STATE OF NEW MEXICO
BEFORE THE SECRETARY OF ENVIRONMENT

IN THE MATTER OF COPPER FLAT MINE,
DISCHARGE PERMIT DP-1840 **No. GWB 18-06(P)**

NEW MEXICO COPPER CORPORATION'S STATEMENT OF INTENT TO PRESENT TECHNICAL TESTIMONY

New Mexico Copper Corporation ("NMCC" or "Applicant") hereby submits this Statement of Intent to Present Technical Testimony in support of the issuance of Discharge Permit 1840 ("DP-1840") at the hearing of this matter, pursuant to the June 15, 2018 Scheduling Order, the Notice of Public Hearing and the requirements of 20.1.4.300 NMAC and 20.6.2.3110.C NMAC.

I. Identity, Qualifications, and Testimony Summaries of Applicant's Technical Witnesses

At the hearing of this matter the Applicant will present the following five technical witnesses. Additional technical witnesses will be made available for cross-examination as described herein. All of NMCC's technical witnesses will offer both factual and opinion testimony. The Applicant reserves the right to present additional non-technical witnesses as part of its direct presentation, as well as technical and non-technical witnesses in rebuttal or in response to witnesses, statements or evidence of other parties or members of the public. Additionally, in accordance with the Scheduling Order entered into this matter on June 15, 2018, Applicant reserves the right to present more than one witness no more than two witnesses for cross-examination following each technical witness' direct testimony.

A. **Mr. Jeffrey Smith, P.E.**
New Mexico Copper Corporation
4253 Montgomery Blvd. NW, #130
Albuquerque, New Mexico 87109
(520) 991-4588

1. Summary of Mr. Smith's Qualifications and Direct Testimony

Mr. Jeffrey Smith is the Chief Operating Officer of NMCC, where he has been employed for approximately 5-1/2 years. He has a Bachelor of Science in Mining Engineering from the University of Arizona and a Master of Science in Management from Stanford University Graduate School of Business. Mr. Smith has more than thirty-five (35) years of experience in mine management and mine engineering. His mining experience includes mine management and mine engineering for mines in the United States, including in New Mexico, Nevada, Idaho, and Arizona, as well as in Mexico and South America. Mr. Smith served as the mine engineer at Quintana Minerals Copper Flat Mine from 1980-1983. He also is a past Board Member of the Pershing County Economic Development Authority in Lovelock, Nevada. He will be offered as an expert in the hearing and will be made available for cross-examination with NMCC consultant Juan Velasquez, and/or with NMCC's Permitting & Environmental Compliance Manager Katie Emmer, whose qualifications Mr. Smith will describe.

Mr. Smith's direct testimony will cover several subject areas, and will include technical testimony. He will provide an introduction to New Mexico Copper Corporation and its Copper Flat Project in New Mexico. He will testify regarding affiliated entities and shareholders, their other mining investments, and the commitment of NMCC to corporate responsibility and environmental stewardship.

Mr. Smith will offer an overview of the Copper Flat Mine project. He will discuss the mine location and history, including testimony regarding the Copper Flat Mine's location within

one of the world's most prolific copper mining regions. He will also offer an overview of the status of the land and the mineral reserves at the mine site, including copper, molybdenum, gold and silver. Mr. Smith will briefly explain the type of mining and processing that NMCC plans to undertake at the Copper Flat Mine Site, including providing an overview of the active mine life. He will offer testimony regarding the project feasibility study that has been completed and the various permitting processes that are currently in progress. He will also provide NMCC's projections of annual copper production and discuss expected recoveries of copper, molybdenum, gold and silver, all of which are present in the target deposit.

Mr. Smith will provide an overview summary of the benefits the Copper Flat Mine will bring to the local community and the State of New Mexico. This testimony will include a discussion of the projected number of jobs, labor income, state and county expenditures, anticipated federal and state tax income in the construction, operation, reclamation and closure phases of the mine operation. His discussion of these subjects will include reference to NMSU Arrowhead Center's assessments of community benefits.

Mr. Smith will offer testimony regarding the permit application for a discharge permit and the regulatory background for issuance of the permit. He will provide a historical overview of the permit application, including the extensive permit application-related submissions of NMCC and its numerous expert consulting firms, from 2010 to present. Mr. Smith will offer testimony regarding the extensive permit application requirements NMCC has fulfilled, including providing the Sampling and Analysis Plan, the 2011 discharge permit application, the extensive technical reports, mining and reclamation plans submitted to NMED, and the 2017 revision to the discharge permit application NMCC submitted to NMED in order to demonstrate compliance with the Copper Rule, 20.6.7 NMAC. Mr. Smith will provide an overview of the Copper Rule and the

company's observance of its requirements and other requirements of the groundwater discharge program administered by NMED, leading to the NMED's determination that the application is technically approvable and the issuance of a draft permit, DP-1840, in early 2018.

Mr. Smith will offer testimony regarding the various methods and plans to protect groundwater at the Copper Flat Mine, including those planned activities that are over and above the requirements of DP-1840, the Copper Rule and NMED's groundwater permitting program. Mr. Smith will discuss NMCC's groundwater protection initiatives including, but not limited to, early reclamation, including reclamation of some prior disturbances at the site, that will be contemporaneous with mine start-up activities; water management planning and stormwater capacity control and retention; watershed reconfiguration to obtain maximum operational and closure benefits; extensive capturing, recycling and reuse of water for mine processing activities; waste rock characterization; and emplacement strategies and water management to protect groundwater. Mr. Smith will offer testimony regarding how the myriad groundwater protection controls were developed and designed and how NMCC intends to implement these controls to make sure groundwater is protected in accordance with the requirements of Draft DP-1840.

Mr. Smith will provide an introduction to, and overview of, the major mine units of the Copper Flat Mine in order to provide context for discussion of Draft DP-1840's groundwater protection controls. He will provide an overview of the major mine features such as the open pit, the waste rock stockpiles, the process facility, the lined tailings facility, water impoundment and ponds, and the roads and administrative areas. He will also describe the main elements of mine reclamation and the Copper Flat Mine Closure Plan. He will provide a general explanation of how each major mine feature will be reclaimed. Mr. Smith will also identify and discuss the financial assurance cost estimate that has been prepared by an expert consulting firm in a manner consistent

with industry standards and applicable requirements of the State of New Mexico and Bureau of Land Management. He will testify about NMCC's intentions to provide an approved method of financial assurance.

Finally, Mr. Smith will provide an introduction to the other technical experts who have assisted NMCC with the Copper Flat project. He will briefly discuss the numerous experts NMCC has employed that will not offer testimony at the hearing, and then will provide a general overview of the experts who will be testifying, including a brief summary of their anticipated areas of testimony. Mr. Smith also may respond to various comments of members of the public received to date and the positions taken in other parties' NOIs filed contemporaneously with this NOI, and he reserves the right to provide rebuttal testimony in this proceeding.

2. Estimated Length of Mr. Smith's Direct Testimony

It is estimated that Mr. Smith's direct testimony will last sixty (60) to ninety (90) minutes, more or less.

B. Mr. Steven Finch, Hydrogeologist-Geochemist
John Shomaker & Associates, Inc.
2611 Broadbent Parkway, NE
Albuquerque, New Mexico 87107
(505) 345-3407

1. Summary of Mr. Finch's Qualifications and Direct Testimony

Mr. Steven Finch is a principal hydrogeologist-geochemist at John Shomaker & Associates, Inc. (JSAI). He has over twenty-eight (28) years of experience working as a hydrogeologist-geochemist with JSAI. Mr. Finch holds a Bachelor of Science in Geology from Sul Ross State University (1985) and a Master of Science in Geology from Northern Arizona University (1991). He has professional certifications and registrations with the American Institute of Professional Geologists and as a Texas Professional Geoscientist. Mr. Finch served on the

Technical Advisory Committee for the Copper Rule. He has experience working on the Copper Flat Mine Site from 1992 to the present. He will be offered as an expert at the hearing.

Mr. Finch's direct testimony will provide an introduction and overview of the hydrogeologic setting of the Copper Flat Mine project, including a discussion of site geology, site hydrology and the hydrologic conceptual model employed to fulfill specific requirements of the Copper Rule. His testimony will include specific references to the Copper Rule, and will include a presentation and discussion of particular figures, maps and data that will aide in his explanations. He will also introduce and provide an overview of the key references that are in the Administrative Record, and that serve as a basis for his testimony, including the Baseline Data Characterization Report (February 2012) and its updates and amendments, the Results from the First Year of the State 1 Abatement Investigation at the Copper Flat Mine Site (May 2014), the Model of Groundwater Flow in the Animas Uplift and Palomas Basin (August 15, 2014) and the Probable Hydrologic Consequences of the Copper Flat Project (May 2018), most of which Mr. Finch prepared or assisted in preparing for the Copper Flat Mine site.

Mr. Finch's testimony will discuss and explain the regional geology and hydrogeology of the area of the Copper Flat Mine, including key structures and geologic features, the watersheds in and adjacent to the mine area, wells and surface water features within a half-mile of the permit area, and the 40 years' worth of robust data analyzed to allow for site hydrogeologic characterization. He will testify regarding the properties of the water bearing units beneath the Copper Flat Mine Permit Area, including the range of hydraulic conductivity of each water bearing zone. He will identify the location of the extensive data points in the immediate mine area from which useful data have been derived. He will also present a geologic map of the mine area, including within a one-mile area outside the mine permit area, reflecting the approximate locations

of known and inferred dikes and faults, the route of an ephemeral water course, and the location of drillings and monitoring wells used to develop cross-sections and data sets supporting his presentation to provide information on the Crystalline Bedrock features (Andesite and Quartz Monzonite) underlying much of the mine site, as well as the Santa Fe Group of sediments and the Quaternary Alluvial Aquifer in the area.

Mr. Finch's testimony will identify and discuss the groundwater elevation contours and gradient within the permit area and in relation to various units of the mine, as well as the location and significance of the East Animas Fault near the eastern side of the permit area between the mine site and points to the east of the mine site, including the Rio Grande that is approximately 12 miles from the mine permit area. He will also discuss groundwater flow in the area of the existing and future open pit associated with the mine. He will introduce and discuss important hydrologic concepts employed by the Copper Rule, including the Open Pit Surface Drainage Area and the Area of Open Pit Hydrologic Containment, and explain their significance in relation to operations and closure of the Copper Flat Mine.

Mr. Finch's testimony will include a description of the hydrogeology associated with key components of the Copper Flat Mine site, including the open pit, waste rock stockpiles and the tailings storage facility. With regard to the open pit at the Copper Flat Mine, he will explain how the open pit is an evaporative sink, how groundwater will flow toward the pit during dewatering and mining operations, and how the open pit at the end of mining will remain a hydrologic sink during rapid fill at closure and following closure in perpetuity. He will also discuss that water in the pit today, and water that will achieve a steady state hydrologic sink in the pit following mining that will prevent water from migrating away from the pit through any pathway. His testimony will also discuss the low permeability of the Crystalline Bedrock in that area of the pit, and explain

why the public need not be concerned that any fractures and fissures in the area will be preferential pathways or the source of any outward migration of pit water into groundwater. He will also provide a comparison of existing and future pit water levels, water surface areas, catchment surface areas and a water balance budget of water entering the pit from precipitation runoff and groundwater inflow versus evaporation out from the pit. He will offer testimony regarding groundwater monitoring plans from existing and proposed monitoring wells, and will offer his views on whether the monitoring wells will be sufficient in terms of number and location to confirm the hydrologic projections using the hydrogeologic conceptual model.

Mr. Finch will also testify regarding Copper Rule requirements for waste rock stockpiles at the mine. He will offer testimony regarding the aquifer evaluation he performed at the mine site, and will discuss the waste rock stockpile conceptual model for operation. He will explain the fact that the waste rock stockpiles during mining will be placed on areas of the site that are underlain by low-permeability andesite, including the features of andesite that will facilitate collection of any precipitation-related infiltration and flow from the waste rock stockpiles. Mr. Finch will testify about the protection of groundwater at waste rock stockpiles 1, 2 and 3 during operations as well as after reclamation, including the proposed groundwater monitoring for the waste rock stockpiles. He will discuss various hydrologic features of the mining and reclamation plans designed to protect the environment, including the diversion of storm water away from the waste rock stockpiles, and the installation of a 36 inch store and release cover system to facilitate evapotranspiration after closure. He will discuss surface water monitoring of the Grayback watershed that will occur during operations and post-closure.

Mr. Finch will also testify regarding Copper Rule requirements for tailings storage facilities such as the one planned for the Copper Flat Mine. He will explain that New Mexico Copper

Corporation proposed to line its tailings storage facility with a synthetic HDPE liner. He will offer testimony regarding the aquifer evaluation and the fact that it evaluated the potential for liner leaks, the impact of the liner on hydrologic gradient, the water quality of any potential seepage, groundwater mixing and transport considerations, and the low travel velocity of any potential leakage. Mr. Finch will further testify regarding the groundwater monitoring requirements for the tailings storage facility set forth in the draft discharge permit.

Mr. Finch's direct testimony will also refer to the work of other experts, including experts from SRK and Golder, inasmuch as their work and his work overlapped in the course of New Mexico Copper's permitting efforts before and after the Water Quality Control Commission's adoption of the Copper Rule. Finally, it is expected that Mr. Finch's testimony will refer to and address various comments submitted by members of the public or their retained experts in comments to the agency as well as in the notices of intent submitted by other parties contemporaneously with submission of this notice of intent. Mr. Finch further reserves the right to offer rebuttal testimony in this proceeding.

2. Estimated Length of Mr. Finch's Direct Testimony

It is estimated that Mr. Finch's direct testimony will last sixty (60) to ninety (90) minutes, more or less.

C. Ms. Ruth Griffiths, EurGeol, CGeol, PhD
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Whales, UK
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1. Summary of Ms. Griffiths' Qualifications and Direct Testimony

Dr. Ruth Griffiths is a senior geochemist in SRK Consulting's United Kingdom office. She is an expert with over eight (8) years of experience working in the mining industry, specializing in geochemical characterization of mine waste, waters and soils, and geochemical modeling of mining environments. Dr. Griffiths holds a Bachelor of Science in Environmental Earth Science, a Master of Science in Environmental Monitoring and Analysis and a Doctor of Philosophy Degree in Environmental Geochemistry, all from the University of Wales, Aberystwyth, UK. Dr. Griffiths is a Chartered Geologist and a Certified European Geologist. Dr. Griffiths has worked on over thirty-five (35) geochemical characterization and modeling projects including projects in North America, South America, Africa, Asia and Europe. She has authored over twenty (20) peer-reviewed mining and geochemistry-related publications and conference papers. Dr. Griffiths will be offered as an expert witness in the hearing and will be made available for cross-examination with her colleague Rob Bowell, whose qualification and involvement she will describe as part of her direct testimony.

Dr. Griffiths' direct testimony will provide an introduction to the technical experts that assisted her in drafting and providing the geochemical evaluation of the Copper Flat Mine project. This will include an introduction of Dr. Rob Bowell, a corporate geochemist at SRK Consulting (UK), who will be available to answer any questions on cross-examination, in addition to Dr. Griffiths following her direct testimony. She will also briefly introduce Amy Prestia, a principal geochemist for SRK Consulting (US), who assisted in preparing the geochemical evaluation of the Copper Flat Mine Project.

Dr. Griffiths will then provide an overview of SRK's objectives in conducting a geochemical evaluation of the Copper Flat Mine project. She will discuss how SRK developed

geochemistry data that were evaluated as part of the DP-1840 application. Specifically, Dr. Griffiths will provide an overview of the geochemical characterization of the waste rock, tailings and pit walls that SRK conducted to predict geochemical reactivity and stability of extracted material, what SRK did in its evaluation to assess impacts to human health and the environment, and finally how SRK identifies options for management of closure of the mine facilities. This overview will include general testimony regarding the potential for acid rock drainage and metal leaching and will also describe the requirements for copper mines, provided in the Copper Rule, 20.6.7 NMAC, which SRK used in its analysis and that NMCC has met or exceeding its DP-1840 application.

Dr. Griffiths will testify regarding the geochemical characterization program that was conducted at the Copper Flat Mine site. She will offer detailed testimony regarding the static and kinetic testing SRK performed on the 146 representative samples of waste rock, ore and tailings that were collected from the Copper Flat Mine site. Dr. Griffiths will offer testimony regarding the static test results of the samples, including the acid generation potential and the metal leaching potential of the samples. She will testify that the static test results demonstrated that metal leaching is generally low with the exception of transitional waste and ore, that the waste generated from transitional material is anticipated to account for less than four percent (4%) of the waste generated during mining, and that the transitional waste and ore will be mined out and removed from the pit during NMCC's mining operations. The ore will be processed and the transitional waste will be disposed of in the waste rock stockpiles in a manner so as to not allow acid generation or impacts to groundwater. She will testify that the majority of samples showed either a low or uncertain potential for acid generation, but that kinetic testing was required to confirm the long-term acid generating potential. Dr. Griffiths will go on to testify regarding the kinetic humidity cell test work

that was performed on 32 samples for up to a maximum of 122 weeks. She will testify that the results of the kinetic testing showed that the majority of samples tested have a low potential for acid generation, and that the static tests over-predicted acid generation. She will testify that the lack of acid generation in the samples is attributed to the encapsulation of sulfide in non-reactive silicate materials, the presence of acid buffering silicate materials at the site, and because the sulfides are crystalline, medium to coarse-grained, which means they are more stable and resistant to oxidation than finer grained or poorly crystalline sulfide minerals. Dr. Griffiths will testify that the kinetic test showed that the metal leaching potential was consistent with the static test results. She will offer testimony that the samples that are most likely to generate acid rock drainage and metal leaching are the transitional waste rock and ore, which for the most part are going to be mined out during operations.

Dr. Griffiths will offer testimony regarding how the Copper Flat Mine site compares to five (5) similar copper deposits. She will testify that the sulfide content and acid generating potential of the Copper Flat Mine waste rock/ore is on the lower end of the observed range of the other five copper deposits.

Dr. Griffiths will provide testimony regarding how SRK's geochemical test results were used to develop water quality predictions for the waste rock stockpiles, the tailings storage facility and the pit water body at the Copper Flat Mine site. Dr. Griffiths will testify that the pore water within the waste rock stockpiles is predicted to be moderately alkaline, that NMCC's reclamation of the facility with revegetated cover will reduce exposure to air and water such that sulfide oxidation will be limited, that impact to groundwater is predicted to be nil, and that all parameters are predicted to be at or below the numeric New Mexico groundwater standards set forth in

20.6.2.3103 NMAC, and in one or two cases are expected to be at or below levels established by existing conditions.

Dr. Griffiths will provide detailed testimony regarding the tailings storage facility ("TSF"), which will include testimony regarding the solution chemistry, that the potential for leakage through liner defects will be low such that impacts to groundwater below the TSF will be negligible, that all parameters are predicted to be below the New Mexico groundwater standards set forth in 20.6.2.3103 NMAC, that isolating historic tailings below the lined facility will protect groundwater quality, and that any potential leakage from the TSF will remain in the immediate area for several hundred years with no migration.

Dr. Griffiths will also testify regarding the predicted water quality for the pit water body. She will testify that the water in the pit post-mining is predicted to be moderately alkaline, that there will be an increase in TDS over time due to evapo-concentration, similar to what exists presently in the pit, and that rapidly refilling the pit will result in better pit water quality.

Dr. Griffiths will offer detailed testimony regarding water quality predictions for the Copper Flat Mine site. She will testify that the vast majority—ninety-six percent (96%)—of waste rock/ore shows a low potential for acid generation and metal release, that the transitional materials—four percent (4%)—of the waste rock/ore shows a greater potential for acid generation and metal leaching, that weathering reactions are slow because of the specific nature of the sulfide materials found at the Copper Flat Mine site, that there are no predicted groundwater impacts from the waste rock stockpiles and the tailings storage facility, and that the pit water quality is predicted to be moderately alkaline with constituent concentrations that are similar to or less than what is currently found in the existing pit lake water.

Dr. Griffiths may refer to the overlapping work of other experts enlisted by New Mexico Copper Corporation to meet or exceed the Copper Rule and other requirements. She also may refer to and address comments already submitted to the agency by members of the public or their hired consultants, or submitted in Notice of Intent materials contemporaneously with this submission, and she and Dr. Bowell reserve the right to offer rebuttal testimony in this proceeding.

2. Estimated Length of Ms. Griffiths' Direct Testimony

It is estimated that Ms. Griffiths' direct testimony will last sixty (60) to ninety (90) minutes, more or less.

C. Mr. David Kidd, P.E.
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1. Summary of Mr. Kidd's Qualifications and Direct Testimony

Mr. Kidd is a principal at Golder Associates Inc. in its Tucson, Arizona office. He serves as project director and designer of the tailings storage facility for the Copper Flat Mine. Mr. Kidd has a Bachelor of Science in Civil Engineering, and a Master of Science in Civil Engineering, with a Geotechnical emphasis, from the University of Arizona. Mr. Kidd served as a MSHA-certified tailings storage facility inspector from 1980-1985 for Amax Coal. Since 1989, Mr. Kidd has worked on tailings storage facility design and construction, and other mine waste design and construction projects, throughout the United States and overseas. Mr. Kidd has worked on approximately 30 tailing storage facility designs since 1989. Mr. Kidd is also a registered professional engineer in New Mexico and other western states. Mr. Kidd will be offered as an expert at the hearing.

Mr. Kidd's direct testimony will provide some of the basics on tailings storage facilities, and will give details regarding the planned tailings storage facility ("TSF") at the Copper Flat Mine. His testimony will include a summary of the requirements for tailing storage facilities set forth in the Copper Rule, 20.6.7 NMAC. Mr. Kidd will offer detailed testimony regarding the TSF design, construction, and reclamation for the Copper Flat Mine site and will explain why the TSF at the Copper Flat Mine site will meet or exceed the requirements set forth under 20.6.7 NMAC, and will also fulfill the dam safety requirements of the Dam Safety Bureau of the Office of the State Engineer (NMOSE-DSB)

Mr. Kidd will testify that there will be one hundred and twelve (112) million dry tons of tailing storage at the Copper Flat Mine TSF site. He will offer testimony that, during operations, the mine will generate an average of thirty thousand (30,000) tons of tailings per day. He will testify about the diversion of stormwater around the Copper Flat TSF. He will also testify how he characterized the TSF at the Copper Flat Mine, using eighty-two (82) test-pits and seventy-five (75) boreholes. Mr. Kidd will offer testimony regarding the liner system that will be placed under the entire Copper Flat Mine TSF, specifically that the liner will be subgrade, that there will be a twelve (12) inch thick liner bedding, an eighty (80) mil thick high density polyethylene ("HDPE") geomembrane liner, and a granular drainage layer with drainage pipe network to reduce the hydraulic head on the liner.

Mr. Kidd will also testify about the feasibility design and associated report submitted into the record as part of NMCC's application. It contemplates that an earthen dam starter dam will be built prior to the deposition of tailings, and that there will be continuous embankment raises using compacted, cycloned sand in a centerline construction configuration. He will discuss inboard and outboard slopes, with whole tailing and cycloned sand deposited inboard of embankments, and the

maintenance of sufficient freeboard to handle the wave run-up in significant storm events. He will also offer testimony about how water reclaimed from the supernatant water pool at the TSF, and water collected in the underdrain collection pond, will be reused in the mill. He will also describe the leak collection and recovery system that will be installed between two layers of geomembrane liner used in connection with the underdrain collection pond.

Mr. Kidd will testify that the slope stability factor of safety calculations meet or exceed NMOSE-DBS requirements. He will describe how residual strength analyses indicate the embankment will remain stable if liquefaction or saturation upstream of the dam occurs, and how a sensitivity analysis performed using seismic loading indicated that interface shear strength values are within normally acceptable ranges to maintain embankment stability.

Although not directly pertinent to the draft discharge permit at issue in the hearing, for the benefit of the public Mr. Kidd will offer testimony with specifics about the NMOSE-DSB's jurisdictional dam requirements, set forth in NMSA §72-5-32 and 19.25.12 NMAC. He will describe how design work to fully meet those requirements is ongoing and not yet fully completed, but that, upon completion, and prior to commencing construction of the TSF dam, New Mexico Copper Corporation will provide the documentation of compliance required by the Copper Rule and the New Mexico Environment Department's proposed language for DP-1840.

Mr. Kidd's direct testimony may refer to the overlapping work of NMCC's other experts, and will respond to comments already submitted to the agency by others interested in NMCC's plans, and possibly comments submitted with NOI materials contemporaneously with this submission. Mr. Kidd further reserves the right to offer rebuttal testimony in this proceeding.

2. Estimated Length of Mr. Kidd's Direct Testimony

It is estimated that Mr. Kidd's direct testimony will last sixty (60) minutes, more or less.

D. Mr. Todd Stein, Sr. Hydrogeologist
Golder Associates Inc.
5200 Pasadena Ave., NE #C
Albuquerque, New Mexico 87113
(505) 821-3043

1. Summary of Mr. Stein's Qualifications and Direct Testimony

Mr. Stein is a senior hydrogeologist at Golder Associates Inc. He has worked at Golder since 2004. Mr. Stein has worked as an environmental consultant, in both the public and private sectors, for over twenty-eight (28) years. Mr. Stein has been involved in the development of closure and closeout plans in New Mexico for the past eleven (11) years and has evaluated and developed reclamation cover designs and cover testing programs since 1997. Mr. Stein has been in charge of the development and design of the Copper Flat Mine reclamation and closure plan since 2015. Mr. Stein has a Bachelor of Science degree in Geology and a Masters in Hydrology from the New Mexico Institute of Mining and Technology. He will be offered as an expert witness at the hearing.

Mr. Stein's direct testimony will detail the components of the Copper Flat Mine reclamation and closure plan. He will offer testimony about reclamation and closure at all of the mine's facilities including: the existing waste rock stockpiles, the new waste rock stockpiles, the TSF, the open pit, the plant area, surface impoundments, ancillary facilities and structures, and the soil salvaging growth media stockpiles. He will testify regarding how NMCC's reclamation and closure plans meet and/or exceed the pertinent requirements of the Copper Rule, 20.6.7.33 and 20.6.7.34 NMAC.

Mr. Stein will testify regarding NMCC's plans to perform reclamation contemporaneously with and following mining operations. He will specifically offer testimony regarding the company's voluntary reclamation of existing waste rock stockpile disturbances, which will begin

in the first phases of mine development. Mr. Stein will testify regarding the design and the phases of reclamation for the existing waste rock stockpiles. He will offer testimony regarding how the existing waste rock stockpiles will be reclaimed, including regrading, drainage and revegetation. He will offer testimony regarding the reclamation and closure plans for the new waste rock stockpiles. He will offer testimony detailing the reclamation design and plans for the new waste rock stockpiles including regrading, providing draining, earthen cover and revegetating the areas.

Mr. Stein will also testify regarding the reclamation and closure plan for the TSF. He will testify that all structures, tanks, buildings, equipment and the like will be removed from the cyclone plant and TSF areas in an approved manner, that the areas will be graded to provide positive drainage, that earthen cover will be used in accordance with 20.6.2.7.33(F) NMAC, and that revegetation is designed to create a self-sustaining plant community. Mr. Stein will further testify regarding the water management plan at the TSF. He will offer testimony regarding the details of the active evaporation program and the passive evaporation program that is designed for the TSF.

Mr. Stein will also testify regarding reclamation and closure of the open pit. Mr. Stein's testimony will cover the design and plan to reclaim and close the open pit following mining, which will include, but is not limited to, removal of infrastructure, rapid filling of the pit, the construction of an earthen safety berm, construction of surface water conveyance channels, and regrading and the revegetation of certain disturbed areas within and at the perimeter of the pit shell.

Mr. Stein will further testify regarding reclamation and closure of the plant area. He will testify regarding the details of closure and reclamation including, but not limited to, the removal of all fuel tanks, reagent storage facilities, building and equipment, the closure of the process water reservoir and impacted storm water impoundments, the reclamation of land bridges across Grayback Arroyo, grading of service areas, and the revegetation of disturbed areas. Mr. Stein will

also offer specific testimony regarding the reclamation and closure of surface impoundments such as the impacted storm water impoundments, the process water reservoir, the TSF underdrain collection pond and the TSF evaporation pond. He will testify regarding the design and plan for reclamation and closure of these surface impoundments including, but not limited to, flushing all process water pipelines, removing and disposing of pipelines, pumping remaining water in the impoundments to the TSF to evaporate, grading impoundment berms and backfilling impoundments, covering impoundments with suitable cover material, and revegetation of all disturbed areas.

Mr. Stein will offer testimony regarding reclamation and closure of ancillary facilities such as haul roads, transmission lines and HDPE liners. Additionally, Mr. Stein will testify regarding reclamation and closure of the soil salvage stockpiles, including grading remaining growth media, ripping of the remaining growth medial and disturbed areas, and revegetating disturbed areas.

Mr. Stein will also offer testimony regarding the reclamation and closure schedule for the Copper Flat Mine. He will provide a detailed summary of the phases of reclamation and the anticipated dates of reclamation. His testimony may refer to the overlapping work of other experts retained by New Mexico Copper Corporation to design operations, reclamation and closure in accordance with the requirements of the Copper Rule and other requirements. He may also refer to and address as part of his direct testimony the comments of others that have been submitted to the agency, or that are submitted in Notices of Intent contemporaneously with this submission, and he reserves the right to offer rebuttal testimony in this proceeding.

2. Estimated Length of Mr. Stein's Direct Testimony

It is estimated that Mr. Stein's direct testimony will last sixty (60) minutes, more or less.

II. Materials Referenced by Applicant's Witnesses

In addition to the materials that the Applicant will use as exhibits, as listed below and attached, one or more of the Applicant's witnesses referenced or reviewed the permit application materials that are on file with the New Mexico Environment Department, drafts of the permit that have been exchanged between the Applicant and the Environment Department, letters and comments submitted to the Environment Department and made a part of the record, the Administrative Record filed by NMED in this hearing on July 10, 2018, the Water Quality Act, and the Water Quality Control Commission's regulations.

III. NMCC's Hearing Exhibits

A. Mr. Smith's testimony will refer to the following exhibits:

1. Resume of Jeffrey Smith
2. PowerPoint Presentation, Jeffrey Smith, NMCC
3. Resume of Juan Velasquez
4. Resume of Katie Emmer
5. M3 Engineering & Technology Corporation, 2013, Copper Flat Project Form 43-101 F1 Technical Report Feasibility Study, New Mexico, USA. Report prepared for THEMAC Resources, November 21 2013
6. New Mexico State University, Arrowhead Center, 2012, The Socioeconomic Impacts of THEMAC Resources Group Ltd. Copper Flat Mine Project in Sierra County, New Mexico
7. New Mexico Copper Corporation's Financial Assurance Proposal and Supporting Material

8. Joint Powers Agreement Between New Mexico Energy, Minerals and Natural Resources Department and New Mexico Environment Department

9. Memorandum of Understanding Between New Mexico Environment Department and U.S. Bureau of Land Management, New Mexico State Office

B. Mr. Finch's testimony will refer to the following exhibits:

10. Resume of Steven Finch

11. PowerPoint Presentation, Steven Finch, John Shomaker & Associates, Inc.

12. Additional Water Balance Detail for Copper Flat Mining Scenarios Considered by BLM Proposed Action, Alternative 1, and Alternative 2

13. Dunn, P.G., 1982, Geology of the Copper Flat porphyry copper deposit, Hillsboro, Sierra County, New Mexico: *In Advances in Geology of the porphyry copper deposits Southwestern North America,* Spencer R. Titley, Editor, University of Arizona Press, Tucson, Arizona, pp. 313-325.

14. Finch, S. T., 2017, Technical memorandum regarding Copper Flat open pit area groundwater chemistry data and application to SRK geochemistry model: prepared by JSAI and submitted to Jeff Smith, NMCC, September 26, 2017, 4 p.

15. Finch, S. T., and Jones, M. A., 2017, Technical memorandum regarding Post reclamation open pit surface area storm-water runoff calculations, Copper Flat Project, New Mexico Copper Corporation: prepared by JSAI and submitted to Jeff Smith, NMCC, September 25, 2017, 4 p.

16. Finch, S. T., and Jones, M. A., 2017a, Technical memorandum regarding hydrologic effects of proposed rapid fill reclamation of Copper Flat Open Pit: prepared by JSAI and submitted to Jeffery Smith, NMCC, October 12, 2017, 10 p.

17. Keller, J., Milczarek, M., and Zhan, G., 2015, Water balance modeling of preferential flow in waste rock materials: 10th International Conference on Acid Rock Drainage and IMWA Annual Conference, 10 p.

18. Niswonger, R.G., Prudic, D.E., and Regan, R.S., 2006, Documentation of the unsaturated-zone flow (UZF1) package for modeling unsaturated flow between the land surface and the water table with MODFLOW-2005: U.S. Geological Survey, Chapter 19 of Section A, Ground Water, of Book 6, Modeling Techniques, 71 p.

19. Smith, L., Lopez, D, Beckie, R., Morin, K., Dawson, R., and Price, W., 1995, Hydrogeology of Waste Rock Dumps: Department of Natural Resources Canada, Contract No. 23440-4-1317/01-5Q, 125 p.

20. Swanson, D. A., and O'Kane, M., 1999, Application of unsaturated zone hydrology at waste rock facilities: design of soil covers and prediction of seepage: Proceedings America Society of Mining and Reclamation, pp. 517-526.

C. Ms. Griffiths' testimony will refer to the following exhibits:

21. Resume of Ruth Griffiths

22. PowerPoint Presentation, Ruth Griffiths, SRK Consulting

23. Resume of Rob Bowell

24. Resume of Amy Prestia

25. Antonijević, M.M. and Bogdanović, G.D., 2004. Investigation of the leaching of chalcopyrite ore in acidic solutions, Hydrometallurgy 73 (3–4), 245–256

26. Aquatic Consultants Inc., 2014, Copper Flat Mine Biological Assessment, November 2014.

27. ASTM, 1996, Method D5744-96. Standard Test Method for Accelerated Weathering of Solid Materials Using a Modified Humidity Cell

28. ASTM, 2013, Method E2242-13. Standard test method for column percolation extraction of mine rock by the meteoric water mobility procedure. ASTM International.

29. Atkins, D., Kempton, J.H., and Martin, T., 1997, Limnologic conditions in three existing Nevada pit lakes: observations and modeling using CE-QUAL-W2. In: Proceedings 4th International Conference on Acid Rock Drainage, Vancouver, BC, May 31- June 6, 699-713.

30. Baas-Becking, L.G.M., Kaplan, I.R. and Moore, D., 1960, Limits of the natural environment in terms of pH and oxidation-reduction potentials. Journal of Geology 68(3), 24-284.

31. Bennett, J.W., Comarmond, M.J. and Jeffery, J.J., 2000, Comparison of Oxidation Rates Of Sulfidic Mine Wastes Measured In The Laboratory And Field, Australian Centre for Mining Environmental Research, Brisbane (2000)

32. Bigham, J.M. Mineralogy of ochre deposits, 1994, In: J.L.Jambor and D.W. Blowes, eds., Environmental Geochemistry of Sulfide Mine Waste,. 103-131. Mineralogical Association of Canada.

33. Bowell, R.J., 1994, Arsenic sorption by iron oxyhydroxides and oxides. Applied Geochemistry, 9, 279-286

34. Bowell, R.J., 2002, Hydrogeochemical dynamics of Pit Lakes. In: Younger, P.L. and Robins, N. (eds) Mine Water Hydrogeology and Geochemistry. Geological Society of London Special Publication, 159-187.

35. Bowell, R.J., Rees, S.B., and Parshley, J.V., 2000, Geochemical predictions of metal leaching and acid generation: geologic controls and baseline assessment: Geology and Ore Deposits 2000, in The Great Basin and Beyond Proceedings, Volume II: Geological Society of Nevada, Reno, p. 799-823.

36. Bureau of Land Management (BLM), 2008 (updated 2010), Instruction Memorandum NV-2010-014, Nevada Bureau of Land Management Rock Characterization Resources and Water Analysis Guidance for Mining Activities. Updated January 8, 2010.

37. Carroll, R.D. and Scott, J.H., 1966, Uphole seismic measurements as an indication of stress relief in granitic rock tunnels. US Geological Survey Professional Paper 550-D, ppD138-D143

38. Castendyk, D.N. and Webster-Brown, J.G., 2007, Sensitivity analyses in pit lake prediction, Martha mine, New Zealand 2: Geochemistry, water-rock reactions, and surface adsorption. Chemical Geology 244, pp56-73

39. Cravotta, C.A. III, 1994, Secondary iron-sulfate minerals as sources of sulfate and acidity. In: C.N. Alpers and D.W. Blowes, eds., Environmental Geochemistry of Sulfide Oxidation. Am.Chem. Soc. Sym. Series, 550. 1994. 345-364.

40. Deng, Y. and Stumm, W., 1994, Reactivity of aquatic iron (III) oxyhydroxides- implications for redox cycling of iron in natural waters. Applied Geochemistry, 9, 23-36.

41. Eary, L.E. 1998. Predicting the effects of evapoconcentration on water quality in mine pit lakes. Journal of Geochemical Exploration, 64, 223-236

42. Eary, L.E., 1999, Geochemical and equilibrium trends in mine pit lakes. Applied Geochemistry 15, pp963-987

43. Ficklin, W.H., Plumlee, G.S., Smith, K.S., and McHugh, J.B., 1992. Geochemical classification of mine drainages and natural drainages in mineralized areas: Proceedings, 7th International Symposium on Water-Rock Interactions, Park City, Utah, p. 381-384.

44. Förstner, U., Ahlf, W. and Calmano, W., 1993, Sediment quality objectives and criteria development in Germany. Water Science and Technology 28, pp307-316

45. Hiemstra, T. and van Riemsdijk, W.H., 1996, Physical chemical interpretation of primary charging behaviour of metal (hydr)oxides. Colloids Surfaces 59, pp7-25

46. INTERA, 2012, Baseline Data Characterization Report for Copper Flat Mine, Sierra County, New Mexico. Report prepared for New Mexico Copper Corporation, February 2012.

47. INTERA, 2012, Addendum to Baseline Data Characterization Report for Copper Flat Mine, Sierra County, New Mexico. Report prepared for New Mexico Copper Corporation, June 2012.

48. Jewell, P.W., 2009, Stratification Controls of Pit Mine Lakes. Mining Engineering 60, pp40-45

49. JSAI, 2011, Amendment to the Stage I Abatement Plan Proposal for the Copper Flat Mine. Prepared for New Mexico Copper Corporation, New Mexico, October 14 2011.

50. JSAI. 2012, Conceptual model of groundwater flow in the Animas Uplift and Palomas Basin, Copper Flat Project, Sierra County, New Mexico. Prepared for New Mexico Copper Corporation, Albuquerque, New Mexico. May 2012.

51. JSAI, 2014c, Review of Methods and Assumptions for Predicting Open Pit Water Quality, Copper Flat Project, New Mexico. Technical Memorandum dated December 17, 2014

52. JSAI, 2015a, Estimated Evaporation Rate for Future Copper Flat Open Pit. Technical Memorandum dated September 1, 2015

53. JSAI, 2015b, Proposed Copper Flat Open Pit Reclamation Plan and Inputs for Evaluating Water Quality Predictions. Technical Memorandum dated March 25, 2015

54. JSAI, 2017a, Copper Flat open pit 1.1.1 Open pit area groundwater chemistry data and application to SRK geochemistry model. Technical memorandum dated September 26, 2017

55. JSAI, 2017c, Expected Selenium Concentrations from Supply Wells PW-1 through PW-4, Copper Flat Project, New Mexico Copper Corporation. Technical memorandum dated September 26, 2017.

56. Kelsall, P.C., Case, J.B. and Chabannes, C.R., 1984, Evaluation of excavation-induced changes in rock permeability. International Journal of Rock Mechanics and Mining Sciences, 21(3), pp123-135

57. Kul'tin, 1997, Performance estimation in exploiting the Yuzhnoe uranium deposit by leaching methods. Atomic Energy 82, pp474-477

58. Kwong, Y.T.J. and Ferguson, K.D., 1997, Mineralogical changes during NP determinations and their implications. In: Proceedings ICARD'97, Vancouver. 435-447

59. Lawrence, R.W. and Wang, Y., 1997, Determination of Neutralization in the prediction of acid rock drainage. In: Proceedings ICARD'97, Vancouver. 451-464.

60. Li, L., Peters, C.A. and Celia, M.A., 2005, Upscaling geochemical reaction rates using pore-scale network modelling. Advances in Water Resources 29, pp1351-1370

61. Li, L., Steefel, C.I. and Yang, L., 2008), Scale dependence of mineral dissolution rates within single pores and fractures. Geochemical et Cosmochimica Acta 72(2), 360-377

62. Lizama, H.M., Harlamovs, J.R., McKay, D.J. and Dai, Z., 2005, Heap leaching kinetics are proportional to the irrigation rate divided by heap height, Minerals Engineering 18 (6), 623–630

63. Maest, A.S. and Kuipers, J.R., 2005, Predicting Water Quality at Hardrock Mines: Methods and Models, Uncertainties and State-of-the-Art. Earthworks, Washington, DC.

64. McLemore, V.T., Munroe, E.A., Heizler, M.T., McKee, C., 2000. Geology and evolution of the mineral deposits in the Hillsboro District, Sierra County, New Mexico in Geology and Ore Deposits 2000, The Great Basin and Beyond: Geological Society of Nevada, Program with abstracts, p. 63

65. Miller, S., Robertson, A., and Donohue, T., 1997. Advances in acid drainage prediction using NAG test: ICARD '97, Vancouver, Mine Environmental Neutral Drainage Program, Ottawa, Canada, p. 535-549.

66. Molebatsi, T., Galindo Torres, S., Li, L., Bringemeier, D. and Wang, X., 2009, Effect of fracture permeability on connectivity of fracture networks: Abstracts of the International Mine Water Conference, 19 – 23 October 2009. Proceedings ISBN

67. Morin, K.A. and Hutt, N.M., 2006, Should a humidity cell sample be gently agitated during testing? MDAG.com Internet case study ~22

68. Moss, P.D. and Edmunds, W.M., 1992, Processes controlling acid attenuation in an unsaturated zone of a Triassic sandstone aquifer UK, in the absence of carbonate minerals. Applied Geochemistry, 7, 573-583.

69. Nordstrom, D.K. and Alpers, C.N., 1999, Geochemistry of Acid Mine Waters. In: Plumlee, G.S. and Logsdon, M.J., eds., The Environmental Geochemistry of Mineral Deposits. Rev.Econ.Geol, 6A. Soc. Econ.Geol. Inc., Littleton, CO. 133-160.

70. Nordstrom, D.K., 1982, Aqueous pyrite oxidation and the consequent formation of secondary minerals. In: Acid Sulfate Weathering, Soil Sci. Soc. Am.

71. Parkhurst, D.L., Appelo, C.A.J. 2010. Users Guide to PhreeqC (Version 2)—A Computer Program for Speciation Batch-Reaction, One-Dimensional Transport and Inverse Geochemical Calculations. Distributed with PhreeqC interactive Version 2.17.5.4799. USGS.

72. Parshley, J.V. and Bowell, R.J., 2003, The limnology of Summer Camp Pit Lake: A case study. Mine Water and the Environment, 22, 170-186.

73. Price, W.A., 1997, Draft guidelines and recommended methods for the prediction of metal leaching and acid rock drainage at minesites in British Columbia: British Columbia Ministry of Employment and Investment, Energy and Minerals Division, Smithers, BC, April 1997, p. 143.

74. Raugust, J.S., 2003, The natural defenses of Copper Flat, Sierra County, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-file report 475, Socorro, N. Mex., New Mexico Institute of Mining and Technology.

75. Richards, J.P., 2003, Tectono-magmatic precursors for geophysical data over a copper gold porphyry Cu-(Mo-Au) deposit formation, in Journal of Economic Geology, v. 96, p. 1419–1431.

76. Ritchie, A.I.M., 1994, The environmental geochemistry of sulfide mine-wastes. In: D.W. Blowes and J.L. Jambor (Eds.) Mineralogical Association of Canada, 201–245.

77. Sapsford, D.J., Bowell, R.J., Dey, M. and Williams, K.P., 2009, Humidity cell tests for the prediction of acid rock drainage. Minerals Engineering 22(1), pp25-36

78. Sigg, L., Stumm, W., 1980, The interaction of anions and weak acids with the hydrous goethite (a-FeOOH) surface. Coll. Surf. 2, pp101–117.

79. Siskind, D.E. and R.R. Fumanti, 1974. Blast-produced fractures in Lithonia granite. Bureau of Mines Report BM-RI-7901. Twin Cities Mining Research Center.

80. Sobek, A.A, Schuller, W.A., Freeman, J.R., and Smith, R.M., 1978. Field and laboratory methods applicable to overburden and mine soils: EPA 600/2-78-054, 203 pp.

81. SRK Consulting, 2010, NI-43-101 Preliminary Assessment, THEMAC Resources Group Limited, Copper Flat Project, Sierra County, New Mexico: Lakewood, Colo. Prepared by SRK Consulting for THEMAC Resource Group Limited, June 30, 2010.

82. SRK Consulting, 2012, Geochemical Characterization Report for the Copper Flat Project, New Mexico. Prepared by SRK Consulting for THEMAC Resources Group Limited, May 2013.

83. SRK Consulting, 2014a, Predictive Geochemical Modeling of Pit Lake Water Quality at the Copper Flat Project, New Mexico. Prepared by SRK Consulting for THEMAC Resources Group Limited December 2014.

84. SRK Consulting, 2014b, Humidity Cell Termination Report for the Copper Flat Project, New Mexico. Report prepared for THEMAC Resources Group Ltd., February 2014.

85. Tempel, R.N., Shevenell, L.A., Lechler, P. and Price, J., 2000, Geochemical modeling approach to predicting arsenic concentrations in a mine pit lake. Applied Geochemistry 15(4), pp475-492

86. THEMAC Resources Group Ltd, 2012, Mine Operation and Reclamation Plan, Copper Flat Mine Project, Sierra County, New Mexico. Report submitted July 18th 2012

D. Mr. Kidd's testimony will refer to the following exhibits:

87. Resume of David Kidd

88. PowerPoint Presentation, David Kidd, Golder Associates Inc.

89. Rules and Regulations Governing Dam Design

E. Mr. Stein's testimony will refer to the following exhibits:

90. Resume of Todd Stein

91. PowerPoint Presentation, Todd Stein, Golder Associates Inc.

92. Excerpt: Blake Hartge 1986; *Bulk Density*

93. Excerpt: Blake Hartge 1986; *Particle Density*

94. Excerpt: Flint Childs 1984; *Physical Properties of Rock Fragments*

95. Excerpt: Gee Bauder 1986; *Particle Size Analysis*

96. Supplemental Soils Report

97. NOAA Atlas 14; Precipitation-Frequency Atlas of the United States

98. Heap Leach Pad; Interim Fluid Management (IFM)

99. Order 1 Soil Survey of Permit Area

100. USDA National Soil Survey Handbook

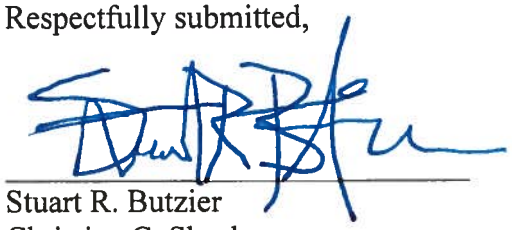
101. US DOI/BLM White Sands Resource Area; Resource Management Plan

102. McGregor Range; Record of Decision and Resource Management Plan Amendment

103. US Army Corps of Engineers; Hydrologic Modeling System

104. Excerpt: Van Genuchten 1980; *A Closed-form Equation for Predicting the Hydraulic Conductivity of Unsaturated Soils*

Respectfully submitted,



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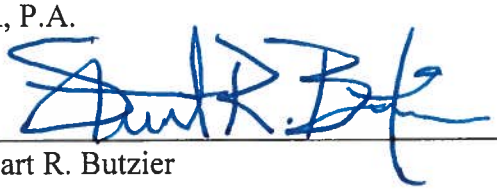
By: 
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