WRITTEN STATEMENT OF JAMES R. KUIPERS, P.E.
On Behalf of Turner Ranch Properties, LLP and Hillsboro Pitchfork Ranch, LC

Before the Mining and Minerals Division of the
New Mexico Energy, Minerals & Natural Resources Department
on the Application of New Mexico Copper Corporation for a
Permit to Operate the Copper Flat Mine in Sierra County, New Mexico

October 23-24, 2018

On July 18, 2012, New Mexico Copper Corporation (NMCC), a wholly-owned subsidiary of THEMAC Resources Group, Ltd., submitted to the Mining and Minerals Division of the New Mexico Energy, Minerals and Natural Resources Department an application for a permit to operate the Copper Flat Mine in Sierra County, New Mexico, under the New Mexico Mining Act. The application has since been supplemented. I respectfully submit this written statement, under section 19.10.9.905.E NMAC, on behalf of Turner Ranch Properties, LLP, which owns the Ladder Ranch, and on behalf of Hillsboro Pitchfork Ranch, LC. Both ranches are located adjacent to the Copper Flat Mine. My written statement discusses my qualifications and presents my comments and critique of the permit application. I will summarize my written statement with oral testimony during the hearing to be held on October 23 and 24, 2018 in Truth or Consequences, New Mexico. The slides I will use in my presentation are Ranches **Exhibit 10**.

On behalf of Turner Ranch Properties, and Hillsboro Pitchfork Ranch, I appreciate the opportunity to submit this written statement, and to testify before the Division.
My statement will focus on the following issues:

- Protection of human health and safety, the environment, wildlife, and domestic animals including wildlife protection, lights, noise, blasting, and fugitive dust.
- Stream and stormwater diversions specific to Grayback Arroyo diversion, waste rock piles, tailing storage facility, and other stormwater channels and features, and their ability to meet both storm events exceeding current predictions and the need for long-term maintenance to protect the source controls used to prevent metals and other contaminants from leaching into groundwater.

- The inherent need for long-term monitoring and maintenance, and thus perpetual care, at mines, such as the Copper Flat Mine, that rely on source controls to meet specified performance standards, such as a maximum of one percent infiltration of meteoric water or groundwater quality standards.
- MMD preparation of an Environmental Evaluation consisting of passages taken from the draft Environmental Impact Statement that is subject to substantial revision and ultimate appeal.
- The inadequacy of the financial assurance proposal, including key aspects of the proposal that could greatly increase the amount of funds necessary for the agencies to perform closure and reclamation of the mine, such as assumptions concerning long-term monitoring and maintenance.

My statement will also focus on impacts to the Ladder Ranch, which is north and east of the proposed mine, and to the Hillsboro Pitchfork Ranch, which is west and southwest of the proposed mine.

I. QUALIFICATIONS

My professional resume is attached as **Exhibit 11**. The following is a summary of my professional experience and qualifications:

- I have over 35 years of professional experience in hardrock mine development, permitting, operations, reclamation, and closure. Industry experience includes experience as chief metallurgist, mill superintendent, mine manager, project manager, and consulting engineer.
- Since 1996 I have provided technical assistance to over 80 public interest organizations, Tribes or First Nations, local, state, and federal governments, as well as financial institutions. I have been the author of numerous workshops, presentations, papers, and reports.
- My areas of specific technical expertise include metallurgy, financial analysis, site characterization, mine facility design, reclamation and closure design and planning, monitoring and adaptive management planning, mine water treatment, economic

analysis, and financial assurance cost estimation. I have previously been qualified as an expert on these topics in numerous state and federal administrative and congressional hearings as well as in New Mexico District Court and in the U.S. Court of Appeals for the Ninth Circuit.

- I have continued to serve as technical adviser on behalf of New Mexico public interest organizations in implementation of the Mining Act and the Water Quality Act since 1998, including prior involvement in Questa, Chino, Tyrone, Continental/Cobre, and Mount Taylor Mines.

II. COMMENTS ON PERMIT APPLICATION

A. Protection of human health and safety, the environment, wildlife and domestic animals.

The New Mexico Mining Act (NMMA) (NMSA section 69-36-1 through 69-36-20) requires in NMSA 69-36-7(H) that the Mining Commission shall "establish by regulation permit and reclamation requirements for new mining operations that incorporate site-specific characteristics. These requirements shall, at a minimum:

(1) require that new mining operations be designed and operated using the most appropriate technology and the best management practices;

(2) assure protection of human health and safety, the environment, wildlife, and domestic animals.

The New Mexico Non-Coal Mining regulations, 19.10.6 NMAC apply to new mining operations. Section 19.10.6.603 NMAC requires that new mining operations and reclamation shall use appropriate technology and best management practices, consistent with the requirements of the NMMA. Section 19.10.6.603.C NMAC, which is similarly consistent with the NMMA, contains a list of specific requirements as follows:

(1) Signs, Markers and Safeguarding

(2) Wildlife Protection

(3) Cultural Resources

(4) Hydrologic Balance

(5) Stream Diversions

(6) Impoundments

(7) Minimization of Mass Movement

(8) Riparian and Wetland Areas

(9) Roads

(10) Subsidence Control

(11) Explosives.

NMCC's Updated Mining Operation and Reclamation Plan (MORP) (2016) section 4.3 is intended to address the requirements of section 19.10.6.603 NMAC.

The following comments pertain to specific sections in the MORP and to additional impacts to human health and safety and the environment that may occur from the proposed Copper Flat Mine. In particular, impacts from fugitive dust, noise, lights, and traffic can affect human health, safety, the environment, wildlife, and domestic animals. The impacts are likely to be most noticeable to adjacent properties including both private landowners and public lands.

a. Wildlife Protection

According to the Updated MORP (2016) section 4.3.2 (Wildlife Protection), which references section 19.10.6.603.C.(2) NMAC), "Construction, operations and reclamation phases of the Project will not impact critical habitat for wildlife based on wildlife studies conducted on site." The MORP goes on to address "physical disturbances ... limited to only those areas needed for mine facilities and access, minimizing impacts to surrounding habitat that may be used by wildlife." Off-site impacts to wildlife from lights, noise, blasting, and traffic cannot be precluded as suggested by the MORP. This is important both with respect to wildlife on adjacent properties, but also with respect to wildlife programs specifically tailored to the present background of minimal anthropogenic light, little noise, and light traffic, free of blasting.

Section 19.10.6.603(2) NMAC (Wildlife Protection) requires that "Measures shall be taken to minimize adverse impacts on wildlife and important habitat. Based on site-specific characteristics, the following measures will be required: (a) restricting access of wildlife and domestic animals to toxic chemicals or otherwise harmful materials; (b) minimizing harm to wildlife habitat during mining; and (c) reclaiming areas of wildlife habitat if not in conflict with

the approved post-mining land use." Additional measures as described further in these comments with respect to lights, noise, blasting, and fugitive dust must also be taken to minimize adverse impacts on wildlife and their habitat. Such measures should be recognized and addressed in the MORP. Such measures should also be addressed with permit conditions if a permit is issued.

Recommendation: The Director should require the applicant, NMCC, to further demonstrate that the proposed mining operations will not impact wildlife outside of the proposed mine permit area, including impacts from lights, noise, blasting, and traffic. In addition, if a permit is issued, the Director should require as a permit condition that the permittee submit a more detailed wildlife protection plan that would be prepared and performed in consultation with the New Mexico Game and Fish Department and adjacent landowners. The plan would include using current best management practices to address potential impacts to wildlife, as wells as existing and future wildlife conservation programs.

b. Lights

The MORP does not address potential impacts from lights to assure protection of human health and safety, the environment, wildlife, and domestic animals. According to Longcore and Rich (2004) (**Exhibit 12**), "In the past century, the extent and intensity of artificial night lighting has increased such that it has substantial effects on the biology and ecology of species in the wild." They distinguish "astronomical light pollution," which obscures the view of the night sky, from "ecological light pollution," which alters natural light regimes in terrestrial and aquatic ecosystems. While they note that "some of the catastrophic consequences of light for certain taxonomic groups are well known, such as the deaths of migratory birds around tall lighted structures ... while more subtle influences of artificial night lighting on the behavior and community ecology of species are less well recognized, and constitute a new focus for research in ecology and a pressing conservation challenge."

The proposed Rosemont Copper Project in Arizona provides an example of light pollution mitigation for a mine site. The Light Pollution Mitigation Report[1] (**Exhibit 13**) includes best management practices for light pollution that include use of the following as mitigation:

- To assess the baseline night sky condition and to allow future measurements, advanced aerial methods will be employed. Aerial surveys have already identified current sources and intensities of light pollution throughout the region as well as characterizing the baseline night sky.
- Full cut off, solid state light emitting diode (LED) lighting systems.
- High fitted target efficacy lighting systems and optics.
- Specific purpose lighting systems with optics that match task requirements.
- Adaptive lighting controls to dim or extinguish lighting when not needed, and to provide immediate "instant on" emergency or operational lighting.
- Additional measures such as color rendering.

Recommendation: The Director should require the applicant, NMCC, to demonstrate that the proposed mining operations will not result in environmental light impacts to residents and landowners or to wildlife and domestic animals outside of the proposed mine permit area. In addition, if a permit is issued, the Director should require the permittee, consistent with current best management practices, to submit a lighting monitoring and mitigation plan that would address potential impacts to adjacent landowners and residents, wildlife, and existing and future wildlife conservation programs. The local community including nearby landowners should be given the opportunity to participate in preparation and performance of the plan.

c. Noise

The MORP does not address potential impacts from noise to assure protection of human health and safety, the environment, wildlife, and domestic animals. It is generally accepted that noise is defined as any loud, discordant, or disagreeable sound or sounds. More commonly, in an environmental context, noise is defined simply as unwanted sound. Certain activities such as mining inherently produce sound levels or sound characteristics that constitute noise, including

[1] http://www.sao.arizona.edu/FLWO/LIGHT/Monrad.pdf

noise from heavy equipment, ore crushing and processing, vehicular traffic, fans, and other sources. The sound generated by proposed or existing facilities may become noise due to land use surrounding the facility, which depends on low levels of ambient noise. When lands adjoining an existing or proposed facility contain residential, commercial, institutional, or recreational uses that are proximal to the facility, noise is likely to be a matter of concern to residents or users of adjacent lands.

As noted by Blickley and Patricelli (2010) (**Exhibit 14**), human development, such as mining activities, introduces anthropogenic noise sources into the environment. They note that the impacts of new sources on wildlife are not well studied; "a growing and substantial body of literature suggests, however, that noise impacts may be more important and widespread than previously imagined." They go on to note that the impacts range in effects from mild to severe, and can impact wildlife species at both the individual and population levels. They identify impacts that "run the gamut from damage to the auditory system, the masking of sounds important to survival and reproduction, the imposition of chronic stress and associated physiological responses, startling, interference with mating, and population declines."

The generally accepted current best management practice to address noise is to develop a site-specific Noise Management Plan (NMP). The application of NMPs to address mine environmental noise is common in Australia. In one example[2] the objectives of a Noise Management Plan for the Northparkes Mine (**Exhibit 15**) were as follow:

- ensure that environmental noise from operations is minimized and appropriately controlled;
- ensure that impacts on surrounding residents are minimized;
- keep the local community and regulators informed of activities where required and respond quickly and effectively to issues or complaints;
- carryout regular monitoring to ensure compliance against noise limits;

[2] http://www.northparkes.com/wp-content/uploads/pdf/201506-Noise-Management-Plan.pdf

- adequately manage and mitigate potential noise impacts from the construction and operational activities.

Noise control measures identified included the following:

- environmental education and training to ensure workforce awareness;
- purchase of equipment that meets relevant noise emission standards;
- maintaining plant and machinery in good working order;
- maintaining haul roads in good condition;
- operating equipment in a manner that will minimize noise emissions;
- avoiding the unnecessary clustering of earth moving equipment;
- regular contact with local residents and landowners;
- scheduling of work with attention paid to adverse weather conditions, particularly at night, and modifications made to the work program where necessary;
- implementation of best management practice to minimize the construction, operational and road noise of the operations;
- a noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions any approvals;
- a program of regular noise monitoring of site operations to determine whether the operations are complying with the criteria set out in project approvals. This monitoring will be undertaken as attended and real-time noise monitoring at surrounding receivers over the life of the mine;
- development of a Construction Noise Management Plan in consultation with relevant agencies and potentially affected receivers that will outline the impact mitigation measures to be implemented should targeted noise monitoring during construction activities identify exceedances of relevant noise impact assessment criteria.

Recommendation: The Director should require the applicant, NMCC, to demonstrate that the proposed mining operations will not result in environmental noise impacts to residents and

landowners or to wildlife and domestic animals outside of the proposed mine permit area. In addition, if a permit is issued, the Director should require the permittee, consistent with current best management practices, to submit a Noise Management Plan that would include addressing potential impacts to adjacent landowners and residents, wildlife, and existing and future wildlife conservation programs. The local community including nearby landowners should be given the opportunity to participate in preparation and performance of the plan.

d. Blasting

The MORP section 4.3.11 (Explosives Blasting), which references section 19.10.6.603.C.(11) NMAC, addresses explosives blasting. According to the MORP, "Blasting will be conducted in a manner to prevent injury to persons or damage to property not owned by the operation. The generation of fly rock will be minimized to ensure that it is confined to the permit area. Blasting will be limited to the daylight hours and performed by trained and certified blasters. Safe seismic disturbance and air blast limits will be established to prevent damage to buildings." McKown (Undated) (**Exhibit 16**) addresses the subject in great detail and discusses the principals of blasting and the impacts of blasting. He notes that blasting has multiple side effects other than flyrock including vibrations, blast pressure, and permanent ground deformations, such as cracks or slides. He addresses the adequacy of the U.S. Bureau of Mines safe limits. He addresses a number of protective and mitigation measures to reduce impacts from blasting. These measures include providing for a public relations plan that includes meetings with residents to review blast impacts, mitigation measures, recognizing and addressing likely things the public will notice when blasting takes place, and responding to any questions or addressing concerns the public might have. In addition, he recommends that pre-blast condition surveys take place and that there be periodic progress meetings with residents.

Recommendation: According to NMAC 19.10.6.603.C(11) (Explosives), "The Director may require a detailed blasting plan, pre-blast surveys or specify blast design limits to control possible adverse effects to structures." The Director should require the applicant to submit a blasting plan that includes identification and application of protective measures and mitigation

consistent with current best management practice intended to reduce potential impacts to both property and the environment including humans, wildlife, and domestic animals.

e. Fugitive Dust

The MORP addresses dust control throughout the document, including use of water sprays to control dust within the primary crusher pocket and at the stockpile feed stacker (p. 2-21, 23), dust control on the stockpile feed conveyor (p. 2-42), dust control within the open pit (p. 2-56), dust control as a surface stabilization measure, and dust control on unpaved haul roads and other disturbance areas (p. 4-2).

The applicant, NMCC, has not submitted an actual dust mitigation and monitoring plan consistent with current industry practice. Fugitive dust emissions can be reduced through application of best management practices. Control measures to reduce fugitive dust emissions must take into account: a) identification and classification of fugitive dust emission sources; b) fugitive dust characterization; c) development and implementation of the best management practices plan; d) employee training; and e) and inspection and maintenance.

Recommendation: The Director should require the applicant, NMCC, to develop and submit a formal dust mitigation and monitoring plan utilizing best practices as suggested by Reed and Organiscak[3] (**Exhibit 17**) and as identified by the Centre for Excellence in Mining Innovation's *Fugitive Dust Best Practices Manual*[4] and related documents (**Exhibits 18, 19, 20**) The local community including nearby landowners should be given the opportunity to participate in preparation and performance of the plan.

B. Stream and Stormwater Diversions

Section 19.10.6.603.C(5) NMAC (Stream Diversions) requires that "When streams are to be diverted, the stream channel diversion shall be designed, constructed, and removed so that the combination of channel, bank, and flood plain configurations shall be adequate to safely pass

[3] W.R. REED AND J.A. ORGANISCAK, Haul Road Dust Control: Fugitive dust characteristics from surface mine haul roads and methods of control. https://stacks.cdc.gov/view/cdc/8897/cdc_8897_DS1.pdf

[4] http://www.cemi.ca/SustainMine/fugitive-dust-best-practices-manual/

the peak run-off of a 10-year, 24-hour precipitation event for temporary diversions, a 100-year, 24-hour precipitation event for permanent diversions."

Stream diversions, including the Grayback Arroyo diversion and general reclaimed feature stormwater diversions, are necessary to protect surface and groundwater quality. The Grayback Arroyo diversion is apparently intended as a permanent diversion to control the pit water inflow. The general stormwater diversion features are intended to prevent erosion from compromising the source control covers – which will be installed on the waste rock piles and tailings storage facility – to protect water quality and promote revegetation.

Anthropogenic climate change has resulted in previous storm event estimates used in operation and closure designs to be highly inadequate. In New Mexico, storms exceeding the predicted 100-year storm event criteria have recently occurred on a common basis, and even 500-year to 1000-year events have occurred in some cases. While New Mexico has not specifically addressed the need to update current NOAA (National Oceanic and Atmospheric Administration) storm event predictions, other states such Montana have done so, recognizing the importance of addressing climate change. The DOWL (2016) Montana Dam Safety Program, Montana Department of Natural Resources and Conservation, Extreme Storm Working Group Summary Report[5] (**Exhibit 21**) is one example.

The MORP section 4.3.5 (Stream Diversions), which references section 19.10.6.603.C.(5) NMAC, identifies the Grayback Arroyo diversion as a permanent existing diversion "that will be maintained to continue to divert water safely around and through the site." NMCC evaluated the existing diversion as able to pass a 550-year return period storm event, while also noting "minor repair and maintenance" would be necessary. The Grayback Arroyo diversion must be properly maintained to ensure that it will continue to bypass stormwater around the open pit and through the site indefinitely into the future.

[5] http://dnrc.mt.gov/divisions/water/operations/dam-safety/MTExtremeStormWorkingGroupReport_R0_12716.pdf

Other than the tailings storage facility diversion ditches designed for a 100-year storm event, the MORP does not specifically address stormwater channel design. The MORP does not specify the design for the stormwater diversions and channels for the waste rock piles or other features. However, for both the waste rock piles and the tailings storage facility, design of the diversion and stormwater runoff control structures is critical. These structures will need to function for as long as the 3-foot source control covers will need to function, which is indefinite but almost certainly beyond 500 years.

Recommendation: Consistent with our recommendations to the N.M. Environment Department concerning stormwater features, we recommend the Director include permit conditions to require, at a minimum, that all permanent diversion and stormwater control structures be designed to meet a 500-year storm event, and that all other diversions and stormwater control structures be designed to meet a 200-year storm event. In addition, the Director should require that the permittee, NMCC, submit a long-term monitoring and maintenance plan for a period of at least 100-years and preferably 500-years for all stormwater related structures. The objectives of the plan should be to protect the source control measures used on the open pit, waste rock piles, and tailings storage facility, to protect both groundwater and surface water quality, and to assure long-term sustainability of revegetation at the site.

C. Perpetual Care

Section 19.10.6.603.H NMAC requires that "The operation will be designed to meet without perpetual care all applicable environmental requirements of the Act, 19.10 NMAC and other laws following closure." The MORP attempts to satisfy that requirement in section 4.8 (Perpetual Care) stating that "After the lands disturbed by NMCC's mining activities are reclaimed, the land will return to being self-sustaining requiring no perpetual care following closure." Accordingly, as will be discussed in our comments on financial assurance, NMCC has provided a maintenance and monitoring plan suggesting that, following reclamation, seven years of maintenance and twenty-five years of post-closure water management and monitoring will be necessary. Applying current reclamation and closure best industry practice, a mine such as the Copper Flat Mine that relies on source controls or other measures to protect water

quality cannot feasibly implement reclamation that allows the company simply to "walk-away" after a limited period of time such as 25-years

Among other reclamation components the Bureau of Land Management's (BLM) 3809 Handbook, section 5.3.3 (Performance of Reclamation), identifies "Isolation, control, or removal of acid-forming, toxic, or deleterious substances" and "Providing for post-mining monitoring, maintenance, or treatment." The various measures proposed for Copper Flat Mine, including the Grayback Arroyo diversion, source control covers on the waste rock piles and tailings storage facility, stormwater diversions, and other measures, are intended to isolate or control potential groundwater contaminants. As such, they require post-reclamation monitoring and maintenance to perform indefinitely to protect the reclamation and closure features. In addition, they require a long-term trust to be established for those features. BLM has addressed long-term closure costs in guidance that recommends using a 500-year period.

In recognition of the necessity of long-term monitoring and maintenance for an indefinite period of time, the New Mexico Environment Department, at the administrative hearing for the Copper Flat Mine groundwater discharge permit (DP-1840), explicitly stated that the Department will require a 100-yr monitoring and maintenance program, renewed every 5-years for as long as necessary, as a condition of the permit. (**Exhibit 22**: Testimony of Kurt Vollbrecht).

Recommendation: Although the MORP proposes to rely on source control and other measures to protect groundwater quality in the long term, it does not describe or provide for monitoring and maintenance, which will certainly be necessary for the continued performance of those source control measures into the foreseeable future. For example, monitoring and maintenance will be necessary to ensure that the soil covers to be placed over the waste rock piles and the tailings storage facility will permanently achieve less than one percent infiltration, and to ensure that the Grayback Arroyo diversion is not compromised. Mines such as the Copper Flat Mine that depend on source control measures as part of the mine reclamation plan, must also include long-term monitoring and maintenance as integral components of the mine reclamation plan. While the Director could require the permittee, NMCC, to include a

long-term monitoring and maintenance plan in the MORP, that would be in apparent violation of the Mining Act's prohibition on perpetual care. Therefore, the Director must deny the permit application because the proposed reclamation plan requires perpetual care.

D. Environmental Evaluation

Section 19.10.6.605.D NMAC provides that the Director shall prepare a draft environmental evaluation which shall include an analyses of the reasonably foreseeable impacts of proposed activities on the pre-mining and post-mining environment and the local community, including other past, present and reasonably foreseeable future actions, regardless of the agency or persons that undertake the other action or whether the actions are on private, state or federal land. The Director may contract with, and the applicant should pay for, a third party to prepare the analysis and assessment.

Although MMD ostensibly prepared an environmental analysis for the Copper Flat Mine, it is taken in its entirety from the 2015 draft Environmental Impact Statement prepared by BLM to comply with NEPA (National Environmental Policy Act). MMD neither prepared the analysis nor hired a third-party to prepare the analysis. The "analysis," moreover, is lifted from a draft document which itself if flawed and subject to substantial revision and eventual appeal.

Recommendation: Before MMD can issue a permit for the Copper Flat Mine, it must prepare its own environmental evaluation in accordance with section 19.10.6.605.D NMAC or it must hire a third-party to do so.

E. Financial Assurance

NMCC submitted a general proposal for financial assurance to MMD. The proposed financial assurance is summarized in Table 1. The estimate includes $44.3M in direct costs for reclamation and closure and $11.5M in indirect costs for a total financial assurance cost estimate of $55.8M.

Table 1 - NMCC CCP Financial Assurance Cost Estimate - Summary of Costs

Facility/Activity Type	Total Cost	% of Direct Costs
Direct Costs		
Waste Rock Dumps	$12,911,961	

Tailings Storage Facility	$17,728,017	
Draindown Management	$4,490,755	
Buildings	$1,911,273	
Pits	$1,937,882	
Pit Rapid Fill	$446,769	
Roads	$30,511	
Ponds	$298,257	
Yards	$1,486,311	
Wells	$134,488	
Waste Disposal	$82,463	
Misc. Facilities	$254,714	
Monitoring	$1,883,745	
Reclamation Maintenance	$686,791	
Direct Costs Sub-total	$44,283,937	
Indirect Costs		
Mob/Demob	$7,592	0.02%
Engineering, Design, Construction Plan	$1,771,661	4.00%
Contingency	$2,657,492	6.00%
Contractor OH and Profit	$4,429,153	10.00%
Contract Administration	$2,657,492	6.00%
Indirect Costs Sub-Total	$11,523,390	26.02%
Total Costs	$55,807,327	

The cost estimate is performed using the Standard Reclamation Cost Estimator (SRCE). I am highly familiar with SRCE and was involved in the original beta testing of the model, and I have subsequently used SRCE to perform cost estimates for the U.S. Environmental Protection Agency. I have reviewed approximately 100 SRCE based cost estimates over the past 15 years. The SRCE model is based on established and accepted methods of engineering cost estimation consistent with third-party financial assurance requirements. I commend NMCC for using SRCE as it limits the typical issues of review to that of unit costs and the basis for the estimate or assumptions that were used. For these comments the unit costs have not been considered, and the focus is primarily on the assumptions provided by NMCC for the estimate as discussed in the following sections.

a. Form of Financial Assurance

Section 19.10.12.1203.A NMAC addresses the form that financial assurance can take. It allows that "The [D]irector may accept the following forms of financial assurance: (1) cash; (2) trusts; (3) surety bonds; (4) letters of credit; (5) collateral bonds; (6) third party guarantees; (7) insurance; or (8) a combination of any of the above." Section 19.10.12.1203.B NMAC provides that the Director shall not accept any type or variety of self-guarantee or self-insurance for the required financial assurance."

Although the applicant, NMCC, has not identified the form of financial assurance it will provide if the mine project were to proceed, the financial assurance instrument must be in a suitable form readily convertible to cash. Given that the applicant is a Yukon, Canada based company owned by an Australian investor with no other assets in the United States, a third-party guarantee or any other form of corporate guarantee would be highly inappropriate and would leave the State of New Mexico with significant risk. A corporate guaranty in the case of NMCC would be, in effect, a self-guarantee contrary to the regulations.

Recommendation: Given the relatively high risk of project abandonment due to both the project ownership and project economics, the Director should ensure that the form of financial assurance for the Copper Flat Mine be readily convertible to cash. In this case, the entire financial assurance should be in the form of cash. Furthermore, the public must be given an opportunity to comment on the form of financial assurance that the applicant proposes before any permit is issued.

b. Financial Assurance Amount

Section 19.10.12.1205.A NMAC requires that "The amount of the financial assurance shall be determined by the [D]irector and take into account, but not be limited to, the estimated cost submitted by the permittee or the applicant. This estimated cost should include at a minimum the following costs: contract administration; mobilization; demobilization; engineering redesign; profit and overhead; procurement costs; reclamation or closeout plan management; and contingencies. Credit for salvage value of building materials or abandoned equipment and

supplies shall not be allowed. Equipment normally available to a third party contractor should be used in determining the estimated cost;

(1) reflect the probable difficulty of reclamation or closure, giving consideration to such factors as topography, geology, hydrology, revegetation potential and approved post-mining land use;

(2) depend on the requirements of the approved permit;

(3) not duplicate any federal or state financial requirements for the same area so long as those entities' financial assurance requirements are at least as stringent as this part; and

(4) not be less comprehensive than the federal requirements, if any."

Section 19.10.12.1205.B NMAC provides that the amount of the financial assurance shall be sufficient to assure the completion of the reclamation plan or closeout plan if the work has to be performed by the state of New Mexico or a contractor with the state in the event of forfeiture" (emphasis added).

Review of the MORP together with the applicant's financial assurance proposal indicates a number of areas where the financial assurance proposal potentially fails to provide sufficient funds for the agencies to complete the reclamation plan. This is in part due to the MORP reflecting an ideal set of circumstances and outcomes that are not consistent with the experience and practice of applying engineered source controls to mine sites, which require both monitoring and maintenance, typically for an indefinite period of time lasting for as long as the source controls must perform as intended. The following comments further elaborate on specific areas of the financial assurance estimate provided by the applicant.

i. Tailings Storage Facility Draindown Management

According to the NMCC reclamation proposal, the underdrain systems will continue to operate after cessation of mining and processing as drain-down of the tailings storage facility will continue to produce water for a number of years thereafter. The applicant's estimate assumes that draindown will continue for a total of 25 years, 5 years of active water management and 20 years of passive water management. The actual amount of time required for draindown is a function of porosity of tailings materials in the long-term and the volume of water remaining in

the tailings storage facility. An "active" evaporative water management program (short-term AEWMS) will be implemented at the end of operations, followed by "passive" evaporative water management system (PEWMS). During active water management water captured in the tailings storage facility underdrain collection pond will be pumped back to the impoundment surface of the facility where it would be force-evaporated through evaporators. Crews are assumed shared between the operation of the recirculation pumping and the forced evaporation for this phase.

Upon completion of placement of the cover on the impoundment, active evaporation through the tailings storage facility evaporation pond will no longer be necessary and the PEWMS will begin. The impoundment will continue to drain at an ever-decreasing rate, requiring that it continue to be collected for passive evaporation and not pumped to the tailings surface cover. Prior to the start of the PEWMS, a new HDPE-lined evaporation pond will be constructed to provide sufficient surface area to passively evaporate the residual drain down waters from the tailings storage facility. For planning purposes, this estimate assumes that the passive evaporation phase will last 20 years after cessation of operations. (Golder, 2017b).

The estimated cost of 5 years of active water management and a new HDPE-lined evaporation pond for passive evaporation estimated to last 20 years is $4,490,755.

The estimation of the draindown rates is inherently uncertain and the actual period during which active water treatment might need to be conducted may exceed five years and continue for decades. The tailings storage facility will always have some level of seepage that is likely to continue beyond 20 years and quite probably will continue long-term. This has been reflected in prior financial assurance estimates at New Mexico sites such as Chino, Tyrone, and Questa, which have assumed 100-years of tailings seepage in estimating long-term financial assurance, and at other sites administered by BLM in Nevada and Montana, which have assumed as much as 500-yrs for long-term tailings seepage.

Recommendation: Seepage from the Tailings Storage Facility having the potential to impact groundwater should be recognized as a long-term liability. Mitigation measures and

corresponding costs should be included in the financial assurance cost estimate for an assumed period of at least 100 years and preferably 500 years.

ii. Buildings

Under NMCC's reclamation proposal, all fuel tanks, reagent storage facilities, and equipment will be removed from the site and disposed of according to applicable federal and state laws; concrete foundations will be broken, walls toppled, backfilled, and covered with 36 inches of growth media; remaining disturbed areas will be graded, ripped, and covered with 6 inches of growth media. This estimate includes costs to cut steel tanks prior to demolition. The costs are calculated using the productivity and crew designation provided in RS Means (Gordian, 2018) for steel cutting, using the labor and equipment rates input into the cost data file (to the extent applicable). Costs for the demolition of the tanks and hauling of debris are included in the Foundations and Buildings sheet.

Residual sediments and fluids will be flushed from the pipelines and placed in the tailings storage facility prior to reclamation of this facility, or at an approved location. Above-ground pipelines will be disposed of in the tailings storage facility prior to reclamation of this facility, or at a nearby approved construction and debris landfill. Buried pipelines will be capped at both ends. Disturbed surfaces will be graded and covered with 6 inches of suitable cover material where unsuitable growth media exists.

The estimated cost of building and foundation demolition is $1,911,273. The estimate does not assume salvage value; however, it does assume that major equipment, piping, electrical, and other internal features will have been removed. While the equipment and any other valuable materials including the building would be the property of the bankruptcy trustee in the event of project forfeiture, there is no assurance they will be of value or will be removed.

Recommendation: The cost of removing equipment and other features should be included in the cost estimate to ensure those funds are available if they are needed. This would likely result in an approximately 50% increase to the present estimate.

iii. Pit Rapid Fill

According to NMCC, the open pit will remain a hydrologic sink capturing groundwater flowing from all directions during post-closure. NMCC will conduct rapid filling of the mine pit with fresh water provided from the off-site well field as the initial step in commencing reclamation and closure until it reaches an average steady-state condition.

The inputs for rapid filling consist of monthly rapid fill rates for six months. Pipeline length and the static head required to pump the water were estimated based on the topography of the site. The estimated cost of pit rapid fill is $446,769, based on the cost of pumping using existing equipment.

The proposal by NMCC identifies the off-site well field for pit rapid fill water but does not address its ownership to those rights in the quantity that might be required (3,000 gpm = 4,842 ac ft/yr). The existing equipment may not be available for use due to maintenance issues or due to ownership by the bankruptcy trustee.

However, NMCC has not demonstrated ownership of legal rights to water in a quantity sufficient to complete rapid refill of the pit.

Recommendation: Given that NMCC cannot demonstrate ownership of the required water, or assure its transfer to MMD in the event of bankruptcy, the Director should either deny using rapid pit refill as an approach, or should require that the cost estimate include the cost of purchasing the water rights at current market rates and installing the necessary conveyances such as pumps and pipelines to convey the water to the pit. This would be likely to add significantly to the estimated cost and could increase it by up to an order of magnitude.

iv. Monitoring

A monitoring schedule for the closure and post-closure periods has been developed by NMCC based on assumptions made with current operations-period monitoring requirements. The actual closure and post-closure monitoring schedule will be finalized in the years preceding closure based on monitoring results. The assumed schedule and costs are based on Attachment I -Estimated analytical costs for groundwater & surface water sampling during

reclamation and monitoring at Copper Flat. Katie Emmer, Permitting & Environmental Compliance Manager, NMCC, 20 April 2018.

According to the schedule below (Table 2), reclamation maintenance and monitoring efforts would occur from mine year 15-40 or Closure Year 1-25. Reclamation work would be performed in mine year 15-19 (closure year 1-5) followed by passive or minimal activities from year 20-40 (closure year 6-25). Monitoring, limited to groundwater and surface water sampling, continues at a decreasing frequency until it is ended from mine year 15-40 (closure year 1-25). The estimated cost of groundwater and surface water sampling for a 25-year period is $1,883,745.

Table 2

Summary of Reclamation Work and Sampling Schedule Post Mine Operation

Year	15	16	17	18	19	20	22	23-30	31-40
Reclamation Work	Bulk Reclamation		Contouring at TSF			Passive/Minimal			
Number of GW wells	25			24		22			20
GW Sampling List	Full List of Constituents				Reclamation List of Constituents				
GW Sampling Frequency	Quarterly				Bi-Annually			Annually	
Number of SW samplers	5				0				
Number of Springs (Assumed)	1				0				
Number of Impoundments	8	5	2		1				

NMCC does not provide any basis for only requiring monitoring for a 25-year period. At other mines in New Mexico (Chino, Tyrone, Questa) the policy has been to assume monitoring for a 100-year period for long-term estimation purposes. At other mines where BLM has jurisdiction estimates for monitoring have ranged from 100 years to 500 years. No costs are included for vegetation, erosion, wildlife, pit lake, tailings storage facility, or other monitoring.

NMCC did not provide a description of reclamation maintenance for the plan or the cost estimate. The cost estimate is based on a one-time cost for reclamation maintenance in year 20 (post-mining year 7) consisting of 10% of the area requiring reseeding and 6% of area requiring growth media. The estimated cost of reclamation maintenance is $686,791.

NMCC provides no basis for only requiring maintenance for a 7-year period. At other mines in New Mexico (Chino, Tyrone, Questa) the policy has been to assume maintenance for a 100-year

period for long-term estimation purposes. At other mines where BLM has jurisdiction estimates for maintenance have ranged from 100 years to 500 years. No costs are included for road maintenance, stormwater maintenance, tailings storage facility, or other maintenance.

Moreover, no costs are included for long-term pit lake mitigation or long-term tailing storage facility capture and passive treatment.

Recommendation: This issue presents the crux dilemma for MMD given this first new hardrock metal mine being permitted under the NMMA. It is clear that this mine, if permitted, will certainly result in long-term requirements for monitoring and maintenance, and potentially long-term operations, together with corresponding costs. However, in order to meet the NMMA prohibition on perpetual care, the applicant has assumed that no monitoring or maintenance will be necessary beyond 25 years after cessation of mining. Based on our understanding of the NMMA it was intended to avoid this dilemma by instructing the Director to not allow for a mine using source controls that require long-term monitoring and maintenance to be permitted.

v. Indirect Costs

Table 3 compares NMCC's proposed indirect costs with current draft MMD guidance and current BLM guidance. The indirect costs proposed by NMCC for most categories and in total are significantly less than those that would be required by either MMD (**Exhibit 23**) or BLM (**Exhibit 24**).

Table 3 - Financial Assurance Reclamation (Construction) Indirect Cost Comparison NMCC Copper Flat FA Proposal, MMD Draft Guidance, BLM Guidance

Indirect Cost Category	Indirect Cost %[1]		
	NMCC CF	**NMMMD**	**USBLM**
Mobilization/Demobilization	In Direct Cost	4%	In Direct Cost
Engineering, Design and Construction Plan	4%	3%	3%
Contingency	6%	15%	10%
Contractor Profit and Overhead	10%	15%	10%
Liability Insurance		1.5% of labor	1.5% of labor
Performance and Payment Bonds		3%	3%
Agency Management/Contract Admin	6%	6%	6%
Agency Overhead			17% of AM/CA

Total[2]	26%	46%	32%

Footnotes:

Indirect Cost %[1] Based on $44,283,937 Total Direct Cost

Total[2] Based on labor = 30% of Total Direct Cost

Given the economic and environmental nature of this mine project there is a higher than usual risk that the state and federal agencies will ultimately become responsible for reclamation and closure of the Copper Flat Mine should it be permitted and operated. Given the high level of uncertainty as to the project outcome, it is reasonable for MMD to require an indirect cost of 46% in this case.

Recommendation: The Director should require the applicant to incorporate and follow both MMD and BLM guidance on indirect cost, incorporating whichever is greater, to ensure the financial assurance meets both state and federal requirements.

vi. Maximum Reclamation Requirements

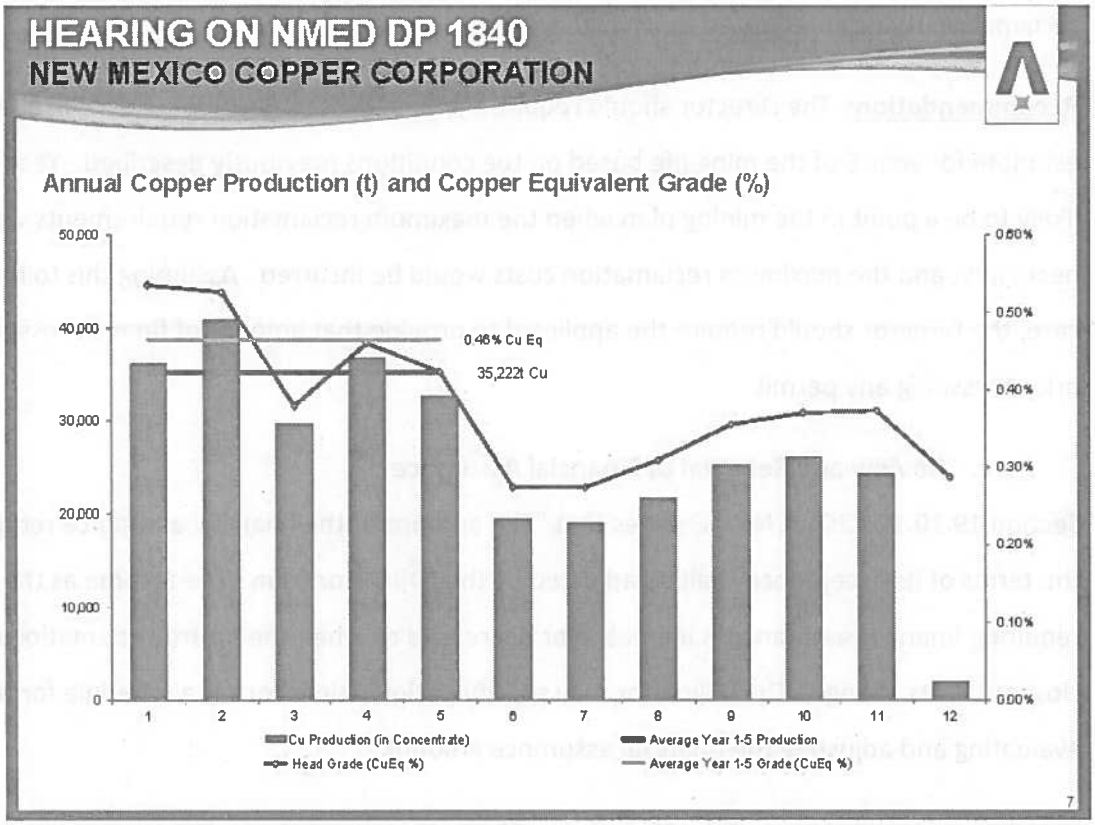
In the MORP and corresponding financial assurance, NMCC assume near ideal outcomes for the proposed mining operation. NMCC assumes that the ore deposit will be mined to its maximum currently known extent; that reclamation and closure will take place after that mining and processing has occurred; that the waste rock piles and waste management area will be built to their final projected extent; that the tailings storage facility will be filled to its design capacity; that the pit lake will form at an elevation that will be entirely on private land owned by NMCC. Each of these assumptions leads to lower reclamation costs, yet each of these assumptions is highly questionable.

Standard practice in mine financial assurance estimation is not to assume an ideal outcome but instead to determine the maximum reclamation requirements. As noted by MMD's Closeout Plan Guidelines for Existing Mine (**Exhibit 22**), "This is the most important step in the estimating procedure. Generally, the greatest estimated reclamation costs will occur at that point in the mining plan where one or more of the following conditions exist:

- The greatest area of disturbance or the greatest area requiring final grading, topsoil placement, and revegetation;

- The largest volume of material to be graded to establish suitable post-mining contours;
- The longest haul distance between material handling areas and the location of final placement;
- The greatest number of structures on site;
- The greatest amount of material that must be handled to cover refuse disposal sites; and
- The need for special reclamation activities, such as handling of acid rock drainage, acidic or toxic materials, developing final cut lakes, handling of topsoil, sealing underground mine entries, and addressing difficult topographic situations.

The below figure from NMCC's presentation (Jeff Smith p. 7) at the Environment Department administrative hearing on the proposed groundwater discharge permit (DP-1840) for the Copper Flat Mine shows that there is a discernible reduction in copper grade and corresponding production from the proposed mine beginning in year 6 and extending through the end of the estimated mine life in year 12.



If economic conditions are not favorable in year 6, the mine operator might be forced to cease mine production and place the mine on standby. The mine might also then be abandoned. If this were to happen the waste rock piles would not reach capacity and the waste repository for materials with higher metals leaching potential would not be completed. The materials with high metals leaching, which would predominately be mined during the first five years of the project, would potentially require additional reclamation. The waste rock piles would also require additional reclamation, such as additional cover material and grading. The tailings storage facility would not be filled and more grading would be needed to achieve positive drainage. The pit would not be completed, and the ensuing pit lake would be more likely to encroach on public land; surface water standards would apply (assuming such standards do not otherwise apply) and additional pit lake mitigation measures would be necessary, including pumping to prevent formation of a pit lake and treatment of the pit water. Therefore, early

closure of the mine – which is quite likely in year 6 – would necessitate more extensive reclamation requirements and much higher costs.

Recommendation: The Director should require the applicant to develop a financial assurance estimate for year 6 of the mine life based on the conditions previously described. Year 6 is likely to be a point in the mining plan when the maximum reclamation requirements would be necessary, and the maximum reclamation costs would be incurred. Assuming this to be the case, the Director should require the applicant to provide that amount of financial assurance prior to issuing any permit.

c. Review and Renewal of Financial Assurance

Section 19.10.12.1206.A NMAC states that "The amount of the financial assurance required and the terms of its acceptance shall be adjusted by the [D]irector from time-to-time as the area requiring financial assurance is increased or decreased or when the future reclamation or closeout costs change. The [D]irector may specify periodic times or set a schedule for re-evaluating and adjusting the financial assurance amount."

Based on our experience in New Mexico as well as other jurisdictions, the current use of a five-year financial assurance renewal period has not resulted in timely or accurate renewals. Other jurisdictions have required three-year renewals, and in some cases annual renewals, which in both cases means that re-estimating financial assurance is an ongoing process. This is particularly important for mining projects with a relatively short mine life and with economic uncertainty such as the Copper Flat Mine project.

Recommendation: The Director should require that the financial assurance for the Copper Flat Mine be re-estimated and renewed annually. The Director should also require that at all times the financial assurance be maintained to represent the maximum future reclamation cost of the mine.

I declare under penalty of perjury that the foregoing is true and correct.

James R. Kuipers

References

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