Addendum to

Compiled Responses to Public Comments Regarding the Permit Applications and Related Regulatory and Administrative Concerns about the Proposed Back Forty Mine Project

Permit Application Review and Public Participation Process

Aquila Resources Inc. (Aquila) is proposing to develop an open pit gold, zinc, and copper mine and processing facility in Lake Township, Menominee County, Michigan. The prosed project requires several permits from the Michigan Department of Environmental Quality (MDEQ).

Aquila has applied to the MDEQ for:

- **Air Use Permit** – The proposed mine and mill operation requires a permit for new sources of air emissions under Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The proposed mine and ore beneficiation and processing facility must meet state and federal air quality requirements. The draft permit conditions include emission restrictions and operational requirements.

- **National Pollutant Discharge Elimination System Permit (NPDES)** – The proposed mill operation requires a permit to discharge to surface waters of the state under Part 31, Water Resources Protection, of the NREPA. The permit contains conditions and requirements to assure that all water quality standards will be met and the designated uses of the receiving waters will be protected.

- **Nonferrous Metallic Mineral Mining Permit** – The proposed mine and mill operation requires a Mining Permit under Part 632, Nonferrous Metallic Mineral Mining, of the NREPA. That permit includes financial assurance, to conduct mining and milling operations. The draft permit specifies conditions to assure the mine and milling operation meets the requirements of the law and will protect natural resources, the environment, and public health.

A fourth permit application, for impacts to wetlands, will be considered by the MDEQ in a separate review process.

The MDEQ formed a multi-discipline/multi-agency Mining Team (MT) to review the Mining Permit application. The MT consisted of technical experts from the MDEQ, the Department of Natural Resources (MDNR), and the Michigan State Historic Preservation Office (SHPO). Collectively, the MT members have the requisite background and expertise in geochemistry of ores and sulfide minerals, water chemistry, containment and monitoring of waste materials, air and water monitoring, financial assurance, soil erosion, mine reclamation, fish and wildlife habitat and protection, endangered species, wetlands, and other pertinent areas.

The MDEQ held a public meeting on the Mining Permit application on January 5, 2016. The MDEQ received public comments at the public meeting, and accepted written comments throughout the review process. The MT submitted a request to Aquila for additional information regarding the application on May 9, 2016. The request incorporated pertinent public comments that had been received as well as questions arising from the MT's independent evaluation. Part 632 required the MDEQ to make a proposed decision by March 15, 2016, taking into account a 14 day extension of the comment period as requested by the public. However, Aquila agreed to extend the time line for a proposed decision three times to allow time for the MDEQ to

coordinate the technical reviews of all NREPA permit applications for the project, complete the review of supplemental information to the Mine Permit Application submitted by Aquila on June 5, 2016, and coordinate a consolidated hearing for all NREPA permit decisions.

The MDEQ held a public participation process on their proposed conditional approval of the three permits. Copies of the Notice of Public Hearing, the Public Hearing Process, the Proposed Decision on the Part 632 Permit, Draft Permit Conditions, fact sheets and the draft terms and conditions for the Air Use Permit to Install, and fact sheets and the draft terms and conditions for the NPDES Permit, were provided for public review and placed on the Internet on MDEQ Web site pages.

Notices announcing the consolidated public comment period and hearing were placed in the Eagle Herald and the Menominee County Journal. Each notice provided pertinent information regarding the proposed action; the locations of available information; a telephone number to request additional information; the date, time, and location of the public hearing; the closing date of the public comment period; and the address where written comments were being received.

The MDEQ held the public hearing at Stephenson High School gymnasium, W526 Division Street, Stephenson, Michigan 49887 on October 6, 2016, from 6:00 P.M. to 10:00 P.M. CST to accept public comment on the proposed decision.

The following comments and responses were inadvertently omitted from the original compiled Responses to Public Comments

Additional Response to Comments

199. **Comment:** The draft permit requires the permittee to maintain the air pressure within EUHGRETORT lower than the press room air pressure so that air flows into EUHGRETORT at all times when EUHGRETORT is operating. However, there is no associated monitoring or recordkeeping requirement which requires the permittee to measure the air pressure within the EUHGRETORT.
Response: The permit has been modified to include requirements to monitor and record the difference between the air pressure inside EUHGRETORT and the air pressure in the press room. Please see Special Condition numbers IV.6 and VI.6 of EUHGRETORT.

200. **Comment:** The draft permit has a limit for mercury for EUHGRETORT but does not provide any test method or time period for this permit limit. In addition, the 99.5percent control efficiency for the condenser and the 99.99 percent control efficiency for the carbon adsorption are optimistic. Stack testing should be required to demonstrate the control efficiency is accurate.
Response: After further review, the AQD has determined that the mercury emission limit proposed in the draft permit would likely be below the detection level for mercury testing methods and compliance with the limit may not be able to be determined through emission testing. Therefore, the mercury emission limit has been removed. In addition, the requirement to check the carbon mercury level and replace the carbon when the mercury level reaches 90 percent or more of its design capacity has been removed.

In place of the emission limit, emission testing, and the check of the carbon mercury level, the AQD added a requirement, with associated recordkeeping, to monitor the mercury concentration in the activated carbon exhaust on a monthly basis and to replace the carbon if the mercury concentration is 0.01 mg/m^3 or greater. Also, the permit now requires two activated carbon beds in series, rather than a single activated carbon bed to ensure the mercury emissions are adequately controlled. Please see Special Condition numbers IV.2, V.1, VI.7, and VI.8 of EUHGRETORT.

201. **Comment:** The draft permit requires the use of a wet scrubber system for the pollution control equipment for EUREFINEFURNACE. However, the permit does not specify the efficiency at which the wet scrubber must operate. MDEQ should include a minimum control efficiency of 95 percent for the wet scrubber as an enforceable condition. The pressure drop and liquid flow rate should be set and maintained at a level which will achieve at least 95 percent control efficiency and these parameters should be part of the applicable MAP.
Response: Special Condition III.2 of EUREFINEFURNACE was modified to require the scrubber to maintain a minimum particulate matter control efficiency of 95 percent and maintain the pressure drop and liquid flow rate in the ranges that will achieve a minimum control efficiency of 95 percent, as specified in the MAP.

202. **Comment:** The units FG1STCRUSHER and EU3DECKSCREEN, EU2NDCRUSHER, EU3RDCRUSHER, EUSPTRANSFERPTS, require the installation and use of baghouses DC-01 and DC-02 for the control of particulate matter. The draft permit requires the use of a pressure drop monitor for the satisfactory use of the baghouses. EPA believes that a pressure drop monitoring system is not sufficient to assure compliance and demonstrate that the baghouses are being operated in a satisfactory manner. MDEQ should require the use of additional monitoring systems, such as bag leak detection, to adequately demonstrate that the baghouses are being maintained and operated in a satisfactory manner.

Response: Monitoring pressure drop of properly maintained baghouses can be sufficient to assure that the baghouse is operating in a satisfactory manner. The malfunction abatement plan (MAP) condition has been modified to specifically address baghouse inspections, maintenance, and pressure drop. In addition, the permit has been modified to require weekly visible emission readings of baghouse exhaust stacks to ensure the baghouses are operating properly. Please see Special Condition number III.1 of FGFACILITY and Special Condition numbers VI.4 and VI.5 of FG1STCRUSHER and FG2AND3CRUSH.

203. **Comment:** The draft permit requires the permittee to maintain the moisture content of the concentrate at approximately 10 percent or higher. The draft permit does not specify the method the permittee shall use in demonstrating that the moisture content is at least 10 percent. MDEQ should include a condition which requires the permittee to test the moisture content of the concentrate at points that are most susceptible to creating fugitive emissions, with sampling done not more than a few inches below the top surface of the concentrate pile to be tested.

Response: The permit has been modified to include a requirement to determine the moisture content of the concentrate, at least once each day that concentrate is loaded into trucks, before the concentrate is loaded into trucks. Note that all concentrate handling occurs within enclosed buildings, which will minimize the emissions to the ambient air from concentrate handling. Please see Special Condition number V.2 of FGCONC.

204. **Comment:** Appendix A of the draft permit contains the Fugitive Dust Control Plan (plan) that specifies the procedures and practices the permittee must use to minimize and eliminate fugitive dust at the site. EPA has the following concerns with the plan elements:

(a) The plan establishes speed limits for haul roads at 15 miles per hour and 20 miles per hour for service roads outside of the haul roads areas. The plan does not provide any practical enforceable methods to determine if the drivers of the trucks are staying below the posted speed limits. MDEQ should include provisions, such as speed detection systems to accurately know the speed limits are being followed.

(b) The plan requires that a dust suppressant be applied to the haul and service roads. The plan does not address the roadway just outside of the mine site. The plan should include a requirement that the public roadways immediately outside of the facility be observed on a routine basis to determine if they require watering, sweeping, or the application of a dust suppressant due to truck traffic from the site as necessary.

(c) The plan requires the use of concrete barriers around ore storage piles. The plan should require that the storage piles should be loaded at a maximum level which would not exceed the height of the concrete barriers. Additionally, ore in the haul trucks should be loaded as to not exceed the top of the truck bed side walls in order to minimize fugitive dust.

Response:

(a) The permit has been modified to include a requirement to install speed limit signs on the facility roadways reflecting the speed limits specified in the Fugitive Dust Control Plan. A speed detection system is not necessary as the majority of the trucks travelling within the facility will be ore haul trucks. These very large trucks are not capable of exceeding the proposed speed limits.

(b) The concentrate haul trucks, which are the primary traffic into and out of the facility, must be washed before leaving the concentrate building. All vehicles that have been in areas where they may come into contact with ore or concentrate must go through a wheel wash before leaving the facility. In addition, roadways, parking lots, and truck staging areas routinely travelled by concentrate haul trucks and delivery trucks are required to be paved. Therefore, the potential for material to be tracked out of the facility onto public roads is minimal and evaluating roadways outside the facility is not necessary.

(c) The storage piles addressed in the comment are temporary piles used to blend the ore before transferring it to the crusher building. The plan calls for use of water sprays to wet the ore in the storage piles to reduce fugitive emissions. Given the temporary nature of the storage piles and the use of water sprays, requiring the storage piles to not exceed the height of the concrete barriers is not necessary to minimize fugitive dust emissions.

The ore haul trucks to be used in the facility are designed to be loaded such that the load exceeds the bed side walls. However, the ore is not expected to contain very much fine material. The blasting will break up the ore but not pulverize it, so minimal fugitive dust is anticipated from the ore in the haul trucks.

In response to this comment, a requirement has been added to the permit requiring the concentrate in the trucks be completely covered prior to leaving the building.

205. **Comment:** It has been recommended by others that MDEQ accept the options provided by Aquila for the control of fugitive emissions, such as enclosed covers on conveyors and chutes, conical covers over stockpiles, minimizing drop point from shovel to truck, watering roads, minimizing traffic speeds and maintaining a minimum moisture level in materials during transport, but also with the consideration that these may be the minimum standards applicable. If better control measures exist, MDEQ is urged to require those controls to minimize fugitive particulate emissions to protect human health and the potential deposition of toxic pollutants in the air and on the soils and water.
Response: The various fugitive emission controls required in the permit conditions have been successfully employed in various industries to control fugitive particulate emissions. The conveyors are required to be enclosed on all four sides, rather than just covered, to ensure the fugitive emissions are controlled.

206. **Comment:** A requirement that a staff position be in place specifically to insure daily compliance with pollution control measures on an ongoing basis, particularly for activities such as drop point distance and traffic speeds. Additionally, logbooks that chronicle these routine compliance checks should be kept on site and available for inspections.
Response: The MDEQ cannot require that the facility have a staff person dedicated to ensuring compliance with pollution control measures on an ongoing basis. The Nuisance Management Plan for Fugitive Dust requires the facility to keep records verifying that the pollution control measures are effective.

The facility is subject to un-announced inspections by MDEQ staff. In the event that pollution control measures are not being adequately implemented, the MDEQ can take steps to ensure compliance, including requiring the Nuisance Management Plan for Fugitive Dust to be updated and issuing Violation Notices, if warranted.

207. **Comment:** The air permit should require regular opacity readings to ensure the fugitive dust control measures are effective. Individuals conducting the opacity readings must be fully trained and have current certification in EPA Method 9 smoke school; copies of the certifications should be are kept on file.
Response: The permit has been modified to require visible emission observations for the two baghouse stacks. Visible emission observations can be certified or non-certified. If a certified reader observes visible emissions in excess of the opacity limit or if a non-certified reader observes any visible emissions, corrective actions are required. Records of the observations have to be kept, as well as records of corrective actions.

The Nuisance Management Plan for Fugitive Dust has been modified to require staff to monitor the roadways and each TWRMF for visible emissions. Method 9 certified readings are not required for the roadways and TWRMFs as the visible emissions should be very low. If visible emissions are observed, then this would indicate that application of dust control measures is required. The specific opacity of the visible emissions is less important than the presence of visible emissions.

AQD inspectors are certified in EPA Method 9 and will evaluate compliance with the various visible emission limits when conducting inspections.

208. **Comment:** The air permit does not address what is done with the used charcoal filters from the mercury retort process.
Response: General condition 12 requires collected air contaminant to be disposed of "in a manner so as to minimize the introduction of contaminants to the outer air". This requires the mercury containing activated carbon to be handled in a way that does not result in mercury being emitted from the activated carbon at the facility.

However, once the activated carbon leaves the facility, it is no longer regulated by the AQD unless it is taken to another facility in Michigan that is regulated by the AQD.

In addition, disposal of the activated carbon must be done in accordance with state and federal waste regulations, which are beyond the scope of the air permitting process.

209. **Comment:** Table 5-3 of the application appears to have an error. The SO2 Class II increment on a 3-hour averaging period should be 512 $\mu g/m^3$ rather than 325 $\mu g/m^3$.
Response: The commenter is correct. Table D of the AQD's Fact Sheet for the permit application contains the correct value of 512 $\mu g/m^3$. This error in the application does not affect the AQD's determination that the facility, as presented in the application and described in the permit conditions, is expected to comply with all applicable air quality rules and regulations.

210. **Comment:** A physician commented that a cystic fibrosis (CF) patient under their care would suffer respiratory effects from particulate emissions from the proposed mine. The patient spends extended periods of time on a property next door to the proposed mine site. The commenter provided two research studies that show fine and course particles in the air lead to more lung infections in CF patients (*Effects of Ambient Air Pollution on Pulmonary Exacerbations and Lung Function in Cystic Fibrosis*; Goss C. et al. 2004, in American Journal of Respiratory Critical Care Medicine, Vol. 169, pp 816-821; and, *Impact of Air Pollution on Cystic Fibrosis Pulmonary Exacerbations*; Goeminne P. et al. 2013, in Chest, Vol. 143, Issue 4, April, pp. 946-954).
Response: The MDEQ agrees with the commenter that exposures to increased air concentrations of particulate matter (PM) can cause increases in respiratory symptoms, and that CF patients are particularly at-risk. However, in this particular case, the emissions and impacts are low enough that the public health will be protected even for sensitive individuals.

The MDEQ evaluates the impacts of particulate emissions using the U.S. Environmental Protection Agency (EPA) health protective National Ambient Air Quality Standards (NAAQS) for PM. The NAAQS is specific for two size fractions of PM: PM2.5 (PM with diameter of 2.5 micrometers or less) and PM10 (PM with diameter of 10 micrometers or less). In order to determine compliance with the NAAQS, air dispersion modeling was used to estimate potential impacts from the mine for each particle fraction and averaging time. Background air concentrations were estimated from nearby air monitors. See Table 1 for a summary of PM impacts.

Table 1. Particulate Matter (PM) Air Concentrations

Measurement	24-hour Air Concentration		Annual Air Concentration
	PM2.5 (µg/m³)	PM10 (µg/m³)	PM2.5 (µg/m³)
NAAQS	35*	150**	12***
Modeled Air Concentration from the Facility at the Maximum Impact Point (south of the mine)	3.37	26.68	0.76
Modeled Air Concentration from the Facility, Where the Patient Stays	0.3	3.4	0.06
Background Air Concentration****	18	35	5.3
Total Air Concentration from the Facility, Where the Patient Stays + Background Air Concentration	18.3	38.4	5.36

* 98th percentile, averaged over three years.
** Not to exceed once per year, averaged over 3 years.
*** Annual mean, averaged over three years.
**** PM background air samples collected at Forest County Potawatomi Site (near Crandon, WI) for PM2.5 and Devil's Lake State Park (near Baraboo, WI) for PM10.
Abbreviations: µg/m³ = micrograms per cubic meter. NAAQS = National Ambient Air Quality Standard
Note: PM10 does not have an annual NAAQS.

The NAAQS are designed to provide a level of protection for all people, including sensitive subgroups. All modeled total PM10 and PM2.5 impacts at the maximum point of impact are below the NAAQS, and the impacts decrease rapidly further from the facility. At the place where the patient stays, the PM10 and PM2.5 emitted to the air from the proposed mine has a relatively small impact compared to background levels. For example, the 24-hr average PM2.5 impact where the patient stays is 0.3 µg/m³, which is roughly 2 percent of the 18 µg/m³ background concentration. The 24-hr impact from the proposed mine is roughly 10 percent of the background PM10 level (3.4 µg/m³ vs 35 µg/m³). Finally, the annual PM2.5 impacts were similarly small compared to background (0.06 µg/m³ vs 5.3 µg/m³; approximately 1 percent of background). Therefore, the impacts of the proposed project will be small compared to the background PM10 and PM2.5 levels, and the total levels will remain well below the health protective NAAQS.

The concern for the patient's potential PM exposures can be further considered using the research studies provided by the commenter. These studies evaluated the effects of short (24-hr) and long-term (annual) PM exposures and their effects on the prognosis of CF. For short-term (24-hr) exposures to PM10, a study by Goeminne et al. (2013) found that for every 10 µg/m³ increase in PM10 there was a resulting 4.3 percent increase in the risk of exacerbation of respiratory deterioration, where exacerbation was defined as the start of oral or intravenous antibiotics. The 24-hr average PM10 impact of 3.4 µg/m³ where the patient stays is considerably less than the 10 µg/m³ incremental increase assessed in the study. And, there are several other mitigating factors that decrease the likelihood of health effects. First, the modeled PM10 impact of 3.4 µg/m³ (24-hour average) is calculated as the high-end scenario over 5 years (i.e., five year 6th highest impact).

Furthermore, the emission rate of particles from the proposed mine is estimated as the highest or worst-case emission rate. In addition, the background air concentration of 24-hr average PM10 is also estimated at the high-end concentration (three year 4th high value). Long-term PM2.5 impacts were not evaluated by Goeminne et al. (2013).

In a study evaluating long-term exposures (Goss et al, 2004), the authors found that for every 10 µg/m³ increase in annual PM2.5 exposures there was an associated decrease in Forced Expiratory Volume after 1 second (FEV1) of 24 milliliters (ml) in patients with CF, as well as an increase in exacerbations (defined as admission to the hospital or use of home intravenous antibiotics). In this study, the average (mean) annual PM2.5 air concentration for patients was 13.7 µg/m³. As shown in Table 1 above, the PM2.5 annual background concentration of 5.3 µg/m³ plus the impact of PM2.5 from the proposed mine of 0.06 µg/m³ where the patient stays is estimated to be 5.36 µg/m³. At 5.36 µg/m³, the patient's potential exposure is less than half of the annual PM2.5 concentration of the study population in Goss et al. (2004) at 13.7 µg/m³. Also, the study by Goss et al. (2004) identified a decrease in FEV1 for every 10 µg/m³ increase of annual average PM2.5. Comparing the metric of increases of 10 µg/m³ PM10 used by Goss et al. (2004), the incremental increase of 0.06 µg/m³ of annual PM2.5 impacts from the mine is approximately 170 times less.

The air concentrations of various sizes of PM where the patient stays, measured using both short- and long-term worst-case scenarios are expected to be well below the NAAQS. The EPA states that the NAAQS "[S]tandards provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly." (https://www.epa.gov/criteria-air-pollutants/naaqs-table) Data from two well conducted studies of the respiratory health of CF patients shows that CF patients have enhanced sensitivity to PM. However, given the relatively small impacts from the facility and the low background concentrations compared to the exposures in the study populations of CF patients, a significant risk of adverse respiratory effects is not expected. Therefore, the emissions of PM10 and PM2.5 from the proposed mine are not anticipated to result in adverse effects to CF patients.