Mar 25, 2022

To: Matt Kelley, Senior Planner

Nevada County Planning Department 950 Maidu Ave, Suite 170 Nevada City, CA 530-265-1423 Matt.Kelley@co.nevada.ca.us Idaho.MMEIR@co.nevada.ca.us

Attn: Matt Kelley,

Please include these comments to the Idaho-Maryland Mine DEIR.

SAMPLING PROCEDURES

Page 93 of the *Groundwater Hydrology and Water Quality Analysis Report*, EMKO states that Rise completed 19 drill core holes, totaling 67,500 linear feet, from 2017-2019. The sampling pattern was to drill 90 feet, pull a 10-foot sample segment, drill another 90 feet, etc. The drill logs are not available for review; the actual dates, precise locations, drift angles, widths, final depths, etc. are unknown.

"The cores were sawed in half in zones of interest and sent to ALS in Reno, Nevada to be assayed. ALS Laboratories crushed and homogenized the sample to ~2 mm size, split a 1 kg sample, pulverized the split sample, and assayed a split of the pulverized sample." (*Groundwater Hydrology and Water Quality Analysis Report* pg 93) Samples were received on 02.20.2019 with a finalized date of 03.05.2019. (*Appendices: Groundwater Hydrology and Water Quality Analysis Report pp 515-516*)

After assay for gold, the samples were subjected to additional testing at different laboratories.

METALS ANALYSES, DI-WET, ABA, WET CHEMISTRY PARAMETERS

FLOTATION COMPOSITE- McClelland Labs

"A composite sample was prepared from 76 samples of the ~2 mm material remaining from assaying. A portion of the material was weighted to represent the interval length and merged to make the metallurgical sample. Sufficient material was available for most samples, except for five samples where no material was available from the assay lab. The 76 samples created a composite metallurgical sample of approximately 46 kilograms (kg) (100 pounds)". (*Groundwater Hydrology and Water Quality Analysis Report pp 95-96*). This composite was sent to McClelland Labs in July 2019 which then homogenized the sample and split it into 4 sub-samples, F1-F4 flotation tailings samples. Page 537 of *Appendices: Groundwater Hydrology and Water Quality Analysis Report* states: "A total of 7 buckets containing 6 separate samples were received from the Maryland mine on July 10, 2019. The

samples weighed 4 to 47 kg, and appeared to be approximately -6 mm in size. The largest sample ("flotation composite") was intended for analysis..."

Is the material 2 mm or 6 mm in size? What is the exact provenance of the 76 samples that comprise the composite as it relates to the 47 cores submitted for assay?

After flotation testing, these samples were shipped from McClelland Labs to a geologist at Benchmark Resources in Folsom, CA during November 2019 who then submitted the samples to ACZ Laboratories in Steamboat CO. These samples, F1-F4, were then analyzed by ACZ for total metals, DI-Wet metals, Static Acid-Based Accounting and wet chemistry parameters.

BARREN ROCK-ACZ Laboratories

On October 29, 2019 a geologist with Benchmark Resources selected barren rock samples: MA-1, MS-1, MA-2, MAA-1, S-1 and MA-3 from Rise Grass Valley. These samples were from 3 different cores [1 sample from I-18-10, 1 sample from I-18-11 and 4 samples from I-19-13 (*Groundwater Hydrology and Water Quality Analysis Report, EMKO pg 93)*], with combined segments equaling 34.1 linear feet. This represents only 0.05% of 67,500 total linear feet.

They were submitted to ACZ Laboratories in November 2019 to be tested for total metals, DI-WET metals, Static ABA and wet chemistry parameters.

METALS ANALYSES-BARREN ROCK CRUSHED CORES-ACZ Laboratories

Samples submitted for metals testing with identifiers can be found in Table 4-9 Barren Rock Crushed Core Samples: Total Metals Results in *Groundwater Hydrology and Water Quality Analysis Report, EMKO pp 101-102.*

Regarding the barren rock crushed core metals analyses, only 5 cores were tested which means that only 26% of the 19 total cores were sampled [1 sample from B-18-02, 3 samples from I-18-10, 1 sample from I-18-11, 2 samples from I-18-12 and 40 samples from I-19-13 (*Groundwater Hydrology and Water Quality Analysis Report, EMKO pp 101-102*)]. All five core segments combined length equal a total of 456.5 linear ft. These combined 10 ft segments represent only 0.68% submitted for testing compared to total of 67,500 ft. In general, each sample represents 10 linear feet. The diameter of the cores is not given. It is not stated how much material, weight wise or volume, is contained in each segment or specifically how that material is "homogenized" to obtain a representative sample for testing.

After assay at ALS Laboratories, the samples were labelled as "Pulp-2, Tailings= (assay pulp)". These 47 samples were then analyzed by ACZ Laboratories for total metals. The final weight used in metals analysis is 1-2 grams of material per sample.

The reference for this "Crush and Pulverize" step is EPA 600/2-78-054 3.1.3 (Field and Laboratory Methods Applicable to Overburdens and Minesoils, March 1978 pp. 43-45). The Foreword states "This report provides chemical, physical, mineralogical, and microbiological procedures for the analysis of coal overburdens and the resultant minesoils. These step-by-step methods identify and measure rock and soil properties that influence advance planning, mining efficiency, post-mining land and water quality and long-range land use."

Procedure (3.1.3):

- 1. Pour field sample onto a large square of brown paper. Spread material evenly and allow to air dry. NOTE: Sample may have to be mixed periodically to speed drying.
- 2. After drying, the field sample is split into two representative subsamples. One subsample is placed in a container, labeled, and stored for physical analyses or individual preference tests.
- 3. The other subsample is placed between two sheets of brown paper and crushed by moderately rolling over the top sheet with a rolling pin. This process is continued until the entire field sample has been processed. NOTE: Do not allow paper fragments to become incorporated with the soil sample. Do not crush rock fragments.
- 4. Pass the crushed material through a sieve with 19 mm openings and discard material retained on the sieve.
- 5. All material passing the 19 mm sieve is crushed to pass through a sieve with 6.35 mm openings.
- 6. Place sieved sample in a 1 liter container and cover. NOTE: Container should not be more than two-thirds full or mixing (step 7) will be impaired.
- 7. Tumble container end-over-end until material is thoroughly mixed.
- 8. Place three heaping teaspoons of the mixed material in the pulverizer. Material is pulverized until it passes a 0.25 mm (60 mesh) sieve. NOTE: A cast iron mortar and pestle can be substituted for the pulverizer.
- 9. Place pulverized material in a plastic vial for laboratory use.
- 10.Label vial with the sample identification shown on the field container.
- 11. Mix sample thoroughly by tumbling the vial end-over-end before subsampling for laboratory procedures (primarily chemical analyses).

After a sample is obtained, according to test method, M3050B (SW-846) Acid Digestion of Sediments, Sludges and Soils, a 1 gram (dry weight) of sample is digested for ICP-MS metals analyses testing. The digestate is then diluted to a final 100 ml volume. Flow injection volumes generally range from 20μ l- 200μ l (microliter) from the 100 ml prepared volume. A μ l (microliter) is equal to 0.001 milliliter(ml) or $1/1000^{\text{th}}$ of ml. Analyses dilution factors range from 1 to 500. For reference: There are 1 million grams in a metric tonne.

All metals were digested using EPA Method 3050B. The results should be defined as the "Total acid soluble/recoverable metals" fraction since this method does not use hydrofluoric acid, thus it is unable to break down silicates. (EPA SW-846 Revision VI December 2018, Chapter 3, pg 4)

ACZ Laboratories did receive "pulp" samples, residual material after ALS gold assay analyses. "In addition to the barren rock samples, Rise provided 48 crushed core samples, taken from ~2 mm assay rejects, for trace element test work." (*Groundwater Hydrology and Water Quality Analysis Report, EMKO, pg 95*) The actual number of samples was 47.

The barren rock samples must be pulverized prior to acid digestion just as the 47 "pulp" samples were pulverized prior to analysis for metal analyses. Any conclusions comparing metals content, leachate capacity, ABA, etc. between pulp results and barren rock results is moot since the sample preparation (pulverization) is identical.

TESTING TIMELINES

After exploratory drilling, cores were sent to ALS Laboratories which were received on 02.20.2019. Date finalized 03.05.2019. "The cores were sawed in half in zones of interest and sent to ALS in Reno, Nevada to be assayed. ALS Laboratories crushed and homogenized the sample to ~2 mm size, split a 1 kg sample, pulverized the split sample, and assayed a split of the pulverized sample." (*Groundwater Hydrology and Water Quality Analysis Report* pg 93)

Then the composite sample was prepared and sent to McClelland Labs for flotation testing from July 2019- November 2019. Samples F1-F4 were then sent to ACZ Laboratories for metals testing, DI Wet testing, ABA and wet chemistry parameters. The Flotation Results Report from McClelland Labs was not submitted to Rise until January 29, 2020.

Also in November, 2019, the 47 crushed core samples were sent to ACZ for metals testing along with the six barren rock samples to be tested for metals, DI WET metals, ABA and wet chemistry parameters.

It is difficult to understand how the composite sample was prepared and analyzed months before the individual samples (barren rock and barren rock crushed core) were submitted to ACZ in November 2019. The chains of custodies do not reflect the written account. Other than the out-going COC from McClelland to Benchmark Resources regarding F1-F4 samples, all sample shipments originate from Rise Grass Valley. The transitions between the various laboratories are not documented regarding dates, amounts, sample containers, etc.

SAMPLE POPULATIONS

FLOTATION COMPOSITE

"A total of seven buckets containing six separate samples were received from the Maryland Mine on July 10th, 2019. The samples weighed 4 to 47 kg, and appeared to be approximately 6 mm in size. The largest (flotation composite") was intended for analysis and metallurgical testing as well as environmental characterization of the testing products... The five remaining samples were indicated to be waste rock samples of various types for environmental characterization and analysis of the waste rock samples will be discussed in a separate report." (*Appendices: Groundwater Hydrology and Water Quality Analysis Report: Appendix H, pg 2*)

"The rougher tailings from two selected tests were also subjected to environmental characterization (discussed in a separate report)." (*Appendices: Groundwater Hydrology and Water Quality Analysis Report: Appendix H, pg 4*)

The flotation composite arriving in a bucket is not a very specific provenance considering that these tailings will be used to determine heavy metal leachates. What material was in this bucket?

What is environmental characterization of the testing products? What is the environmental characterization of the waste rocks? Where is the separate report that describes the preparation and analysis of the waste rock and rougher tailings for "environmental characterization"? Is the environmental characterization part of the Cement Paste Backfill study?

BARREN ROCK SAMPLES

The three cores represent a 15.8% sample population when compared to 19 total cores. Samples MA-1(I-19-13), MS-1(I-19-13), MA-2 (I-19-13), MAA-1(I-19-13), S-1(I-18-11) and MA-3 (I-18-10) were each tested for barren rock total metals, barren rock leachate DI-WET, barren rock Static Acid-Based Accounting, and Wet Chemistry parameters. In addition, samples MA-1, MS-1 and MA-1 were assayed for gold determination.

BARREN ROCK CRUSHED CORE SAMPLES

Metals analyses for forty out of forty-seven representing 85% of the total rock core samples were from a single drill core, I-19-13, at various depths (167 ft bgs to 4774.6 ft bgs = 4607.6 total feet). These samples represent 6.8% sample population when compared to 67500 total linear feet. In addition, 25% of this core is missing between depths 3227.0-3583.0 = 356 ft, 3969.7-4313 = 343.3 ft and 4323.0-4767.9 = 444.9 ft. These missing sections total 1144.2 ft out of 4607.6 feet. The remaining 3463.4 feet represent a 5.1% sample population compared to the 67500 total linear feet.

CONCLUSION

It is obvious that very limited sampling and testing has been done. Only one sample, B-18-02, was analyzed from the "Brunswick" area- metals analyses were performed on the barren rock crushed core sample. Rise plans to mine in this area immediately along with the installation of major infrastructure.

There are egregious issues with the Chains of Custody regarding sample dates, locations and quantities. Samples from only 5 cores are represented out of 19 total cores. Eight five percent of total metals analyses (barren rock crushed cores) were performed on one core, l-19-13, while 67 % of barren rock total metals, leachate Di-WET testing, wet chemistry along with ABA testing were performed on this same core.

There are inconsistencies and omissions within this limited sampling as well. For example, S-1 is taken from core I-18-11 at a depth of 4725.6'-4725.7'. This is a total of 0.1 feet or 1.2 inches. The diabase sample above it (Y973586) is taken at 4107.8-4117.55'. What is between these two samples with 608.05 feet missing? Where did the serpentinite layer begin? How deep is the serpentinite layer beneath since sampling stopped after 1.2 inches?

Sample (Y973596) from core I-19-13 at 4767.9'-4772.7' is listed as MA in the Hydrology report but as Meta volcanic serpentinite on ALS COC. Sample (Y973597) from core I-19-13 taken from 4772.7'-4774.6' is serpentinite also. What is below this level where sampling stopped after 1.9 feet? This is known serpentinite containing asbestos.

QUALITY CONTROL ISSUES

Regarding static acid-base-accounting, page 510 of the *Appendices: Groundwater Hydrology and Water Quality* states that the following parameters are not offered for certification or are not covered by NELAC certificate #ACZ:

Neutralization Potential as CaCO3	M600/2-78-054 NV Modified Sobek Procedure
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
Sulfur HCI Extractable	M600/2-78-054 3.2.4 & 3.2.6 Modified Sobek
Procedure	

Sulfur HNO3 Extractable	M600/2-78-054 3.2.4 & 3.2.6 Modified Sobek
Procedure	
Sulfur Hot H2o Extractable	M600/2-78-054 3.2.4 & 3.2.6 Modified Sobek
Procedure	
Sulfur Residual	M600/2-78-054 3.2.4 & 3.2.6 Modified Sobek
Procedure	
Sulfur Total	M600/2-78-054 3.2.4 & 3.2.6 Modified Sobek
Procedure	

Lack of certification impacts validity of acid-base-accounting results for all samples: MA-1, MA-2, MA-3, MAA-1, MS-1, S-1, F-1, F-2, F-3 and F-4 (pp 495-504, Appendices: *Groundwater Hydrology and Water Quality Analysis Report*).

SILICA

Toxic air contaminants, silica and asbestos, will be produced daily in massive quantities. Silica content is assumed as 60% quoting a textbook definition of andesite rock composition. But 98% of the total rock mined is assumed to be meta-andesite. Regarding rock composition, meta-andesite rock is not just andesite....it has undergone metamorphosis becoming altered in composition. Johnston (1940) stated: "The degree of metamorphism may vary in this unit, such that parts of it have been referred to as amphibolite schist, porphyrite, diabase, and quartz porphyrite." (*The Gold Quartz Veins of Grass Valley, referenced in Groundwater Hydrology and Water Quality Analysis EMKO pg 9*)

500 tons of barren rock will be mined each day.

Mineralized ore rock, gold in quartz (100% silicon dioxide) veins, has not been accounted for in silica calculations.

1000 tons of ore rock will be mined each day.

Silica content was not tested on any samples even though the methods utilized, ICP-MS, can analyze for both Silicon (Si) and Silica (SiO₂) and more specifically can be performed by their contracted laboratory-ACZ Laboratories (ACZ Analytical Capabilities 2017).

What is the actual silica content of the barren rock and ore rock?

ASBESTOS

Forty-two samples were analyzed for asbestos: two blanks, 2 Centennial tailings and 38 drill core samples. The core samples were from 6 of 19 (32%) of total cores drilled by Rise: 9 samples from I-18-11, 1 sample from I-18-12, 9 samples from I-19-13, 7 samples from I-19-14 and 4 samples from I-19-14A. The average overall length of the sample cores tested was 5.34 inches. Drilling was stopped when asbestos was detected. Drill logs are not available, therefore unable to determine depth or width of serpentinite deposit encountered. Asbestos sampling was limited. Centennial tailings were only identified by grid number-no information as to quantity, location, depth, etc.

Rise states that 1% of material mined each day will be serpentinite (*Groundwater Hydrology and Water Quality Analysis Report*, pg 93). Yet all of the geological maps located in the *Technical Report for the Idaho-Maryland Mine Project* show the quartz veins running with the

contact points of the faults along the serpentinite deposit (AMEC 2017 pp 7-17, 7-23, 9-9, 9-11, 9-26).

The Air Quality and Greenhouse Gas Emissions Analysis Technical Report: Earthwork and Material Handling Fugitive Dust: Construction Activity Fugitive Dust Nov 2021 pg 300 states that the serpentinite concentration of Mine Fill will be 14.3%. How can the mine fill concentration be seven parts serpentinite when it comprises only 1 % of material mined?

"Exploration drilling was designed to test a variety of mineralization throughout the deposit in areas where mining is expected to occur." (pg 93, Hydrology Report) "Rise selected mineralized samples for metallurgical testwork by reviewing drill logs and maps. Samples were selected to represented (sic) materials representative of future mining. Factors considered in selection were gold grades, minimum mining widths, mineralization style, and locations throughout the potential mining areas." (pg. 95 Hydrology Report)

CONCLUSIONS

How can the actual ratios of rock mined be known based on this work? This information is necessary to determine emissions of toxic air contaminants such as heavy metals, silica and asbestos.

Why wasn't more testing done on the Brunswick area since mining is anticipated to begin there immediately along with the installation of major infrastructure?

How can the data from this limited sampling be extrapolated to 2585 acres being mined to unknown depths for the next 80 years?

Thank you,

Jam Hered KAT

Pam Heard RRT Registered Respiratory Therapist (RRT) 11500 Brunswick Pines Road Grass Valley CA 95945 pspheard@yahoo.com