino Mine Closure-Closeout Plan, dated February 14, 2018, and Table 5-1 of the Tyrone Mine Closure-Closeout Plan, dated April 29, 2020 indicate that several impoundments will be utilized for postclosure stormwater control. Please provide an analysis for impoundments and pipelines proposed for use at closure and existing at the mine site and include them in the appropriate figures.

Chino and Tyrone will begin updating the respective CCPs in 2024 and 2025. Chino and Tyrone acknowledge that the agencies' approval letter sought to expand upon the scope of work that the Company proposed for this voluntary study. The Company's proposal was consistent with the relevant permit condition. Chino and Tyrone focused on the primary work scope that was agreed upon as the original intent for this report. The company recommends further discussion of this comment in the Task 4 working session. Chino and Tyrone propose that the parties consider the information that has been provided and utilize the Task 4 working session to discuss these matters and then agree upon approaches for the next CCPs.

8. Tables 5, 6, 8, and 9 of the Task 3 Report do not clearly distinguish which Feature or Subbasin ID is associated with each Facility. For instance, as listed in Table 6 on page 13, it is unclear which bench channel, top channel, or downchute are associated with North of Tailing Pond 6 East, Tailing Pond 6 East, and Tailing Pond 6 West. Similarly, Table 8 on page 17 displays a line between Subbasin ID 2A/2B-A and 2A/2B-B although both subbasins are associated with the 2A Leach/2B Leach Facility. Similar issues are present in the other tables listed above. Please provide an updated version of these tables that clearly delineates which Features and Subbasin IDs are associated with each Facility. Also please ensure that Table 5 and Table 8 have the same column headers for peak flows adjusted for climate change.

Tables 5, 6, 8, and 9 will be updated to include details of the features and/or subbasin ID's that are associated with each facility. Additionally, the headings for Tables 5 and 8 will be updated so that they both have the same column headings. The updated tables will be included in the revised Task 3 Report.

9. The abbreviation for Articulated Concrete Block (ACB) is not defined in the Task 3 Report. Please include a definition for this abbreviation.

A footnote will be added to all tables where the "ACB" abbreviation is used explaining that ACB represents "articulated concrete block" as discussed in Section 608.6.1 of the New Mexico Drainage Design Manual as "articulating concrete block systems".

10. Table 10 of the Task 3 Report indicates that the channel dimension for the downchute with the largest catchment is not available and that assumed values were used. This leads to estimated freeboard values ranging between 0.2-1.3 feet (ft.) for riprap and 0.7-1.7 ft. for ACB for present conditions and estimated freeboard values between 0.6-1.6 ft. for ACB and 0.1-1.2 ft. for riprap for climate change conditions. Please clarify why the estimated freeboard values can vary by over a foot for the various channel linings.

The difference in channel lining materials (riprap, ACB, or otherwise) will lead to a change in roughness values that causes changes to channel depths during peak flow evaluations.

With respect to channel dimensions - downdrain channel dimensions shown in the typical sections on the Chino Reclamation Design Drawings (Chino CCP Appendix A Figure 22) indicate that the downdrain channel dimensions will be variable. As such, WSP applied typical downdrain dimensions for constructed downdrains at FMI facilities in our analysis, with bottom channel widths ranging from 10 to 20 feet, channel depths ranging between 2 and 3 feet, and channel sideslopes of 3.0H:1.0V. The freeboard estimate ranges presented in Table 10 are associated with the variable channel dimension applied in our analysis. The actual downdrain dimensions used in the Chino Earthwork Cost Estimates (Appendix E of March 2019 Earthwork Cost Estimate Summary Report) consist of 20-foot wide channel bottoms and 2-foot channel depths with 3.0H:1.0V sideslopes.

The rip-rap scenario was listed for conceptual completeness; however, financial assurance for future CCP downdrains assume that ACBs are the most likely technology that would be utilized. Please also see the response to comment 11 below concerning the use of excess freeboard to convey flows.

11. Table 10 of the Task 3 Report indicates that the longest top channel will have an estimated freeboard of 0.5 ft. with desert pavement, 0.4 ft. with riprap for present conditions; and an estimated freeboard of 0.4 ft. with desert pavement, and 0.3 ft. with riprap for climate change conditions. Section 20.6.7.34.F NMAC of the Copper Mine Rule states, in part, "the final design and CQA/CQC plan shall include best management practices that will be employed during reclamation to address erosion and storm water management in a manner that meets the requirements of the Water Quality Act and commission regulations." In addition, Section 20.6.7.17.D (2)(f) NMAC requires, "(o)pen channel conveyance structures intended to transport stormwater to an impoundment shall be designed to convey, at a minimum, the peak flow from a 100 year return interval storm event while preserving adequate freeboard, but not less than six inches of freeboard." Please discuss how these criteria, including adequate freeboard, will be met considering the freeboard estimates listed in Table 10 and discussed above.

These analyses were completed using conservative screening tools to evaluate the adequacy of current methodologies for conceptual CCP development with respect to hypothetical increased precipitation events. Chino and Tyrone certainly do not consider it a failure if some of the excess freeboard is utilized to pass a larger storm event than the design storm. The intent of this analysis was to provide an assessment of global climate models and apply a reasonable projection of precipitation to our CCP designs for the education of all parties so that recommendations could be made for future CCPs. Our conclusion is that the current design processes are sufficiently conservative to meet not only the existing regulatory requirements, but also the potential increased precipitation due to climate change.

12. The Task 2 Report recommends a 14% increase of 100-year, 24-hr storm events to estimate the effects of climate change on surface water conveyance. Please indicate if the water holding capacity of current and proposed reclamation cover materials is sufficient to accommodate this estimated medium middle increase in precipitation.

We appreciate this question and have provided additional information on this topic below. This information was not part of the Task 3 report due to it not being in the scope. However, some key points to consider on this topic follow.

- Part 2 of Subsection F of 20.6.7.33 NMAC states that "Soil cover systems shall be designed to limit net-percolation by having the capacity to store within the fine fraction at least 95 percent of the long-term average winter (December, January and February) precipitation or at least 35 percent of the long-term average summer (June, July and August) precipitation, whichever is greater."

- A modeled hypothetical increase for a single 100-year storm event does not imply a change to the long-term average precipitation during the above months (which would influence cover design).

- The effect of a single 100-year, 24-hour storm event on the storage capacity calculation is negligible and we conclude that the current design method for soil covers is proper and adequate.

Closing Statement:

Freeport emphasizes that the Task 3 report analysis is consistent with the latest information provided by New Mexico for much higher risk facilities and the approach suggested by subject experts. Monitoring and discussions of performance of these systems during closure will also continue and the analysis here may require updates as new information is available.

Lastly, if there are preferred analysis approaches associated with any of the comments in this document, the team would greatly appreciate any relevant documentation developed by the State of New Mexico for review and for consideration in updating the analyses in this document.

If you have any questions, please contact me at 575-912-5773 or Ms. Sherry Burt-Kested at 575-912-5927.

Sincerely,

Thomas L. Shelley
Environmental Services Manager

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ecc. Carmen Rose