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Cabinet Secretary


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MEMORANDUM

DATE: June 18, 2018

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

FROM: Brad Reid, Mining Environmental Compliance Section  
Shelly Lemon, Bureau Chief, Surface Water Quality Bureau  
Patrick Longmire, Ph.D., Principal Aqueous Geochemist, Ground Water Quality Bureau  
Joe Marcoline, Ph.D., Mining Environmental Compliance Section, Ground Water Quality Bureau

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

RE: **NMED Comments for the Copper Flat Mine Permit Application, Applicant Response Related to NMED Review of Two Technical Reports, Sierra County, MMD Permit No. SI027RN**

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The New Mexico Environment Department (NMED) received correspondence from the Mining and Minerals Division (MMD) on May 29, 2018 requesting that NMED review the responses provided to MMD by the Applicant for two technical reports the NMED commented on in a memo to MMD dated March 16, 2018. NMED comments are set forth below.

**Background**

On December 13, 2017, New Mexico Copper Corporation (Applicant) for the Copper Flat Mine submitted two documents as addendum to MMD Permit No. SI027RN. The titles of the two documents submitted are as follows: *Probable Hydrologic Consequences of the Copper Flat Project, Sierra County, New Mexico* by John Shoemaker & Associates, Inc., December 2017; and, *Predictive Geochemical Modeling of Pit Lake Water Quality, Copper Flat Project, New Mexico* by SRK Consulting, December 11, 2017. NMED is providing comment on the responses provided to MMD by the Applicant on May 22, 2018.

Holland Shepherd

June 18, 2018

Page 2 of 2

### **Mining Environmental Compliance Section**

NMED reviewed the New Mexico Copper Corporation (NMCC) “response to agency comment table” and the updated reports titled *Predictive Geochemical Modeling of Pit Lake Water Quality, Copper Flat Project, New Mexico* and the *Probable Hydrologic Consequences of the Copper Flat Project, Sierra County, New Mexico* (updated reports). With respect to the updated hydrologic consequences report, while NMED disagrees with a few of the assertions by NMCC in the response to comment table, we are pleased to see all the substantive issues raised in the agency comments were thoroughly addressed and that all the requested updates were included in the reports.

Regarding the responses contained in the updated geochemical modeling report prepared by SRK Consulting (U.S.), Inc. for THEMAC Resources Group Ltd., SRK utilized the geochemical computer program PHREEQC developed by the US Geological Survey (USGS) to model different water-rock interactions. These interactions include groundwater and pit lake/wall rock mixing, precipitation/dissolution, and adsorption/desorption processes expected to occur at Copper Flat. The revised PHREEQC simulations are reasonable and applicable to post-mining, aqueous geochemical conditions expected to be encountered after cessation of mining operations at the Copper Flat site. A significant amount of site-specific water chemistry and mineralogical data, and experimental results obtained from leachate testing have been conducted that are used as relevant inputs to the revised PHREEQC simulations for Copper Flat. Site-specific geochemical data and information provide relevant and meaningful input parameters for modeling complex geochemical interactions currently taking place at the site, and those that are hypothesized or predicted to take place in the future. NMED independently ran all PHREEQC simulations using input files provided in the May 2018 report submitted by SRK Consulting Inc., and evaluated and verified different output files serving as the primary source of material described in the text and shown in various figures in the SRK report.

### **Surface Water Quality Bureau**

The Surface Water Quality Bureau comments are attached to this memo.

### **NMED Summary Comment**

NMED has no additional comments at this time.

If you have any questions regarding the above comments, 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  
DJ Ennis, Copper Flat Mine, Lead Staff, EMNRD-MMD  
Kurt Vollbrecht, Program Manager, MECS

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

FROM: Shelly Lemon, Surface Water Quality Bureau Chief

**SUBJECT: SWQB Comments on NMCC Response to Comments, Regular New Mine, New Mexico Copper Corporation, Copper Flat Mine, Review of Documents, Sierra County, MMD Permit No. SI027RN**

DATE: June 8, 2018

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On March 22, 2018, the New Mexico Energy, Minerals and Natural Resources Department (“MMD”) and the New Mexico Environment Department (“NMED”) provided comments regarding the Copper Flat Mine’s “Predictive Geochemical Modeling of Pit Lake Water Quality...” (dated December 11, 2017) and the “Probable Hydrologic Consequences (“PHC”) of the Copper Flat Project...” (dated December 2017). New Mexico Copper Corporation (“NMCC”) responded to MMD and NMED on May 22, 2018 in the form of a response matrix. Below, we consider the responses to the Surface Water Quality Bureau (“SWQB”) only.

**NMED SWQB PHC Comment 2. Monitoring Plan.**

**NMCC Response.** *The Monitoring Plan contained in Appendix E of NMCC’s Discharge Plan Application which is incorporated into NMCC’s Mining Operation and Reclamation Plan meets part of the MMD’s request to provide surface and groundwater monitoring to verify predicted direction of the models. In addition, a monitoring plan has been developed to verify the similarity of the hydrologic balance in the potentially affected areas, a copy of which is provided herewith.*

NMED SWQB supplemental response: NMED SWQB appreciates more insight on the proposed Ground Water Level Monitoring Plan. The Plan identifies quarterly monitoring (with hourly measurements for the alluvial aquifers through pressure transducers) on 27 wells in total over three distinct aquifer systems [Santa Fe Group aquifer (twelve wells); shallow alluvial aquifer along Animas (four wells) and Percha (three wells); and crystalline bedrock (eight wells)]. The Plan also states, “[w]hile performing groundwater level data collection, NMCC will also check and document stream flows, if present, along Las Animas and Percha Creeks.” NMED SWQB encourages NMCC to not only document but measure stream flows, if present and practicable. NMED SWQB also recommends that a water chemistry sample also be collected during quarterly monitoring events to provide additional information regarding surface and subsurface connectivity.

**NMED SWQB PHC Comment 3. Potential hydrologic consequences to perennial flows.**

**NMCC Response.** *The Monitoring Plan contained in Appendix E of NMCC’s Discharge Plan Application which is incorporated into NMCC’s Mining Operation and Reclamation Plan meets*

*part of the MMD's request to provide surface and groundwater monitoring to verify predicted direction of the models. In addition, a monitoring plan has been developed to verify the similarity of the hydrologic balance in the potentially affected areas, a copy of which is provided herewith. Also, note that the model simulated effects on Percha Creek occur on the alluvial system where there is no perennial streamflow, therefore no effect on streamflow. The effect on evapotranspiration is proportionally small and would not be measurable.*

*The model does not independently simulate streamflow, but rather includes flow (groundwater inflow and recharge) into the alluvial system and evapotranspiration from the riparian area. This is similar to the description of Las Animas Creek by Davie and Spiegel (1967) in which they stated "the stream plus the adjoining shallow aquifer is called a water course." Most of the temporary reduction in flow into the alluvial system will be manifested as a reduction in evapotranspiration, rather than a reduction in stream flow. The model-simulated changes are non-measurable because they are such a small part of the system water balance, and because they are temporary.*

*Furthermore, the model is conservative by assuming a hydraulic connection between the Las Animas alluvial system and the underlying Santa Fe Group west of MW-11 to the Animas uplift. The model may be overstating the reduction in flow to the alluvial system. The water budget for perennial segments of Las Animas Creek is more significantly influenced by inflow from snowmelt runoff, and infiltration of storm water runoff events than by groundwater inflow from the Santa Fe Group aquifer. Any above-average snowmelt or storm runoff event will mask the model-simulated reduction of inflow from SFG groundwater. Likewise, just one irrigation well pumping from the alluvial aquifer, such as those on Ladder Ranch and other locations along Animas Creek, will obscure smaller potential effects to streamflow. Maximum model simulated change in Las Animas Creek evapotranspiration and flow reduction is 18 ac-ft./yr. (0.025 cf.). Water-level monitoring in the alluvial aquifer has shown seasonal changes of more than 10 ft. (INTERA, 2012), which would make it difficult to identify a smaller effect of less than 1 ft. Detecting the effect would require water-balance measurements to three significant digits. This would be impossible, particularly when the largest stress on the alluvial system (irrigated agriculture) is unmeasured and ongoing.*

NMED SWQB supplemental response: The JSAI Report states that groundwater-level drawdown along Las Animas Creek and most of Percha Creek will be minor and the projected effects on evapotranspiration and surface discharge will be correspondingly small. The report also states that the impacts to the shallow alluvial aquifer are temporary and water levels will recover to pre-mining levels. While NMED SWQB can appreciate the model and projected outcomes, the Bureau takes temporary as being the life of the active mining activities and the recovery time after mining ceases. This temporary impact may be significant to aquatic life, stream habitat and riparian vegetation.

If you have any questions or require clarifications, please contact me (505) 827-2819, or Jennifer Fullam (505) 827-2637.