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To: Matt Kelley, Senior Planner

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Attn: Matt Kelley,

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

HEALTH RISK ASSESSMENT CRITIQUE:

Community Health Risks from Exposure to Toxic Air Contaminants

"As explained in Section 2.1.2.2, Non-Criteria Air Pollutants, of the AQ-GHG Technical Report, a TAC is an air pollutant, identified in regulation by CARB, which may cause or contribute to an increase in deaths or serious illness, or which may pose a present or potential hazard to human health…Health effects to TACs may occur at extremely low levels and it is typically difficult to identify levels of exposure which do not produce adverse health effects. "(*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment*, *Appendix B Memorandum*, *Subject: Idaho-Maryland Mine-Health Effects from Criteria Air Pollutants*, *pg 10*, *2021*)

"A dispersion modeling analysis was conducted for DPM emitted from diesel vehicles and off-road equipment, blasting emissions, as well as for TACs from fugitive dust sources on the proposed project site for the HRA to assess the health risk impacts of the project's construction and operation on proximate off-site sensitive receptors." (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment*, *Appendix B*, *pg 8*, *2021*) "The cancer risk calculations were performed by multiplying the predicted dispersion modeled output data by the TAC emissions and the appropriate risk values…The noncancer health impact of an inhaled TAC is measured by the hazard quotient, which is the ratio of the ambient concentration of a TAC in units of µg/m3 divided by the reference exposure level (REL), also in units of µg/m3." (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment*, *Appendix B*, *pg 4*, *2021*)

"For evaluating health risk, the HRA was based on the assumption that exposure from construction and operational TAC emissions would generally occur up to 20 hours per day, 7 days per week for construction and up to 24 hours per day, 7 days per week, for 30 years for operation. This is consistent with OEHHA's guidance for performing operational HRAs.1" *(Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment*, *Appendix B*, *pg 1*, *2021)*

The Idaho-Maryland Mine Project permit is for 80 years, almost three times the 30 years of exposure used in the health risk assessment.

WHAT WILL BE THE IMPACT ON HEALTH AFTER THOSE 30 YEARS OF EXPOSURE AND BEYOND?

This critique will examine input data points used in the AERMOD dispersion model whose output data then predicts the health risk impacts to the community from exposure to toxic air contaminants.

AERMOD MODEL

Regarding the selected dispersion model and its inputs is the statement -"Principal parameters of AERMOD for the project operations included the following:

- Dispersion Model
- Meteorological Data
- Urban and Rural Options
- Terrain Characteristics
- Sensitive Receptors
- Source Release Scenario
- Buildings" (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, pp 8-12, 2021*)

Several of these principal parameters require additional scrutiny with regards to the actual inputs used in the model and their applicability to the Grass Valley community in terms of future health risks.

Air pollutant dispersal is dependent on several factors: wind speed, wind direction, atmospheric stability and topography. (Transport and Dispersion of Air Pollution, Chapter 3, www.3epa.gov)

Atmospheric stability is dependent on the forces that relate to the vertical movement of air such as air density, air pressure, temperature and relative humidity. These forces dynamically interact on a constant basis to affect turbulence and the subsequent dispersal patterns of pollutants. It becomes critical to obtain the most accurate meteorological data available for input into these models which then estimate the health risks for cancer along with acute and long-term illness from exposures.

METEOROLOGICAL DATA

From the EPA Support Center for Regulatory Atmospheric Modeling (SCRAM) Air Modeling-Observational Meteorological Data: "Observed meteorological data for use in air quality modeling consist of physical parameters that are measured directly by instrumentation and include temperature, dew point, wind direction, wind speed, cloud cover, cloud layer(s), ceiling height, visibility, current weather, and precipitation amounts. These data are used in air quality models to capture the atmospheric conditions occurring at a source and/or receptor location, and therefore, play an important role as they effect the concentration of pollutants at receptors of interest." (www.epa.gov/scram/air-modeling-observational-meteorological-data, retrieved 1.27.2022)

The HRA states: "The nearest stations with processed meteorological data for use in AERMOD are Blue Canyon (17 miles away), Auburn (18 miles away) and Beale (22 miles away). The predominant wind direction at the project site is from the North-East and South-West direction (Meteoblue 2020). The Blue Canyon met station has a predominant wind direction from the North-East and South; the Auburn met station from the East; and the Beale station from the South-East and North-West (CARB 2020)." (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, pg 12*)

"Blue Canyon was selected since it is the closest station and is the most representative of the project site. "(*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk*

Assessment, Appendix B, pg 12, 2021) There are multiple reasons why Blue Canyon is NOT representative of the project site in terms of meteorological conditions.

Blue Canyon is in the Sierra Nevada Mountains at an elevation of 4695 ft. This elevation creates a very different climate and weather patterns than what Grass Valley experiences in the foothills at an elevation of 2411 ft. Simply changing the terrain elevation data input does NOT correct for the differences in air density, air pressure, solar heating and dry/wet adiabetic lapse rates that result from the significant disparities between Grass Valley and Blue Canyon meteorological conditions.

The website, MeteoBlue states: "Climate Grass Valley 39.22°N 121.06°W The meteoblue climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth. They give good indications of typical climate patterns and expected conditions (temperature, precipitation, sunshine and wind). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornados."(Meteoblue. 2020. Climate Grass Valley. (Accessed September 2020. https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/grass-valley_united-states-of-america_5353775.)

NOTE: 30 km=18.641 miles The MeteoBlue site is not specific to Grass Valley with a spatial resolution of 30 km. A comparison of downloads in Meteoblue from both locations, Blue Canyon and Grass Valley, shows identical graphic measurements for ALL parameters:

- Average temperatures and precipitation
- Cloudy, sunny and precipitation days
- Maximum temperatures
- Precipitation amounts
- Wind speed
- Wind rose

Because of the 30 km resolution, Meteoblue makes zero distinction between Grass Valley and Blue Canyon weather patterns.

In the Air Quality Report, the consultant utilizes multiple quotes from various county documents, agencies and websites to substantiate his climate and weather claims. For the sake of argument, this critique uses data downloaded from WeatherSpark.com to compare Grass Valley to Blue Canyon meteorology. This website uses the same databases to compare the two locations.

The data for Grass Valley CA is based on a statistical analysis of historical hourly weather reports and model reconstructions from January 1, 1980 to December 31, 2016 (36 years total). The stations contributing to this reconstruction are: Nevada County Air Park (/y/149703/Average-Weather-at-Nevada-County-Air-Park-California-United-States-Year-Round) (67%, 5.0 kilometers, east); Auburn Municipal Airport (/y/145263/Average-Weather-at-Auburn-Municipal-Airport-California-United-States-Year-Round) (24%, 29 kilometers, south); and Beale Air Force Base (/y/145271/Average-Weather-at-Beale-Air-Force-Base-California-United-States-Year-Round) (9%, 33 kilometers, west).

The WeatherSpark data source for Blue Canyon illustrates the typical weather at Blue Canyon-Nyack Airport, based on a statistical analysis of historical hourly weather reports and model reconstructions from January 1, 1980 to December 31, 2016.

OTHER DATABASE COMMONALITIES FOR WEATHERSPARK

All data relating to the Sun's position (e.g., sunrise and sunset) are computed using astronomical formulas from the book, Astronomical Algorithms 2nd Edition (https://www.amazon.com/Astronomical-Algorithms-Jean-Meeus/dp/0943396611), by Jean Meeus.

All other weather data, including cloud cover, precipitation, wind speed and direction, and solar flux, come from NASA's MERRA-2 Modern-Era Retrospective Analysis. This reanalysis combines a variety of wide-area measurements in a state of-the-art global meteorological model to reconstruct the hourly history of weather throughout the world on a 50-kilometer grid.

Land Use data comes from the Global Land Cover SHARE database, published by the Food and Agriculture Organization of the United Nations.

Elevation data comes from the Shuttle Radar Topography Mission (SRTM), published by NASA's Jet Propulsion Laboratory.

Names, locations, and time zones of places and some airports come from the GeoNames Geographical Database.

Time zones for airports and weather stations are provided by AskGeo.com.

Maps are © Esri, with data from National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, and iPC

THE NEVADA COUNTY AIR PARK REFERENCED AS THE WEATHERSPARK SOURCE IS 4000 FEET NE OF THE BRUNSWICK SITE AS THE CROW FLIES.

GRASS VALLEY

There is an average 10°F higher temperature differential every month of the year in Grass Valley. This conclusion has been verified on WeatherSpark and the Western Regional Climate Center databases. For example, the hot season lasts for 3.1 months in Grass Valley, from June 15 to September 18, with an average daily high temperature above 81° F. In Blue Canyon there is no hot season. The warm season there lasts for 2.9 months, from June 20 to September 18, with an average daily high temperature above 72°F. Average hourly temperatures also vary dramatically between the two locations.

Regarding precipitation: annually Grass Valley receives 53.2 inches rainfall vs 67.5 in Blue Canyon; and annually Grass Valley receives 8.4 inches snowfall vs 240.40 inches snowfall in Blue Canyon.

Wind directions also display wide variances between the two locations. This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

The average hourly wind speed in Grass Valley does not vary significantly over the course of the year, remaining within 0.5 miles per hour of 5.7 miles per hour throughout.

The predominant average hourly wind direction in Grass Valley varies throughout the year. The wind is most often from the south for 7.4 months, from February 10 to September 21, with a peak percentage of 55% on August 11. The wind is most often from the east for 4.6 months, from September 21 to February 10, with a peak percentage

of 49% on January 1. (https://weatherspark.com/y/1178/Average-Weather-in-Grass-Valley-California-United-States-Year-Round)

BLUE CANYON

In Blue Canyon, the average hourly wind speed at Blue Canyon-Nyack Airport experiences *mild* seasonal variation over the course of the year.

The *windier* part of the year lasts for *4.3 months*, from *November 19* to *March 30*, with average wind speeds of more than *5.2 miles per hour*. The *windiest* month of the year at Blue Canyon-Nyack Airport is *December*, with an average hourly wind speed of *5.7 miles per hour*.

The *calmer* time of year lasts for *7.7 months*, from *March 30* to *November 19*. The *calmest* month of the year at Blue Canyon-Nyack Airport is *May*, with an average hourly wind speed of *4.8 miles per hour*.

The wind is most often from the south for 3.7 months, from January 31 to May 21; for 3.4 weeks, from August 18 to September 11; and for 1.1 months, from November 3 to December 7, with a peak percentage of 48% on March 2. The wind is most often from the west for 2.9 months, from May 21 to August 18, with a peak percentage of 41% on July 18. The wind is most often from the east for 1.7 months, from September 11 to November 3 and for 1.8 months, from December 7 to January 31, with a peak percentage of 41% on October 20. (weatherspark.com/y/145297/Average-Weather-at-Blue-Canyon-Nyack-Airport-California-United-States-Year-Round#)

The Brunswick Industrial site is located just southeast of Grass Valley. This means that the winds will transport all pollutants to the north and west toward the Brunswick Basin and downtown.

It is interesting to note that in Blue Canyon, the wind is blowing east during the hottest part of the year, May 21 to August 18. This input into AERMOD would not correlate with Grass Valley wind data under any circumstances.

These differences in weather variables must be taken into account during HRA modeling since the project will be located in Grass Valley not in Blue Canyon. Using Blue Canyon meteorological data is NOT representative of Grass Valley.

The meteorological input data, AERMET, is designed to accept data from any of the following sources: 1) standard hourly National Weather Service (NWS) data from the most representative site; 2) morning soundings of winds, temperature, and dew point from the nearest upper air station; and 3) on-site wind, temperature, turbulence, pressure and radiation measurements. AERMET can process commercially available or custom on-site meteorological data. (www.weblakes.com/guides/aermod/section8/8_1

SHOULDN'T METEOROLOGICAL DATA MORE REPRESENTATIVE OF GRASS VALLEY BE USED FOR THE HEALTH RISK ASSESSMENT?

WINDBORNE PARTICULATE MATTER

The following tables are based on Stoke's Law for Fluid Particle Forces and EPA Inhalable Dust definitions and calculations:

Table 1: 10-micron particle

Wind Speed (mph)	Distance Traveled (miles)
3.1	0.55
6.2	1.1
12.4	2.3
24.8	4.6
37.3	6.9
49.7	9.2

Table 2 : 5-micron particle

Wind Speed (mph)	Distance Traveled (miles)
3.1	2.2
6.2	4.5
12.4	9
24.8	18
37.3	27
49.7	36.1

(http://toxsci.oxfordjournals.org/content/65/1/7.full (including impacts/effects of airborne sulfur (SO2) and silica particulates/particles)

The average wind speed in Grass Valley is 5.7 mph. The Brunswick Site is located 2 miles from downtown Grass Valley. As evidenced above, the smaller the particle, the greater the distance travelled. Grass Valley currently monitors PM 2.5 at the Litton Building. Nevada County is currently classified as nonattainment status for PM10.

The International Agency for Research on Cancer of the World Health Organization has classified PM2.5 as a human carcinogen (*IARC: Outdoor Air Pollution a Leading Environmental Cause of Cancer Deaths; Technical Report; International Agency for Research on Cancer (IARC): Lyon, French,27 2013)*

On September 22, 2021 the World Health Organization revised air quality guidelines decreasing criteria air pollutants, especially the recommended exposure levels for PM10 and PM2.5. (https://www.iqair.com/us/blog/air-quality/2021-WHO-air-quality-guidelines

Has a baseline scenario for Grass Valley PM2.5 emissions or PM10 emissions been created since Nevada County is in nonattainment status for PM10? Were background PM2.5 concentrations from long range sources added to the HRA model?

A baseline concentration must be established in order to measure the TRUE impact from the addition of this project to existing air quality and the cumulative impacts on community health.

DPM, silica and asbestos fugitive dust will be emitted under two different categories: criteria air pollutants and as Toxic Air Contaminants. Yet in each situation, their health impacts to the community will be minimized.

As a criteria air pollutant, emission levels are not related to the immediate geographical area: “Notably, as detailed in Appendix C, there are numerous scientific and technological complexities associated with correlating criteria air pollutant emissions from an individual project to specific health effects or potential additional nonattainment days, such as the disconnect between mass emissions and concentrations due to secondary pollutant (such as O3) generation and pollutant transport, as well as the inaccuracy of applying regional and population-wide models to a local level in order to estimate health effects, and there are currently no modeling tools endorsed by an expert agency (i.e. NSAMQD) that could provide reliable and meaningful additional information regarding health effects from criteria air pollutant generated by individual projects.” *(Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project, pg 46, 2021)*

As a toxic air contaminant, asbestos and respirable crystalline silica will fall under the non-criteria air pollutant category. There are no established limits for monitoring emissions of non-criteria pollutants into the ambient

environment. The HRA is based on 30 years of exposure, thus the cumulative effects of the 80-year permit are not addressed.

HOW WILL THE RELEASE OF THESE TOXIC MICROSCOPIC PARTICULATES TO THE AMBIENT ENVIROMENT BE MONITORED?

SENSITIVE RECEPTORS

When listing *Receptors Used for Evaluating Modeled Impacts* are the following statements: "There are existing residences in all directions of the project site, with the nearest located north of East Bennett Road at approximately 100 feet from the project boundary. The nearest hospitals and schools to the project sites are the Sierra Nevada Memorial Hospital on Glasson Way (approximately 1800 feet north of the Centennial Industrial Site) and the Montessori House of Children on The Burma Road (approximately 2,500 feet south of the Brunswick Industrial Site boundary). However, residential receptors are the most conservative to evaluate as discussed further in Section 4.3." (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, pg 7, 2021*)

What about the impacts to the following receptors?

The Durham School Bus Depot is located 1.74 Miles west of the Brunswick Industrial Site on Bennett Road. These buses transport our children throughout the county. Will we be delivering asbestos and silica dust along with the children?

Within a 2-mile arc north of the Brunswick Industrial Site are 5 Skilled Nursing Facilities (Golden Empire, Wolf Creek, Atria Memory Care, Spring Hill Manor, and Crystal Ridge), at least 6 Assisted Living Facilities, 10 low-income housing apartment complexes, Hospitality House and Brunswick Commons housing for the homeless. All supportive services are located here as well: Pride Industries, FREED, Alta Regional Center, DaVita Dialysis, Nevada County Public Health offices and Connecting Point. Chapa-De Indian Health and multiple physicians' offices serving Medi-Cal patients are located here too.

According to the 2020 US census, 28.6% of Nevada County is 65 years or older as compared to the statewide rate of 14.3% for that population. Under age 65, the disability rate is 14.4% and 32.4% of the population have Medicaid coverage. The mortality rate from Chronic Lung Disease is double the state wide rates (69.26 deaths/100,000 people vs 34.92/100,000). There are also elevated rates for Heart Disease Mortality, Hypertension Mortality, Stroke Mortality and All-Cause Cancer Mortality vs state wide rates.

The demographics of our community must be considered in the context of this project. We already have elevated baselines for high levels of the criteria air pollutants ozone and particulate matter, radon, aging population, chronic disease, and poverty.

WILL THE COUNTY'S EXISTING BASELINES BE TAKEN INTO ACCOUNT?

SOURCE RELEASE SCENARIO

Table 2. Emission Source Parameters

DIESEL FUEL

These parameters are used to input data into the AERMOD dispersion model. On Page 10 of the HRA, the generators are listed at a Base Elevation of 2,748.39 m. This calculates to a height of 9017 feet. The Brunswick

Diesel Storage Tank is listed at a Base Elevation of 2,757.74 m which equals a height of 9048 feet and the Centennial Diesel Storage Tank is listed with a Base Elevation of 2,491.44 m which equals 8174 feet. These measurements are used to estimate carcinogenic volatile organic compound emissions from breathing and working losses from storage tanks which include benzene, hexane, toluene and 2,2,4-trimethylpentane. *Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, Pg 23, 2021*)

All data entry inputs should be verified in AERMOD model due to these errors, especially units of measure, which may be affected for other source parameters (i.e. plume height/plume width of 25/25 meters for line sources).

Diesel fuel combustion from generator use will exhaust gases and DPM. These estimated emissions have been included for only 100 hours per year during testing/maintenance. Any emissions from actual use have been categorized as speculative. During a Public Safety Power Shutoff (PSPS), it is anticipated that 15,000 gallons of diesel fuel combustion per day will be required to maintain mining operations.

Will diesel fuel consumption be monitored? Will there be any provisions to mitigate the impacts from PSPS generator use contributing to increased criteria air pollutants, GHGs and DPM emissions affecting the community and environment?

Will there be any penalties if Tier 4 Final engines are not used exclusively due to “commercially available” status exemptions?

FUGITIVE DUST

SILICA

Silica will be released from on-road vehicles, underground blasting and crushing, ore processing along with earthwork and material handling.

All of the consultants have stated in their reports that they are using information provided by Rise to generate their conclusions. A prime example is the silica emissions. The following table shows the anticipated rock types and amounts expected to be mined:

Rock Type	Percent of Total
Meta-Andesite	96%
Altered Meta-Andesite	2%
Diabase	1%
Serpentinite	1%

This chart represents the anticipated barren rock ratios to be mined, approximately 500 tons per day. It does not account for the 1000 tons of mineralized ore rock to be mined each day. (*Groundwater Hydrology and Water Quality Analysis, EMKO, pg 93)*

“The applicant estimates that the ore processed would be quartz veins hosted primarily within andesite rock and an assumed 60% silica content.”(*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, pg 35, 2021)*

Regarding rock composition, this is meta-andesite rock 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)*

The laboratory that Rise used for all metals analyses, ACZ Laboratories, is certified to perform both silica and silicon dioxide tests yet not a single sample was analyzed for this parameter. *(ACZ Analytical Capabilities 2017).*

The engineering firm, NV5, stated in the *Centennial Geotechnical Report* (pg 12) that: "We understand that the sand tailings will likely have a gradation similar to the historical gradation presented in the table below, and will typically have a large proportion of quartz."

Mesh Size	Particle Size (mm)	Particle Size (micron)	Percent Passing	Description
48	0.300	300	97.7	Medium Sand
65	0.212	212	87.5	Fine Sand
100	0.150	150	63.9	Fine Sand
200	0.075	75	32.3	Silt
325	0.044	44	12.1	Silt

Quartz is 100% silicon dioxide AND "1000 tons of ore" rock will be processed into tailings each and every day, *Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix, B pg 21, 2021*).

These tailings will contain respirable crystalline silica, a toxic air contaminant. Rise has assumed that the ore rock is 98% andesite with a silica content of 60%. There is no data to substantiate this assumption. Minimizing the levels of this TAC to be generated from the excavation of material and milling of quartz greatly diminishes its' impact in the HRA considering the vast amounts, 1500 tons of barren and ore rock, to be mined each day.

HOW WILL THE COMMUNITY PROTECT ITSELF FROM UNKNOWN QUANTITIES OF SILICA?

ASBESTOS

Asbestos will be released from on-road vehicles, during underground blasting and crushing, ore processing and along with earthwork and material handling.

The rock composition chart above lists total serpentinite mined at 1% yet the *Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Earthwork and Material Handling Fugitive Dust: Construction Activity Fugitive Dust* assumes *Serpentinite Content of Mine Fill* at 14.3%. Based on the given information, daily mine fill content is composed of 500 tons of tailings and 500 tons of barren rock at 1% serpentinite.

With these ratios, how can engineered fill contain 14.3% serpentinite?

Rise has developed an Asbestos, Serpentinite and Ultramafic Rock management plan with the goal of minimizing asbestos release. A 90-day rolling inventory will be maintained in an effort to prevent asbestos contaminated material from being used as aggregate and engineered fill. A three-grab composite sample will be obtained for every 1000 tons mined. The sampling point is located mid drop in the silo. Inventory material will then be screened using Polarized Light Microscopy (PLM), followed by Transmission Electron Microscopy (TEM) testing with results to be mathematically converted to Phase Contrast Microscopy (PCM) equivalent units. These tests are not comparable since they utilize different preparatory methods, sample amounts and microscopy techniques. The detection limit for PLM testing is 0.25% and the detection limit for TEM testing is 0.001%. Conversion of TEM to PCM equivalent units yields a detection limit of 0.01%.

Under this plan, Rise is using the PCM equivalent units limit of 0.01% to calculate emissions levels for fugitive dust. “A conservative approach for the modelling of TAC emissions is used, with the asbestos content in mined materials assumed at the maximum of 0.01% by mass of PCM equivalent units. The average asbestos content of the mined material is of primary concern since asbestos does not have established acute noncancer effects (OEHHA)”(*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, pg 22, 2021*).

Initial asbestos sampling of 42 samples (*Asbestos Sampling Memo June 2020*) resulted in two samples at 0.075% and 2.5% by PLM analysis along with two samples at 2.0% and 3.1% by TEM analysis. The remaining 38 samples were non-detect (<0.25%) by PLM. Re-testing of these PLM samples by TEM yielded 6 samples with results greater than the PCM equivalent units detection limit of 0.01% in addition to the original 2 TEM samples that were not re-tested. Thus, **twenty percent** of the samples had asbestos levels greater than 0.01% PCM equivalent units.

Excluding the two grab tailings samples from Centennial and the two blanks, the average overall length of a sample core tested for asbestos was 5.34 inches. 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-19-13A, 8 samples from I-19-14 and 4 samples from I-19-14A. Drilling was stopped when asbestos was detected. Drill logs are not available, no information available as to quantity, location, depth, etc. These cores appear to be in close proximity to each other as viewed on geological maps (*Asbestos Sampling Memo June 2020 pp 11-13*).

DEIR pg 3-20: “The ASUR plan incorporates routine asbestos testing by Transmission Electron Microscopy (TEM) and an Asbestos Inventory to ensure that average mined material and engineered fill contains less than 0.01% asbestos by mass of Phase Contrast Microscopy (PCM) equivalent units.”

Just because Rise believes that they will be able to control the distribution of material to 0.01% asbestos content does NOT mean that they can control the amount of asbestos in the actual mined material. The content of asbestos in the serpentinite is unknown until tested-this requires blasting, excavation, crushing, skipping, conveyance to the surface, deposition and storage to then be followed by testing. Ventilation from the mine during these underground processes will emit asbestos to the ambient environment. This quantity of asbestos emissions is unknown and CANNOT be assumed to be only 0.01%.

The ASUR Plan dictates the use of water curtains and an auxiliary fan system when mining serpentinite material. According to Rise, this system uses MERV 16 filters that will trap particles to 0.03 microns reducing asbestos fibers by 95% before the fibers enter the main ventilation system. How much asbestos will be in the remaining 5% if the initial asbestos content of the rock is unknown along with the unknown quantities of rock mined?

Maintenance of the 0.01% inventory will not be attemptable until AFTER the material is mined, brought to the surface and tested twice- requiring up to two weeks before the results are known.

These asbestos emissions are not accounted for in fugitive dust estimations.

In 1986, asbestos was identified by the Board (CARB) as a toxic air contaminant: the Board also determined that there is not enough scientific evidence to identify an asbestos threshold level below which no significant adverse health effects are anticipated (17 CCR 93000). *(Implementation Guidance Document 2017, CARB pg 1*)

The World Health Organization (WHO) concurs that there is no safe level of asbestos exposure. Any asbestos released to the ambient environment will create chronic exposure risk for the community since asbestos does not readily degrade. Protecting mine workers from acute exposure when mining material “rich in asbestos” does not equate to the same level of community protection. Under these circumstances, miners will work a short-shift, wear respirators, be monitored for exposure, and decontaminate themselves before going home. They have the freedom of choice to work in that environment, financial compensation, training in exposure control and health care benefits. The community has none of these protections.

By using the detection level of 0.01% mass by PCM equivalent units to calculate emissions used in the HRA, the levels of this TAC have been grossly underestimated.

HOW WILL THE COMMUNITY PROTECT ITSELF FROM UNKNOWN QUANTITIES OF ASBESTOS?

HEAVY METALS

"Blasting and crushing would also result in emissions of dust with trace heavy metals TACs including arsenic, beryllium, cadmium, copper, lead, manganese, mercury, nickel, selenium, and vanadium. Concentrations of each heavy metal within the barren rock and mineralized rock was taken from Table 4-7 of the *Groundwater Hydrology and Water Quality Analysis Report for the Idaho-Maryland Mine Project* (EMKO Environmental, Inc. 2020)"

Heavy metals will be released: from off-road equipment, on-road vehicles, during underground blasting and crushing, ore processing along with earthwork and material handling-all phases of operations.

The data used for heavy metal toxic air contaminants in the Health Risk Assessment are all notated by the laboratory as being received and tested beyond the EPA recommended hold times of 28 days for mercury and 6 months for all remaining metals. Exploratory drilling began in 2017. Since the drill logs are unavailable, the exact sample dates for each core are unknown, but all samples were submitted and received by the gold assay laboratory on February 20, 2019. (*Appendices: Groundwater Hydrology and Water Quality Analysis EMKO, pp 515-516*) and (Appendices: *Groundwater, Hydrology and Water Quality Analysis Report: Inorganic Extended Qualifier Reports pp. 389-407 and 458-484)*

After assays were performed, samples were then submitted to ACZ Laboratories for metal analyses. It is not clear where the samples were located between the assay lab, ALS Laboratories in Reno, Nevada and submission to ACZ Laboratories in Steamboat Springs, Colorado. The Chain of Custodies describe these 47 samples as Tailings (assay pulp). All list a sample date of 3/5/19:12:00 pm. Under the Sampler's Name were the initials, BM (Ben Mosssman?) Ben Mossman and Andrew Kopania of EMKO both received copies of the laboratory reports as listed on the CoCs. The laboratory received by date for all samples is 11.11.2019. Twenty samples were digested on 11.22.2019 and the remaining twenty-seven samples were digested on 11.26.2019. (The digestion dates would be used for endpoint hold time calculations).

These samples may have been collected at that time but they were NOT sampled at that time. These metals analyses were performed in November 2019 in two batches. This means that all samples were tested at least 9 months beyond their hold time expiration date, probably more.

Potentially toxic elements (PTEs) hosted in asbestos elongate mineral particles is one of the factors that determines their toxic/pathogenic effects. Metals such as Fe, Mn, Cr, and Be are known to induce toxicity and contribute to asbestos related diseases. "…it is essential to quantify the toxic elements present in asbestos elongate mineral particles in order to prevent asbestos-related diseases." (https://doi.org/10.1016/j.chemgeo.2020.119896Get rights and content)

SHOULDN'T VALID DATA BE USED WHEN EVAUATING THE HEALTH RISKS TO THE COMMUNITY FROM THESE TOXIC AIR CONTAMINANTS, ESPECAILLY WHEN THESE METALS HAVE THE ABILITY TO POTENTIATE THE EFFECTS OF ASBESTOS?

CONCLUSION

"Based on the PM10 emissions estimated, emissions of asbestos, silica, and heavy metals were estimated for the purposes of this HRA." (*Air Quality and Greenhouse Gas Emissions Analysis Report for the Idaho-Maryland Mine Project: Health Risk Assessment, Appendix B, Pg 22)*

Estimations of estimates…estimates of estimations

IS THERE ANY VALIDITY IN ANY OF THESE ASSUMPTIONS, ESTIMATIONS OR DATA REGARDING THE EMISSIONS OF SILICA, ASBESTOS, HEAVY METALS OR DPM?

IS THERE ANY VALIDITY TO THIS HEALTH RISK ASSESSMENT OF OUR COMMUNITY?

Thank you,

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