State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

Fernando Martinez, Director
Mining and Minerals Division

July 30, 2018

Mr. Ty Bays
Senior Land and Water Resource Analyst
Freeport-McMoRan Tyrone Operations
P.O. Box 571
Tyrone, NM 88065

RE: Review and Comments on Emma Exploration Project Minimal Impact Exploration Application, Permit No. GR079EM

Dear Mr. Bays,

The New Mexico Mining and Minerals Division ("MMD") received an application for a minimal impact exploration permit from Freeport-McMoRan Tyrone Operations ("Tyrone"), dated May 31, 2018 ("Application"). MMD has reviewed the Application, requested comment from other state agencies and tribal entities, and conducted an inspection of the proposed exploration drill hole site on July 12, 2018. MMD provides the following comments:

General Comments

1. MMD received the Application from Tyrone on June 4, 2018 and requested additional information from Tyrone regarding the application in an e-mail, dated June 19, 2018. MMD requested clarification of the actual number of proposed drill holes, whether mud rotary drilling is proposed to be used, and commented on the inclusion of "oats" in the proposed reclamation seed mix. Tyrone provided a response to the MMD request for additional information in an e-mail, dated June 20, 2018. MMD included the response by Tyrone as a supplement to the Application.

Specific Comments

1. Section 6, Groundwater/Surface Water Information, Subsection A, page 16 of the Application requests Depth to groundwater and TDS (total dissolved solids in mg/L). Tyrone responded that the TDS concentration is "unknown". Please provide a TDS concentration of the groundwater if available from an area well.

2. Section 6, Groundwater/Surface Water Information, Subsection F, page 18 of the Application asks if any of the proposed drilling will occur within 100 feet of any perennial, intermittent, or ephemeral streams. Tyrone responded "no" to this question. However, during an inspection of the proposed Emma Exploration Project conducted by MMD on July 12, 2018, a number of proposed exploration drill hole locations were

observed to be located within approximately 100 feet of an intermittent or ephemeral stream (proposed exploration drill holes # 4, 5, 13, 24 and 25). No perennial streams were observed during the inspection. During the inspection, Tyrone staff agreed to relocate these and other holes that may be located within 100 feet of a drainage bottom at least 100 feet away from these drainages. Please confirm that the exploration drill holes that are located within 100 feet of a drainage bottom will be relocated and provide an updated map showing the new locations of the proposed exploration drill holes and the other exploration drill holes proposed in the Application.

3. Section 7, Reclamation and Operating Plan, Subsection D, Reclamation Details, page 20 of the Application states that the drill sites will be regraded. During the MMD inspection a number of the proposed drill pad will be on hill slopes. Will the drill pads that are located on hill slopes be regraded to approximate original contours (i.e., will the drill pad areas be backfilled and regraded with the soils and rock that were excavated to recreate the approximate original slopes present prior to the exploration project)?

4. Section 7, Reclamation and Operating Plan, Subsection D, Reclamation Details, page 21 of the Application provides a proposed seed mix. Appendix A of Revision 14-1 of Permit No. GR007RE for the Little Rock Mine includes an approved seed mix. In addition, the Tyrone Mine is currently conducting vegetation test plots at the USNR stockpile area. The native vegetation near these areas appear to be similar to the vegetation of the area of the Emma Exploration Project. MMD recommends that the reclamation seed mix for the Emma Exploration Project consist of plant species that are consistent with the seed mix of either the Little Rock Mine or the USNR test plots at the Tyrone Mine. In addition, if Tyrone wishes to include "cover crop" types of plant species, MMD recommends the use of a winter wheat rather than oats if the seeding will be done in the Fall.

Financial Assurance Cost Estimate

1. MMD has reviewed the third-party financial assurance cost estimate proposed by Tyrone that was provided with the Application and provides the following comments:

   a) A motor grader is proposed as the only heavy equipment used for the reclamation of the proposed surface disturbance. Use of a backhoe and or dozer and an excavator is likely more appropriate. In addition, moving this equipment from drill pad to drill pad over the hilly quarter-section of area will take time. Total proposed time of equipment use in the cost estimate is 8 hours and is insufficient.

   b) A light duty truck is estimated at $16.16 for the duration of the project. An ATV is estimated at $40.40. Both of these estimates are insufficient for a third-party cost estimate for this project.

   c) The two personnel listed are an Equipment Operator at 9.6 hours and a Laborer at 4 hours. Staff time for a third-party cost estimate should include time getting to the project, standby time, working time and returning to Silver City. In addition, the project will need to include at least one Manager.

d) The seeding cost quote should not be reduced by the Indirect Rate.

e) Insufficient labor time and resources have been allotted for seed distribution.

f) The Indirect Cost rate of 39.6% is lower than should be used. In addition, a mobilization cost should be included in the Indirect Cost amount.

2. A drill hole abandonment cost estimate was not provided with the Application. Drill hole abandonment costs are required for minimal impact exploration permits where drilling is used. Attached is the MMD Guidance for Estimating Reclamation Costs for Part 3 Minimal Impact Exploration Permit Applications ("Guidance"). Please refer to the Guidance and calculate and provide MMD with proposed drill hole abandonment costs for the drill holes proposed in the Emma Exploration Project.

3. The Guidance also provides guidelines for the third-party costs associated with reclaiming and reseeding surface disturbance for exploration projects. MMD recommends that Tyrone use the third-party costs listed in the Guidance (i.e., $8,900 for the first acre of anticipated surface disturbance, and $4,900 per acre for each additional acre of disturbance) for the Emma Exploration Project cost estimate. The sum of the third-party reclamation drill hole abandonment costs and the surface disturbance reclamation costs for the Emma Exploration Project will be reviewed by MMD in determining the financial assurance amount.

Comments of Other Agencies

MMD provided copies of the Application to the New Mexico Environment Department, the New Mexico Department of Game and Fish, the New Mexico Office of the State Engineer, the New Mexico Department of Cultural Affairs, and the New Mexico State Forestry Division. Please see the attached comments from these agencies and provide a response to these comments to MMD.

Please respond to the MMD and agency comments within 30-days of receipt. Contact me at 505-476-3432 or at David.Ohori@state.nm.us if you have any questions.

Sincerely,

David Ohori, Permit Lead
Mining Act Reclamation Program ("MARP")

Enclosures

cc: Holland Shepherd, Program Manager, MARP
Allyson Siwik, Executive Director, Gila Resources Information Project
Mine File (GR079EM)

GUIDANCE FOR ESTIMATING RECLAMATION COSTS
for
PART 3 - MINIMAL IMPACT EXPLORATION AND MINIMAL IMPACT MINING
and
PART 4 - REGULAR EXPLORATION PERMIT APPLICATIONS

A major goal of the New Mexico Mining Act is to ensure the adequate reclamation of all areas disturbed by exploration and mining operations. The primary mechanism for accomplishing this is a permitting and enforcement process that requires the posting of financial assurance ("FA") sufficient to ensure completion of a reclamation plan. The FA serves as a guarantee that reclamation will be completed and, in the event of FA forfeiture, monies will be used by the regulatory authority to contract for the necessary reclamation work.

The Mining Act Reclamation Program Rules require that an applicant for an exploration or mining permit provide "*an estimate of the proposed financial assurance required by 19.10.12 NMAC*". The purpose of this guidance is to provide an expedited approach for calculating the costs associated with reclaiming a simple exploration site and/or a simple surface mining operation. The applicant's calculated cost estimate for the post-exploration or post-mining site reclamation will be considered by the Director for determining the amount of FA the applicant is required to post prior to receiving approval for any operations.

This cost estimation guidance is based upon the costs of a third party to perform the reclamation. Following this simplified process will aid in expediting the review process.

COST ESTIMATION COMPONENTS

This approach for estimating the costs to reclaim a simple exploration or mining site involves adding together the component costs of; (1) drill hole abandonment, (2) reclaiming and reseeding all surface disturbances.

DRILL HOLE ABANDONMENT

Each drill hole shall be plugged from total depth to within 2 feet of the original ground surface or the collar of the hole, whichever is lower, with a column of cement, high-density bentonite clay or other materials specified in the permit. If the approved plugging material is not cement, then the top ten feet of the column of plugging material must be a cement plug, the top of which must be placed at 2 feet below ground surface. The remaining top 2 feet of the drill hole shall then be backfilled with topdressing or top soil from the top of the cement plug to the original ground surface elevation. The hole shall be plugged as soon as practicable and satisfy the requirements of the New Mexico Office of the State Engineer, and the New Mexico Environment Department, for proper plugging of such holes.

Estimated costs for abandoning boreholes using bentonite-cement grout ranges from approximately $14.00 to $25.00 per foot. For the purposes of estimating a simplified cost of abandoning boreholes, the MMD cost is $14.00/foot. The FA cost estimate could be higher or lower based on site-specific characteristics.

Wet drill holes must be sealed pursuant to the Office of the State Engineer's Rules and Regulations (19.27.4.36 NMAC) which states, "*Any person drilling a mine drill hole that encounters a water bearing stratum shall plug that hole in accordance with Subsection C of 19.27.4.30 NMAC or Subsection K of 19.27.4.31 NMAC.*"

All wet drill holes must be plugged and abandoned by displacing neat cement slurry, cement grout mix, or other pre-approved plugging mud through a tremie pipe placed bottom upwards to ten feet from the ground surface. Twenty-four hours after displacement of the plugging mud plugs will be "felt for" to insure that they have been properly seated. The top 10 feet should be neat cement slurry, bentonite based plugging material, or other sealant approved by the state engineer. If artesian, the entire hole needs to be plugged with a neat cement slurry and the well plugging witnessed by the state engineer.

Shallow, dry drill holes could potentially be filled with hydrated bentonite chips to 12 feet below ground surface, pending authorization by MMD in the applicant's permit. The top 12 feet should be a cement plug followed by 2 feet of soil or topdressing, unless otherwise approved by MMD and the state engineer.

RECLAIMING AND RESEEDING ALL SURFACE DISTURBANCES

Costs associated with a third party to backfill and grade, scarify and/or rip, and re-seed all disturbances. (This component includes drying out the mud pit prior to regrading.)

Sum the total amount of all acreage expected to be disturbed during exploration or mining operations. For exploration and mining sites, consideration must be given to the site specific conditions such as dimensions of all anticipated drill pits, access roads, borrow areas, drainage crossings, culvert removals and compacted overland routes. Additional costs will be considered on a site-specific basis dependent upon the need to control runoff, inhibit fugitive dust, and contain and dispose of all wastes associated with the exploration and mine reclamation activities. After adding up all the anticipated disturbances in units of acres apply the following cost per acre:

$8,900 for the first acre
$4,900 per acre for each additional acre

Note: The per acre cost includes a 40% add-on to cover the indirect costs. Additionally, assistance from the Mining and Minerals Division, the Natural Resources Conservation Service, other agencies, universities, and revegetation contractors can be consulted for local conditions, best plant species, planting times, fertilizers, and revegetation costs.

COST SUMMARY

Required financial assurance can now be determined by adding together the drill hole abandonment and the reclamation and reseeding costs as described above.

In the event the operator feels that a lesser amount of financial assurance is justified than what this guidance suggests, they must justify their position by providing MMD with a complete and detailed financial assurance worksheet.

Escalation rates for mining operations, only, shall be applied to the financial assurance calculation for a minimum of five years. This is to cover the cost of future reclamation. The escalation rate is based on the Consumer Price Index (CPI), averaged over the last 20 years. In 2013 the 20 year average for the CPI is 2.5%.

An example of an exploration scenario and resulting financial assurance amount follows.

Post-Exploration Reclamation Cost Estimating – Example

Proposal to drill 7 drill holes to 220 feet each and disturb a total of 3.13 acres:

- Cost of abandoning 7 drill holes;
  (7 x 220 feet) x $14.00/feet = $21,560.00

- Cost of reclaiming 3.13 acres of disturbance;
  $8,900 (first acre) + (2.13 (additional acres) x $4,900) = $19,337.00

- Total FA required;
  $21,560.00 + $19,337.00 = **$40,897.00**

Mining Reclamation Cost Estimating – Example

Cost of reclaiming 10 acres of disturbance:

- $8,900 (first acre) + (9 (additional acres) x $4,900) = $53,000.00

- Total FA required with escalation over 5 years;
  $53,000 x $(1+ 2.5\%)^5$ = **$59,964.63**

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Ground Water Quality Bureau
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BUTCH TONGATE
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J.C. BORREGO
Deputy Secretary

MEMORANDUM

Date: July 25, 2018

To: Holland Shepherd, Program Manager, Mining Act Reclamation Program

Through: Jeff Lewellin, Mining Act Team Leader, Mining Environmental Compliance Section

From: George Llewellyn, Mining Environmental Compliance Section
John Moeny, Surface Water Quality Bureau
Neal Butt, Air Quality Bureau

Subject: **NMED Comments, Freeport-McMoRan Tyrone Operations, Emma Exploration Project, Grant County, New Mexico, MMD Permit No. GR079EM**

The New Mexico Environment Department (NMED) received correspondence from the Mining and Minerals Division (MMD) on June 19, 2018 requesting NMED review and provide comments on the above-referenced MMD permitting action. To facilitate a scheduled inspection of the proposed minimal impact exploration project, the comment period was extended by MMD until July 25, 2018. NMED has the following comments.

Background

Freeport-McMoRan Tyrone Operations (Applicant) proposes a minimal impact exploration project to advance up to 22, six-inch diameter borings to a depth of 1,300 feet below ground surface. The project is on land owned by the Applicant in Sections 25 and 36, T19S, R15W, which is approximately 1/2 mile south of the Tyrone Mine. The purpose of the proposed exploration project is to evaluate potential reserves of copper.

Air Quality Bureau

The Air Quality Bureau comments are attached under separate letterhead.

Surface Water Quality Bureau

The Surface Water Quality Bureau comments are attached under separate letterhead.

Mining Environmental Compliance Section

The Applicant did not provide the ground water total dissolved solids concentration information in the application as required by 19.10.3.302.D.(5) NMAC. NMED cannot evaluate potential water quality impacts to ground water without the information required by regulation. As indicated in the application, the depth to ground water is estimated to be 500 feet below ground surface. In the likely instance ground water is encountered while advancing the borings to the total depth of 1,300 feet below ground surface, plugging and abandonment of the borings should comply with New Mexico Office of the State Engineer regulations for wet holes as is indicated in the application. In addition, the applicant must contain any water produced from the exploration holes at the drill sites.

NMED Summary Comment

NMED finds that the exploratory project is likely to have a minimal impact to the environment if operated and reclaimed with the approved permits, pollution controls, and the comments above.

If you have any questions, please contact Jeff Lewellin at (505) 827-1049.

cc: Bruce Yurdin, Division Director, NMED-WPD
Shelly Lemon, Bureau Chief, SWQB
Liz Bisbey-Kuehn, Bureau Chief, AQB
Fernando Martinez, Division Director, EMNRD-MMD
David Ohori, Lead Staff, EMNRD-MMD
Kurt Vollbrecht, Program Manager, MECS
Keith Ehlert, Operational Team Leader, MECS

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MEMORANDUM

TO: Jeff Lewellin, Mining Act Team Leader
Mining Environmental Compliance Section
Ground Water Quality Bureau (GWQB)

FROM: John Moeny, Surface Water Quality Bureau

SUBJECT: Request for Comments, Minimal Impact Exploration Project, Freeport-McMoRan Tyrone Operations, Emma Exploration Project, Grant County, MMD Permit No. GR079EM

DATE: July 19, 2018

On June 19, 2018, NMED received a request for comments regarding a minimal impact exploration permit submitted by Freeport McMoRan-Tyrone Mining. The project is located in Grant County on lands owned by Freeport-Tyrone, just south of the existing Tyrone facility.

Summary of Proposed Action

The Applicant intends to drill up to twenty-two, 6.0" exploratory drill holes to a maximum depth of 1,300 feet. Each drill site will have an associated ground disturbance for the sump pit and drill pad totaling 2,800 square feet at each location. Drill cuttings will be collected and buried at each drill location. Access to drill sites will be a combination of new and existing roads and the total estimated disturbance for the exploration is 3.37 acres.

Relevant State and Federal Water Quality Regulations

Intermittent water quality standards under 20.6.4.98 NMAC apply to all unclassified waters of the state including ephemeral drainages in the project area, until a hydrology protocol (HP) survey is conducted and a Use Attainability Analysis (UAA) is approved by the Water Quality Control Commission (WQCC) in accordance with 20.6.4.15 NMAC.

Construction activities in support of the drilling, mining or hauling in ephemeral drainages may require a federal Clean Water Act Section 404 Dredge and Fill Permit and the corresponding

Section 401 State of New Mexico Certification of the federal permit. For details contact the US Army Corps of Engineers Las Cruces Regulatory Office at **575.268.8612**.

This Project will disturb one or more acres and storm water discharges may be covered under either the U.S. Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) or under the Multi-Sector General Permit (MSGP) under Sector G Metal Mining.

Among other things, a SWPPP must be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters.

Operators of certain small construction activity (disturbance of one to five acres) may be waived from permit requirements under limited circumstances. To be eligible for this waiver, operators must certify to EPA that they are eligible (see Section 9 Appendix C of the CGP). Waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). If this Project transitions into mining activities, MSGP coverage would be required at that time.

The CGP was re-issued January 11, 2017 and is effective February 16, 2017. The CGP and the eReporting tool (NeT-CGP) to apply for coverage or waivers is available at: https://www.epa.gov/npdes/2017-construction-general-permit-cgp. The MSGP was re-issued effective June 4, 2015, that Permit information is available at https://www.epa.gov/npdes/stormwater-discharges-industrial-activities

In addition to the regulations above, the following best management practices are recommended to protect surface water quality.

- Fuel, oil, hydraulic fluid, lubricants, and other petrochemicals must have a secondary containment system to prevent spills.
- Ground water sump pits may not be used as disposal locations for hydraulic fluids, oils, contaminated drilling mud or other materials that may pose a pollution risk to surface and ground water.
- Ground water sump pits must be lined and setback from drainages by a minimum of 100 feet.
- Appropriate spill clean-up materials such as absorbent pads must be available on-site at all times during road construction, site preparations, drilling and reclamation to address potential spills.

- Report all spills immediately to the NMED as required by the New Mexico Water Quality Control Commission regulations (20.6.2.1203 NMAC). For non-emergencies during normal business hours, call 505-428-2500. For non-emergencies after hours, call 866-428-6535 or 505-428-6535 (voice mail, twenty-four hours a day). For emergencies only, call 505-827-9329 twenty-four hours a day (NM Dept of Public Safety).

Impacts to Surface Water Quality

The SWQB finds Freeport McMoRan's proposed exploration is likely to have a minimal impact to surface waters if operated and reclaimed with the approved permits and pollution controls and the comments above.

If you have any questions, please phone me at (575) 956-1545.

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MEMORANDUM

DATE: July 13, 2018

TO: Jeff Lewellin, Mining Act Team Leader
Mining Environmental Compliance Section, Ground Water Quality Bureau

FROM: Neal Butt, Environmental Analyst
Control Strategies Section, Air Quality Bureau

RE: Request for Comments, Minimal Impact Exploration Project, Freeport-McMoRan Tyrone Operations, Emma Exploration Project, Grant County, MMD Permit No. GR079EM

The New Mexico Air Quality Bureau (AQB) has completed its review of the above-mentioned mining project. Pursuant to the New Mexico Mining Act Rules, the AQB provides the following comments.

Air Quality Permitting History

The AQB has not issued any air quality permits for this operation.

Details

The applicant, proposes to drill up to 22 drill holes up to 1,300 feet deep, in Grant County, New Mexico. The proposed drilling sites are located approximately ½ mile south of the Tyrone Mine.

Air Quality Requirements

The New Mexico Mining Act of 1993 states that "Nothing in the New Mexico Mining Act shall supersede current or future requirements and standards of any other applicable federal or state law." Thus, the applicant is expected to comply with all requirements of federal and state laws pertaining to air quality. Current requirements which may be applicable in this mining project include, but are not limited to the following:

Paragraph (1) of Subsection A of 20.2.72.200 NMAC, *Application for Construction, Modification, NSPS, and NESHAP - Permits and Revisions*, states that air quality permits must be obtained by:

"Any person constructing a stationary source which has a potential emission rate greater than 10 pounds per hour or 25 tons per year of any regulated air contaminant for which there is a National or New Mexico Ambient Air Quality Standard. If the specified threshold in this subsection is exceeded for any one regulated air contaminant, all regulated air contaminants with National or New Mexico Ambient Air Quality Standards emitted are subject to permit review."

Further, Paragraph (3) of this subsection states that air quality permits must be obtained by:

"Any person constructing or modifying any source or installing any equipment which is subject to 20.2.77 NMAC, *New Source Performance Standards*, 20.2.78 NMAC, *Emission Standards for Hazardous Air Pollutants*, or any other New Mexico Air Quality Control Regulation which contains emission limitations for any regulated air contaminant."

Also, Paragraph (1) of Subsection A of 20.2.73.200 NMAC, *Notice of Intent*, states that:

"Any owner or operator intending to construct a new stationary source which has a potential emission rate greater than 10 tons per year of any regulated air contaminant or 1 ton per year of lead shall file a notice of intent with the department."

In addition, pursuant to Subsection A of 19.10.3.302 NMAC, *Minimal Impact Exploration Operations*:

"A minimal impact exploration operation will not exceed 1000 cubic yards of excavation per permit. Disturbances for constructed roads, drill pads and mud pits shall be no more than 5 acres total and will not be counted in the excavated materials. The type of road construction, the number and type of drill pads, and other disturbances when considered with site specific conditions will be major factors in determining eligibility for minimal impact status which is in the discretion of the director."

The above is not intended to be an exhaustive list of all requirements that could apply. The applicant should be aware that this evaluation does not supersede the requirements of any current federal or state air quality requirement.

Fugitive Dust

Although fugitive dust is a common problem at mining sites, the AQB does not have a rule that regulates fugitive dust at this time. Meanwhile, we recommend controls to minimize emissions of particulate matter from fugitive dust sources to limit public health and traffic safety impacts. The following control strategies can be included in a comprehensive fugitive dust control plan (from EPA's *Compilation of Air Pollutant Emission Factors, AP-42*):

Unpaved haul roads and traffic areas: paving of permanent and semi-permanent roads, application of surfactant, watering, and traffic controls, such as speed limits and traffic volume restrictions.

Paved roads: covering of loads in trucks to eliminate truck spillage, paving of access areas to sites, vacuum sweeping, water flushing, and broom sweeping and flushing.

Material handling: wind speed reduction and wet suppression, including watering and application of surfactants (wet suppression should not confound track out problems).

Bulldozing: wet suppression of materials to "optimum moisture" for compaction.

Scraping: wet suppression of scraper travel routes.

Storage piles: enclosure or covering of piles, application of surfactants.

Miscellaneous fugitive dust sources: watering, application of surfactants or reduction of surface wind speed with windbreaks or source enclosures.

Recommendation

The AQB has no objection to the current request for a permit.

The applicant is expected to comply with all requirements of federal and state laws pertaining to air quality. This written evaluation does not supersede the applicability of any forthcoming state or federal regulations.

If you have any questions, please contact me at (505) 476-4317.

GOVERNOR
Susana Martinez

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TO THE COMMISSION
Alexandra Sandoval

DEPUTY DIRECTOR
Donald L. Jaramillo

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23 July 2018

David Ohori, Permit Lead
Permit Lead, Mining Act Reclamation Program
Mining and Minerals Division (MMD)
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: Emma Exploration Project, Freeport-McMoRan Tyrone Operations, GR079EM; NMDGF No. 18540

Dear Mr. Ohori,

The New Mexico Department of Game and Fish (Department) has reviewed the project referenced above. Freeport-McMoRan (FMI) is proposing to drill 21 exploratory holes, each to a depth of approximately 1,300 feet. The drilling sites will be located in Grant County, Township 19S, Range 5W, Sections 25 and 36. The total acreage that will be disturbed by the project is approximately 3.37 acres. A site inspection was conducted 12 July 2018 with staff from the Department, MMD, FMI, and the New Mexico Environment Department.

The permit application states that in order to prevent wildlife entrapment, a plastic perimeter fence will be installed around the mud pits, and that one side of the pits will be sloped at 3:1 to provide an escape ramp. In order to eliminate the potential for wildlife to become entrapped in mud pits, the Department recommends the use of closed loop drilling systems. Closed loop systems eliminate the need to build fences or install netting to exclude wildlife, reduce the amount of surface disturbance associated with the well pad site, and consume significantly less water. If a closed loop system is not used, drilling pits should be covered or netted to exclude flying and terrestrial animals. Extruded, knit, or woven netting material is preferred. Monofilament netting should not be used due to its tendency to ensnare wildlife and cause injury or death. The Department recommends a mesh size of $^{3}/_{8}{}^{th}$ inch to exclude smaller animals. Netting material must be held taught over a rigid and adequately supportive frame in order to prevent sagging.

The permit application also states that "...a bird survey will be conducted just prior to construction, if construction occurs during the period of 1 May thru 31 August". To minimize the likelihood of adverse impacts to songbirds and raptors, and to prevent impacts to migratory bird nests, eggs or nestlings, the Department recommends that ground disturbance and vegetation removal activities be conducted outside of the primary migratory bird breeding season described above. If ground disturbing and clearing activities during the breeding season cannot be avoided, an adequate buffer zone should be established around any active nests to minimize disturbance to nesting birds. Buffer distances should be at least 100 feet from songbird and

raven nests, 0.25 mile from raptor nests. Active nest sites in trees or shrubs that must be removed should be mitigated by qualified biologists or wildlife rehabilitators. Department biologists are available for consultation regarding nest site mitigation, and can facilitate contact with qualified personnel.

The permit application specifies a very limited reclamation seed mix consisting of three warm-season grass species (blue grama, side-oats grama, and oats), and one forb species (yellow sweet clover). Yellow sweet clover is not native to the project area, and since no scientific name was provided for "oats", it is unclear whether the proposed species is native. The Department recommends that only native plant species be used in the reclamation seed mix. To increase the chances for successful reclamation, a more diverse seed mix containing at least three warm season grasses, two cool season grasses, and three forb species is recommended. The Department also recommends that the seed mix and mulch be certified weed-free, and that seed test results are requested from the vendor in order to avoid inadvertently introducing exotic species to the reclamation site. Any alternate seeds used to substitute for primary plant species that are unavailable at the time of reclamation should also be native. When possible, the Department recommends using seeds that are sourced from the same region and habitat type as the reclamation site.

In order to minimize the potential for excess soil erosion, the Department recommends maintaining a 150 foot buffer area of undisturbed native vegetation on both sides of the arroyo at drill site numbers 23, 24, and 25.

Thank you for the opportunity to review and comment on the proposed exploration project. If you have any questions, please contact Ron Kellermueller, Mining and Energy Habitat Specialist, at (505) 476-8159 or ronald.kellermueller@state.nm.us.

Sincerely,

Matt Wunder, Ph.D.
Chief, Ecological and Environmental Planning Division

cc: USFWS NMES Field Office

MEMORANDUM

OFFICE OF THE STATE ENGINEER

Hydrology Bureau

DATE: July 6, 2018

TO: David Ohori, Permit Lead, Mining Act Reclamation Program ("MARP")/MMD

Lloyd Valentine, District III Manager, WRD, Deming

THROUGH: Ghassan Musharrafieh, Ph.D., P.E., Chief, Hydrology Bureau

FROM: Steve Acheampong, Ph.D., Hydrologist, Hydrology Bureau

SUBJECT: Review and Comments, Minimal Impact Exploration Permit Application, Emma Exploration Project, Permit No. GR079EM, Freeport-McMoRan Tyrone Operations

I. Introduction

On June 19, 2018 the Mining and Mineral Division (MMD) of the State of New Mexico Energy, Minerals, and Natural Resources Department (EMNRD) requested the Hydrology Bureau of the Office of the State Engineer (OSE) to review and comment on Minimal Impact Exploration Operation Permit Application for the Emma Exploration Project, Permit No. GR079EM. The application for the minimal impact exploration permit proposes to drill up to twenty one 6-inch drill holes to a maximum depth of 1300 feet below ground level (bgl) and construct 21 drill pads measuring 70 feet by 40 feet for copper exploration in Grant County, New Mexico. The proposed drilling sites are on a property owned by the applicant located approximately half a mile south of the Freeport-McMoRan Tyrone Mine in Township 19 South, Range 15 West, sections 25 and 36.

The total acreage of land that will be disturbed by the proposed project from drill pads, cuttings disposal pits, new roads, improved roads and overland travel routes is 3.37 acres. The reported estimated depth to groundwater by the applicant is 500 feet bgl although depth to water data from the New Mexico Office of the State Engineer (NMOSE) for exploratory wells in the area ranges from approximately 100 to approximately 700 feet bgl (see attached). No available information on the water quality in terms of major ions and total dissolved solids (TDS) concentrations of the groundwater in the area was provided by the applicant. The test holes will be plugged upon completion and the evaluation of the mineral resources by the applicant. The applicant has completed and attached NMOSE form WR-07. However, no plugging plan of

operations form from the OSE is attached although it is indicated on page 16 of the application that a copy is attached. There is however, a 2008 letter from NMOSE attached granting approval of a proposed plugging procedure submitted by Freeport-McMoran Copper and Gold and granting a variance from NMAC 19.27.4.30 C for some monitor wells.

II. Comments

The Hydrology Bureau has completed a review of the project application and provides the following comments:

II. A. Surface Water

The proposed exploration drilling will be conducted in an area with no nearby permanent surface water body and no drilling is proposed to occur within the channel of any perennial, intermittent or ephemeral streams. Also there are no springs observed in the project area.

II. B. Groundwater

In section 6C of the application on page 16, the applicant contends that groundwater is anticipated to be encountered during the exploration because the total estimated drill depth of 1,300 feet bgl exceeds the depth to water in the area which ranges from approximately 100 ft to approximately 700 ft bgl as shown in the attached logs of exploratory wells. Field water quality data show that the quality of the groundwater in the area is generally good with specific conductance values of less than 500 µS/cm (see attached). The applicant's selection of the wet hole abandonment option 1 on page 17 of the application appears appropriate and will not be affected by the water quality and should be used in accordance with New Mexico Administrative Code (NMAC) 19.27.4.30 to plug the wet wells. In addition to NMOSE form WR-07, if groundwater is encountered and the following additional forms are required:

- NMOSE well completion records should be filed and can be obtained at (http://www.ose.state.nm.us/WR/NewForms/WR-20%20Well%20Record%20and%20Log_2017-06-30Final.pdf);
- Mineral exploration holes encountering groundwater are considered "wells", and should appropriately be plugged under approved NMOSE Well Plugging Plan of Operations (http://www.ose.state.nm.us/WR/NewForms/WD-08%20Well%20Plugging%20Plan%20of%20Operations_2017-06-30_final.pdf);
- Plugged "wells" require the filing of NMOSE Well Plugging Records, as necessary (http://www.ose.state.nm.us/STST/Forms/WD-11%20Plugging%20Record_2009-09-08_final.pdf).

In the unlikely event that artesian water is encountered during drilling, the drill hole shall be plugged in accordance with 19.27.4.31 NMAC. Section 19.27.4.31 NMAC subsection C states that if a previously unidentified artesian stratum is encountered such that underground water flows uncontrollably to the land surface or between geologic units, the flow shall be controlled immediately. The state engineer shall be immediately notified that artesian stratum was encountered and a plan of operations shall be submitted in accordance with Subsection A of

19.27.4.31 NMAC.

The applicant selected dry hole abandonment option 2 on the application form if a dry hole is encountered. This option requires the applicant to use neat cement slurry for the abandonment of dry holes should one be encountered, in compliance with Mining and Minerals Division NMAC 19.10.3.302.L regulations. NMOSE Well Plugging Handbook states that if the well does not penetrate a water bearing strata, the well must be filled to within 10 feet of the ground surface with clean fine sand or clean native fill and the remaining 10 feet of the well to ground surface with an approved sealant by the State Engineer. The difference notwithstanding, the MMD methodology selected by the applicant for the abandonment of dry holes appears appropriate and should be used.

Attached is the General Concerns List. The Mining and Minerals Division exploratory application and associated filings can be found at:
http://www.emnrd.state.nm.us/MMD/MARP/Emma_Project.html

Well Logs

General Concerns Related to NMOSE Regulation of Exploratory Borehole Drilling Encountering Groundwater and Associated Plugging of those Borings

Well drilling activities, including exploratory borehole drilling (drilling of "mine drill holes") that penetrate a water-bearing stratum and well plugging, are regulated in part under 19.27.4 NMAC (New Mexico Administrative Code) promulgated 6/30/2017, which requires any person engaged in the business of well drilling within New Mexico to obtain a Well Driller License issued by the NMOSE (New Mexico Office of the State Engineer). Therefore, a New Mexico licensed Well Driller shall perform the drilling and plugging of exploratory boreholes that encounter groundwater.

Additionally, all onsite well drilling activities, including but not limited to exploratory borehole drilling encountering groundwater and plugging of such water-bearing boreholes shall be conducted under the supervision of the New Mexico licensed Well Driller or a NMOSE-registered Drill Rig Supervisor under the direction of the licensed Well Driller.

Plugging of exploratory boreholes that encounter groundwater will occur under joint jurisdiction of the NMOSE and MMD (Mining and Minerals Division). Filing and acceptance of the NMOSE Well Plugging Plan of Operations (http://www.ose.state.nm.us/STST/Forms/WD-08%20Well%20Plugging%20Plan%20of%20Operations_2016-01-20_final.pdf) in conjunction with filing NMOSE Applications for Permit to Drill a Well with no Consumptive Use of Water (http://www.ose.state.nm.us/WR/Forms/WR-07%20Application%20for%20Permit%20to%20Drill%20a%20Well%20with%20No%20Consumptive%20Use_2012-06-14_final.pdf) are required where it is expected water-bearing stratum/strata may be penetrated by project boreholes.

Additional NMOSE filings will be required where it is requested that an exploratory borehole be converted to a water well. The well design and construction shall be subject to the provisions of 19.27.4 NMAC Regulations. Appropriation of water from such a conversion may require a water right. **The MMD may disallow the conversions of exploratory borings to water wells if not permitted specifically in the MMD permit.**

Any exploration drilling where a water-bearing stratum is encountered will be subject to pertinent sections of those rules and regulations contained in 19.27.4 NMAC (6/30/2017), including but not limited to Sections 19.27.4.30.C NMAC for plugging and abandonment of non artesian wells; 19.27.4.31 NMAC for artesian wells; and 19.27.4.36 NMAC for mine drill holes that encounter water. A complete version of the NMOSE 19.27.4 NMAC regulations can be found on the NMOSE website at:
http://164.64.110.239/nmac/parts/title19/19.027.0004.htm

Use/extraction of Temporary Casing
When drilling through caving overburden or unconsolidated geologic units, use of temporary casing may be desired. Any temporary casing should be inserted into a borehole of sufficiently large diameter to allow easy extraction upon termination of all drilling. To help prevent deleterious fall-in or drainage of cuttings/sediments into the annulus outside the temporary casing, the top of the annulus should be made appropriately fluid-tight.

If the temporary casing becomes stuck in-place, difficulties in the proper plugging of the borehole and resultant potential for commingling of aquifers or surface water drainage may occur via an

unsealed annulus. When setting of temporary casing occurs or is expected, appropriate detail of the proposed casing extraction and borehole clean-out process prior to plugging will be required in the NMOSE Well Plugging Plan of Operations if the borehole encounters a water-bearing stratum. Should casing be left in a water-bearing boring, 19.27.4 NMAC provisions apply, including those requiring an appropriate type and extent of annular seal surrounding the well casing.

Exploratory Borehole Plugging

Terms of borehole plugging will be established jointly by the evaluation of the NMOSE Well Plugging Plan of Operations and the review of the relevant MMD application for water-bearing boreholes. Approved high-solids bentonite abandonment-grade sealants and/or approved cement slurries will be required for plugging as deemed hydrogeologically appropriate by the agencies. If the exploratory borings do not encounter groundwater, MMD plugging regulations (19.10.3 NMAC) prevail over those of 19.27.4 NMAC.

NMOSE well plugging regulations require tremie placement of the column of well sealant, which shall extend from the bottom of the borehole to ground surface. The NMOSE defers to the discretion of the MMD for the choice of sealant versus natural fill in the upper ten to twelve feet of a borehole plug to facilitate site restoration.

Required plugging of water-bearing exploratory borings shall occur within the timeframe specified by either the NMOSE or MMD. The MMD may enforce a plugging time frame that would minimize cave-in and the potential for incomplete plugging due to blockages in the borehole.

Drill Rig Fuels, Oils and Fluids

Drill rigs contain and consume fuels, oil, and hydraulic fluids, and are subject to leaks. The rig often remains in-place longer than other pieces of exploration equipment onsite, are frequently running, and are positioned immediately above and adjacent to the open borehole. As a standard practice to prevent contamination and reduce site cleanup activities, it may be beneficial to use bermed, impermeable ground sheeting under the drill rig. Consideration of bermed containment volume sufficient to accommodate a high-intensity precipitation event is also a good practice.

Ohori, David, EMNRD

From: Roth, Daniela, EMNRD
Sent: Wednesday, June 20, 2018 11:36 AM
To: Ohori, David, EMNRD
Subject: RE: Request for Comments on Emma Exploration Project, Permit No. GR079EM, Freeport-McMoRan Tyrone Operations

Dear David Ohori:

Thank you for giving me the opportunity to review and comment on the Emma Exploration Project, Freeport-McMoRan Tyrone Operations, in Grant County, NM (Permit No. GR079EM).
I do not anticipate any impacts to state listed endangered plants from the proposed exploration project as described. However, I recommend against the use of non-native plant species in the reclamation process (yellow sweet clover, oats). These may become established and outcompete native vegetation.

Please let me know if I can be of further help.

Sincerely,

Daniela Roth

Botany Program Coordinator
EMNRD – Forestry Division
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Santa Fe, NM 87505
505-476-3347
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Susana Martinez
Governor

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RECEIVED
JUN 25 2018
MINING & MINERALS DIVISION

June 22, 2018

David Ohori
Permit Lead, Mining Act Reclamation Program
Mining and Minerals Division
1220 South Saint Francis Drive
Santa Fe, NM 87505

Re: Request for Comments on Emma Exploration Project, Permit No.GR079EM, Freeport-McMoran Tyrone Operations

Dear Mr. Ohori:

I am writing in response to your request for comment on the above referenced exploration project received at this office June 21th, 2018.

Pursuant to 19.10.5.505 NMAC, Permit Modifications and Revisions, the Director shall determine whether a permit modification would have an adverse impact on cultural resources listed on either the National Register of Historic Places or the State Register of Cultural Properties or be located in a known cemetery or other burial ground.

According to our files, there are no cultural resources listed on either the National Register of Historic Places or the State Register of Cultural Properties in the permit area. There are also no known cemeteries or other burial grounds. Based on this information, this permit will have no adverse impacts to cultural resources listed on the National or State Registers.

Although there are no cultural resources listed on either the National Register of Historic Places or the State Register of Cultural Properties, the permit area has never been archeologically surveyed; therefore this office recommends a cultural resources survey be conducted on any undisturbed portions of mine property where proposed new ground disturbance will occur for this permit.

This survey should be performed by a qualified professional to determine if any historic or archaeological properties are present and if so, to provide documentation of those resources to our office. This information can then be used to evaluate the National Register of Historic Places eligibility of any resources identified during the survey and

determine project effects on those resources. A list of state permitted archaeologists and archaeological firms are available from this office upon request or can be downloaded from our web site at:

http://www.nmhistoricpreservation.org/documents/consultants.html

If you have any questions concerning these comments, please do not hesitate to contact me by phone at (505)-452-6115 or e-mail me at richard.reycraft@state.nm.us

Sincerely,

Richard. Reycraft
Staff Archaeologist

Log: 108123