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GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
UPPER PENINSULA DISTRICT OFFICE



LIESL EICHLER CLARK
DIRECTOR

February 15, 2019

VIA E-MAIL

Mr. David Anderson
Director, Environment and Regulatory Affairs
Aquila Resources
E807 Gerue Street
Stephenson, Michigan 49887

Dear Mr. Anderson:

SUBJECT: Back Forty Project - Mining Permit Amendment Application – Request for Additional Information - MP 01 2016

At this time in the technical review of the Back Forty Project Mining Permit Amendment Application (MPAA) received November 5, 2018, the Oil, Gas, and Minerals Division (OGMD) requests that Aquila Resources respond to the items listed below. Section 63205 (9) of Part 632, Nonferrous Metallic Mineral Mining, of the Natural Resources and Environmental Protection Act, Act 451 of 1994, as amended, states that a determination that an application is administratively complete does not preclude the department from requiring additional information from the applicant.

Mining Plan, Volume I:

1. Figure 4.1: When does mine pit excavation begin in the project timeline? How do the phases of development of the pit (Figure 4.2) correlate with the project timeline?
2. Figure 4.3 is difficult to read. Please provide a more readable copy.
3. Section 4.1.3: Has the amended mine plan changed the variation in the estimated number of employees over the life of mine? R425.203 (b)
4. Section 4.8: Michigan Department of Natural Resources (DNR) shall be copied on the mussel relocation plan and plans for mussel relocation activities. Special Permit Condition (SPC) B12
5. Section 4.5.1: Clarify how the plan for tailings transport meets the requirement of SPC E8 and E9.

Reclamation Plan, Volume 1:

6. Section 8.0 of Appendix C references the need for borrow pit areas within the project site for predicted overburden shortfall. Proposed borrow pits were not included in the reclamation plan. If there are plans for borrow pits within the project site, the locations and reclamation of these sites are required to be included in the reclamation plan.
7. Understanding that the final engineered design of the Waste Water Treatment Plant (WWTP) will be submitted to the Department of Environmental Quality (DEQ) for approval prior to construction of the WWTP, what water treatment technologies are anticipated to be necessary for operations and closure? It is not clear whether the financial assurance estimates take into account the cost to treat water from the Tailings Management Facility (TMF) at initiation of Phase 3 of reclamation at a point in operations when the TMF contains the largest volume, and the cost to treat water after commissioning of the Closure WWTP.
8. Section 6.1: Describe the maintenance that will be required during Reclamation Phase 4? How do the financial assurance estimates take into account these activities?
9. What is the soil erosion and sedimentation control (SESC) plan for reclamation activities?

Contingency Plan, Volume I:

10. Section 4.3.5 of the Mining Plan indicates that explosives will be stored and handled on site, which is different from the original Mining Permit Application (MPA) Mining Plan. This was not addressed in the list of amendments to the Contingency Plan, Section 8. Provide a stand-alone updated contingency plan document to include all applicable items listed in R425.205 and Section L of the Mining Permit, including assessment of risk and response measures. A copy of the updated contingency plan is required to be submitted to the emergency management coordinator having jurisdiction over the affected area.

Cutoff Wall Design and Menominee River Bank Stability Assessment, Volume I, Appendix B:

11. Sect. 4.3, Hydrogeological Seepage Model: Is this the same model as referenced in the June 2016 Response? Was this groundwater model submitted as part of the wetland permit for the Back Forty Project?
12. Section 3.1 Design Criteria: The minimum factor of safety for slope stability is 1.3. Industry standard for dams is generally 1.5. Where does the factor of safety

(FOS) falls below 1.5 on the embankment and what would be the impacts of a slope failure in those locations?

13. Provide additional information from the SLOPE/W and SEEP/W models and input parameters. What were the water surfaces assumed on each side of the berm in each model? What flood/operating conditions do those represent? Provide a description of what scenario the pseudo-static model was designed to capture and what the reduced FOS means as it relates to stability of the embankment. Section 4.4 Stability of Overburden Soil – Table 1: The harmonic mean k values for each of the four soil materials was used. Section 2.3, Hydrogeology, gives a range of k values for each of the soils, with the worst case being higher than the harmonic mean. While this may not make a huge difference in the SLOPE/W model, was sensitivity analyses conducted to evaluate the impacts of using the higher conductivity values for the soils to capture that “worst case scenario” rather than the average by using harmonic mean values?
14. Phreatic surface is assumed from the SEEP/W seepage model for the SLOPE/W slope stability model. While this is appropriate, what are the SEEP/W model input parameters and results to ensure that the phreatic surfaces are reasonable? What is the expected seepage through the foundation? Critical exit gradients of 0.33 to 0.25 are generally acceptable and result in factors of safety for seepage through the foundation of 3 to 4. Where do the critical exit gradients occur, and what the results are at those locations?

Design of Tailings Management Facility, Waste Rock Facilities, Ore Storage Areas, and Overburden Stockpile, Volume I, Appendix C:

15. Part 632, R409(i)(F) requires a cover to be employed to isolate the reactive materials from precipitation and air as soon as practicable. While it may not be practicable to cover the waste rock and ore during operations, especially with an operations period of only 7 years, provide plans for covering these materials should production be idled.

Water Management, Volume I, Appendix D:

16. Will the contact water roadside ditches be paved or lined?
17. How was the groundwater level of the site taken into account in the design of the Contact Water Basin (CWB) and South Waste Rock Facility (SWRF)? How will soil and foundation conditions be verified during construction of the storage facilities?
18. What is the plan for snow storage in the contact area?

19. Fig. 1: The emergency overflow structures are not shown in contact water management area.
20. Contact Water Management, CWB Design Procedure (Operations Phase): Reference to the LLCS1, LLCS2, LLCS3, and LLCS4 should be corrected as follows to be consistent with the design procedure:
- Water flows associated with the TMF including water collected from the two sumps LLCS1 and LLCS2 and decant water pumped from the pond.
 - Water from sump LLCS3 LLCS2 associated with the SWRF and sump(s) LLCS3 and LLCS4 associated with the NWRf.

Environmental Monitoring Plan, Volume 1, Appendix F:

21. Module 1, Groundwater Monitoring Well Locations: Provide a revised Figure 1-2, Table 1-1, and Tables 1-2 to include the following:
- a. Additional leachate/compliance monitoring wells as close as practicable and downgradient of LLCS1, LLCS3, LLCS4, south of the CWB (near WL-2b), and between the mine pit and the Menominee River (near WL-14). Proposed CW-3, CW-5, and CW-6 may be relocated for monitoring of the collection sumps.
 - b. Table 1-2: Revise to continue monthly monitoring of groundwater elevations during operations.
22. Module 1, Figure 1-3: Are there plans to monitor WL-40 as required by SPC K26?
23. Does the proposed regional monitoring include points in WL-14, WL-2b, WL-B1, and WL-C1?
24. Provide the Standard Operations Procedures (SOP's) referenced in Section 3 of Module 2 of the Environmental Monitoring Plan (EMP).
25. Section 3.2 of Module 2: While SPC K4(e) was included in the Mining Permit based on recommendations from Water Resources Division (WRD) during the review of the original MPA, upon review of the EMP provided in the MPAA, WRD has provided the following interpretation of SPC K4(e): The 95% exceedance flow is not the equivalent of stagnant water. It is dependent on the measured and/or estimated flow of the waterbody using specific methods for calculating flow. For example, if a waterbody is intermittent, the 95 % exceedance flow may at times reach zero cubic feet per second but at other times it might be greater than zero. If the waterbody is perennial in nature, it will almost always have some amount of flow. For purposes of sampling, if by measurement (using acceptable methods), the water is found to have a flow greater than zero cubic feet per second, the waterbody should be sampled. Alternatively, a sample could be taken regardless of flow to be conservative. WRD recommends that the language be modified in the Mining Permit (SPC K.4.e) to indicate that surface

water quality samples should be taken unless flow is equal zero. Revise Module 2 to indicate that samples will be taken unless flow is stagnant, or equal to zero.

26. Section 3.2 of Module 2: Any adjustment of parameters and/or monitoring frequency of environmental monitoring required by the Mining Permit requires OGMD approval.
27. Module 2, Table 2-2, Surface Water – For consistency with the NPDES effluent water quality monitoring, provide a revised Table 2-2 to include the following additional parameters: Barium, Beryllium, Boron, Total Chromium, Hexavalent Chromium, Total Cobalt, Lithium, Molybdenum, Strontium, Thallium, and Vanadium. See item #38 regarding detection levels.
28. Section 4.1 of Module 4, Survey Approach: The time frame must be June 1-September 30 for MDEQ Procedure 51 (P-51) sampling. P-51 is suitable for wadeable streams and is not used to detect change (at least at small increments). It is used to determine if water bodies are meeting designated uses. Monitoring plans are needed for Menominee River stations that are not wadeable. Additional survey procedures will need to be planned and described if the goal is to detect small changes in biological community health from one year to the next.
29. Section 4.2 of Module 4, Sediment Sampling: GLEAS Procedure #64 has been renamed and is now WRD_SWAS-011. The facility should submit a sediment sampling plan for approval prior to facility operation. MDEQ Remediation and Redevelopment Division (RRD) memorandum (RRD Operational Memorandum No.4). gives some guidance on characterization of water body sediments to develop a sampling plan.
30. Section 4.3 of Module 4, Community Assessment: Note P-51 is suitable for only wadeable streams and is not used to detect change (at least at small increments). Additional monitoring plans will be needed for Menominee Stations that are not wadeable and to determine if there have been changes in biological community health beyond determining if the other indigenous aquatic life and wildlife designated use is being met.
31. Section 4.3 of Module 4, Community Assessment: The community assessment described in this section is a general description of what they have planned, but it is not what WRD would consider a sampling plan. Examples of expected details include; how often they will complete the sampling, what literature they are using to develop the plan, what methods beyond P-51 that they will be using, what literature they will use to identify the aquatic insects, what level of identification they will be using etc. A QAPP is needed to determine if what is planned will be adequate.

32. Section 4.3 of Module 4, Phytoplankton and Zooplankton: Methods and metrics to be used to identify and characterize community health and change are not identified. This paragraph is vague and should not be considered a plan.
33. Section 4.5 of Module 4, Fish Tissue Sampling: Procedure #31 has been reformatted and is now Procedure #4. Here is a link to the revised procedure: https://www.michigan.gov/documents/deq/wrd-swas-proc31_445628_7.pdf
34. Module 4, References: MDEQ, 2002a and MDEQ 2008 are the same document, but it has been updated.
35. Module 4, Table 4-1, Aquatic Sampling Station Description: In the previous 632 application review, WRD indicated that AQ1 was not a good location for a "background" condition sampling location. It is upstream of the White Rapids Dam and therefore some parameters [e.g. temperature, TSS, dissolved oxygen, and substrate (habitat)] are likely to be impacted by backwater from the dam. The habitat data in Table 4-2 indicates sediment may have been trapped at AQ1 when compared to AQ2 and AQ3, both of which include some riffle/run habitat. A site should be selected that is downstream of the dam some distance to be out of the direct effects of a dam discharge, but upstream of the proposed mining activities. Provide a revised Table 4-1 with latitude and longitude locations of monitoring locations, including revised location for AQ1, and a revised Figure 4-2 showing aquatic sampling locations. Aquatic sampling should be conducted at the new location pre-operations.
36. Module 4, Table 4-2: What quantitative measures will the facility use to describe habitat availability at each station and measure changes in that availability of habitat to biotic communities over time?
37. Module 4, Table 4-3: Add a foot note that Module 7 covers postclosure monitoring.
38. Module 5, Table 5-1: For consistency with the NPDES effluent water quality monitoring, provide a revised Table 2-2 to include the following additional parameters: Barium, Beryllium, Boron, Total Chromium, Hexavalent Chromium, Total Cobalt, Lithium, Molybdenum, Strontium, Thallium, and Vanadium. See item #38 regarding detection levels.
39. Module 5, Table 5-2, Wastewater discharge effluent to Menominee River Sampling Parameters: A foot note on the table indicates that target detection levels were "adjusted per laboratory capabilities and requirements of the event." Per the NPDES permit: "Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval from the Department, the permittee may use alternate analytical methods (for parameters with methods specified in 40 CFR 136, the alternate methods are restricted to those listed in 40 CFR 136)." As this would be

addressed through the NPDES permit, it is recommended to contact WRD regarding quantification levels.

40. Once approved by WRD through compliance with the wetland permit, the wetland monitoring plan shall be submitted to OGMD and the EMP shall be revised to include wetland monitoring during operations and Module 7 shall be updated to include continued wetland monitoring during the postclosure monitoring period.
41. Module 7, Table 7-3: Is location MSG-9 monitoring the Menominee River, or a tributary?
42. Module 7: A written request to terminate the postclosure monitoring shall be provided to the DEQ not less than 18 months before the proposed termination date, including technical data and information demonstrating the basis for termination, as required by R425.407 of Part 632.
43. Module 8, Quality Assurance Project Plan: What QA/QC protocols will be followed for pre-operations confirmation baseline surface water monitoring required by SPC K5?
44. Section 5.4 of Module 8: Explain how information from sections 4 and 5 will be documented.

Environmental Impact Assessment, Volume II:

45. Section 2.5 Surface Water: One year of additional baseline data on the surface water stations identified in SPC K3 of the mining permit is required prior to operations. Has Aquila Resources initiated this monitoring?
46. Section 2.5.1 Potential Impacts to Surface Water Quantity: Part 301 requires a permit to diminish an inland lake or stream. Is mine dewatering induced drawdown of groundwater expected to impact any area streams?
47. Appendix B, Update to Site-Wide Water Balance: Total streamflow contributions to the Shakey River watershed are predicted to be reduced by 41 m³/hr (6.1% decrease from current conditions) relative to existing conditions during operations. What is the expected impact to streamflows within the Shakey River watershed due to this reduction?
48. Section 4, Feasible and Prudent Alternatives: Were any other methods evaluated for development of the TMF? Why is the proposed design preferred?

Thank you for your attention in this regard. To discuss the time frame for a response and if you have any questions, please contact me at the telephone number listed below or by e-mail at humphreym@michigan.gov.

Sincerely,



Melanie Humphrey
Oil, Gas, and Minerals Division
Upper Peninsula District Office
906-250-7564

MH/KT

cc: Mr. Adam Wygant, DEQ
Mr. Harold Fitch, DEQ
Mr. Rick Henderson, DEQ
File: Back Forty Project, CM9