ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Katie Hobbs
Governor

Karen Peters
Cabinet Executive Officer
Executive Deputy Director

**Comprehensive Request for Additional Information**

April 5, 2024

***Via Electronic Mail***

South32 Hermosa Inc.
Attn: Brent Musslewhite, Director
1860 E. River Road, Suite 200
Tucson, AZ 85718

**Re: Hermosa Project**
**Individual Aquifer Protection Permit (APP):** Significant Amendment
**Inventory No.** 512235**, Licensing Timeframe No.** 101257, Place ID: 18640

Dear Mr. Musslewhite,

The purpose of this letter is to formally inform you that the Arizona Department of Environmental Quality does not have all of the information required to grant your permit and may deny the permit if this information is not received. We received the above-referenced application on **December 22, 2023**, and have made several informal requests beginning on 3/15/2024 for this information. At this time, the application is in the Substantive Phase of the Licensing Timeframe (LTF) for this application, however, this letter suspends the review timeframe.

This decision is an appealable agency action under A.R.S. § 41-1092. You have a right to request a hearing and file an appeal under A.R.S. § 41-1092.03(B). You must file a written Request for Hearing or Notice of Appeal within **30 days** of your receipt of this Notice. A Request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Hearing Administrator
Office of Administrative Counsel
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, AZ 85007

The Request for Hearing or Notice of Appeal shall identify the party, the party's address, the agency and the action being appealed and shall contain a concise statement of the reasons for the appeal. Upon proper filing of a Request for Hearing or Notice of Appeal, ADEQ will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal you have a right to request an informal settlement conference with ADEQ under A.R.S.

§ 41-1092.06. This request must be made in writing no later than **20 days** before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

**Required Information**

The following information is required to lift the suspension of the timeframe and continue the processing of this application as per Arizona Revised Statues (A.R.S.) § 41-1075:

**General Items**

1. ADEQ approves the closure and post closure cost submitted in the amendment application in the amount of $24,657,909. Submit a financial assurance mechanism, for the above closure and post-closure costs that complies with the requirements of A.A.C. R18-9-A203(B) prior to Grant. Note, the due date stated on page 5 of this letter is not applicable to this comment.

**Engineering Items**

Provide information requested below as per A.A.C. R18-9-A202(A)(5).

**Geotechnical**

2. On page 73 of the Hermosa APP PDF file, it is mentioned, 'If instability is identified, slope stabilization may be required. The site APP (No. P-512235) requires periodic inspections of tailing storage facility (TSF) slope conditions. Please provide the Geologic Hazards Assessment study for the site. In the absence of such a study, it would be considered CSI in the permit.
3. Please consider a CSI to share the annual InSAR (Interferometric Synthetic Aperture Radar) data with ADEQ.
4. On page 85 of the Hermosa APP PDF file (page 17 of Attachment A, Hermosa Lined TSF Design Amendment), please include the various site investigations mentioned in Table 3.1 - GEOTECHNICAL INVESTIGATIONS SUMMARY TABLE.
5. On page 98 of the Hermosa APP PDF file, please provide the report for Large Scale Direct Shear Interface Shear Strength testing for the liner.
6. On pages 129 and 185 of the Hermosa APP PDF file, kindly provide the existing instrumentation data. According to drawing A222, only two VW piezometers are planned for installation on the south side. Please include additional VW piezometers around the perimeter of the future dry stack to confirm the phreatic line during operation to match with drawing A262 Page 193. Ensure that the data matches the stability analysis and provide the triggering water level for each piezometer, whether installed or planned, on the TSF.
7. On page 140 and 144 of the Hermosa APP PDF file, for BADCT, undrained stability is required. Please provide the undrained stability analysis including both Peak and Residual factors of safety (FOS).
8. On page 144 of the Hermosa APP PDF file, where it is mentioned, 'The estimated settlement is based on elastic theory,' kindly provide the Isopach for the total settlement evaluation. Please include long-term settlement in addition to the calculated elastic settlement.

9. On page 193 of the Hermosa APP PDF file, on the drawing A262 Note 1 mentioned the GCL may be used in case of low permeability material not available at the site, please consider a CSI that need to be approved by ADEQ before using GCL to replace the low permeability layer.
10. On Page 211 of the Hermosa APP PDF file, please consider as CSI to provide annual shaft remediation report to ADEQ.
11. On page 216 of the Hermosa APP PDF, the contour outside the existing stacking in the initial condition appears confusing. Please clarify or revise it by either replacing it with the current condition or depicting the state before the commencement of material placement.
12. Please consider as the CSI, the Annual Report for the construction of the filtered tailings placement and waste rock placement, including aerial photos. Additionally, include the Construction Quality Assurance (CQA) report, ensuring that the materials placed align with the initial assumptions used during slope stability analysis.
13. On page 1329 of the Hermosa APP PDF file, please update Figure No. 1: Slope Stability Evaluation for TSF1 with all available Boreholes (BHs), Test Pits, and Cone Penetration Tests (CPTs).
14. On page 1329 of the Hermosa APP PDF file, please provide two separate figures: one depicting the current condition and another showing the final contour for Figure No. 1, which pertains to the Slope Stability evaluation sections TSF1.
15. On pages 1330 to 1344 of the Hermosa APP PDF file, please include the Boreholes (BHs), Test Pits, and Cone Penetration Tests (CPTs) on the four stability cross sections.
16. On pages 1330 to 1344 of the Hermosa APP PDF file, please provide the output of the Stability software, with a specific emphasis on the critical surface and the associated Factor of Safety (FOS). Additionally, include information on the friction along each slice of the critical failure surface, as it pertains to confirming the potential failure passing through HDPE.
17. Please supply the earthquake deformation analysis for the liquefaction analysis. In the absence of such deformation analysis, consider it a Construction Quality Control/Quality Assurance (CSI) requirement to provide earthquake deformation analysis specifically for the filter dry stack.
18. Please provide the static liquefaction analysis and include the critical state line for static liquefaction. In the event that there is no existing static liquefaction analysis, consider it a Construction Quality Control/Quality Assurance (CSI) requirement to provide the static liquefaction analysis specifically for the filter dry stack.

**Climate Memo**

19. On page 276 of the Hermosa APP PDF file, in the 'Arizona Mine Site Meteorological Analysis,' ADEQ recommends the installation of a site weather station. This is advised due to the site's high elevation, allowing for the calibration and confirmation of weather data used for the project in comparison to station locations around the area.
20. On page 278 of the Hermosa APP PDF file, please remove the Draft on Table 2 of the Meteorological Analysis March 2017 Technical Memorandum
21. On page 278 of the Hermosa APP PDF file, the data in Table 2 – Recorded Monthly Site Precipitation (inches) spans from 2007 to 2016. Please update the report using appropriate values with the most recent available data, as per the water balance model,

which includes data from 2008 to 2022 (see Table 4.2 on page 1353 of the Hermosa APP PDF file (page 8 of the Water Balance report). NOTE: The values in the "Annual" column on Page 278 for the years 2015 and 2016 are slightly different from that shown in the "Total" column on page 1353.

22. On page 283 of the Hermosa APP PDF file, the report titled 'Hansen, et al., Hydrometeorological Report No. 49 (HMR 49), Probable Maximum Precipitation – Colorado River and Great Basin Drainages, National Weather Service, Silver Spring, MD, reprinted 1984.' is approximately 40 years old. Please provide justification for the continued use of this data and explain why it is considered still valid for the project.
23. Please update the data on Table 8 – Pan Evaporation Recorded at the Site (inches) on page 288 of the Hermosa APP PDF file. The current data covers the period from 2007 to 2016. Do the same for the evaporation data in the Water Balance memo (see page 1356).
24. On page 288 of the Hermosa APP PDF file, the data on Table 9 – Completeness of Pan Evaporation Recorded at the Site spans from 2007 to 2016. Please update the dates with the most recent available data, as indicated in the water balance model, which includes information from 2008 to 2022.

**Water Balance**

25. On page 1360 of the Hermosa APP PDF file, "The water balance model was developed using an analytical spreadsheet model developed in Microsoft Excel" ADEQ recommends developing a GoldSim model for the future water balance, allowing for calibration and adjustments based on site-specific data.
26. On Page 1354 of the Hermosa APP PDF file, "Table 4.4 summarizes the precipitation depths with modifications set by the predicted climate change effects on design storm intensity for the year 2030". Please provide the dry and wet conditions for the water balance to support the pumping rate and ensure a satisfactory freeboard. Additionally, include the project strategy for managing excess water or addressing water deficits in the overall project plan.
27. On Page 1348 of the Hermosa APP PDF file, please explain the distinction between active and passive evaporation as depicted in Figure 3.1 of the Water Balance Model Schematic.
28. On Page 1353 of the Hermosa APP PDF file, it is noted that as part of the water balance analysis, the system was assessed for a 100-year, 24-hour storm occurring at the end of each day, considering a dataset spanning from 2008 to 2022 (14 years). please explain the process to obtain 100 years 24 hours storm.
29. On Page 1353 of the Hermosa APP PDF file mentioned "precipitation from 2011 was selected to represent average conditions. The total precipitation recorded in 2011 of 23.01 inches was 3% greater than the 15-year average." From the Table 4.2. Monthly Precipitation Totals (2008-2022) in inches, the total precipitation value for 2022 is 25.05 inches. Please justify / clarify the text.
30. Please provide the annual water balance data, differentiating the inflow and outflow for each facility, and provide a revised Figure 3.1 in Appendix I, Water Balance in Attachment A showing volume of inflows and outflows. Additionally, present any deficit or excess water that the project may experience throughout the life of the mine.
31. The Water Balance section of the application indicates there is an "Active Evaporation" system. It does not appear that this system was previously evaluated and included in the

permit as an additional feature of the BADCT for the Underdrain Collection Pond. Please clarify and provide information related to the active evaporation system including but not limited to the number of units, steps that are implemented to minimize overspray, steps that will be taken during high wind speeds, manufacturer's specifications, etc.

32. Explain why the model does not account for direct precipitation on the expanded TSF1 footprint (see Figure 3.1 in Appendix I, Water Balance in Attachment A).
33. Explain why the water balance model is only evaluated for the period between 2024 and 2032.

**Seismic Hazed Analysis**

34. On Page 233 of the Hermosa APP PDF file, it is stated that "Historical seismicity in the region was reviewed to identify earthquake events with a moment magnitude (Mw) of 4.0 or greater." Please provide justification for the rationale behind specifically using earthquake events with a moment magnitude (Mw) greater than 4.0 in the review of historical seismicity in the region.
35. On Page 235 of the Hermosa APP PDF file, please provide the $V_{s30}$ value from geophysical data from the site as mentioned on page 4 of the report "For seismic hazard evaluations, the averaged shear wave velocity in the upper 100-feet below the ground surface ($V_{s30}$)".
36. On Page 240 of the Hermosa APP PDF file, please provide the following references
    a. Boore, D.M., Stewart, J.P., Seyhan, E., and Atkinson, G.M. (2014). NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes, Earthquake Spectra, Vol. 30 (3).
    b. Campbell, K.W., and Bozorgnia, Y. (2014). NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra, Earthquake Spectra, Vol. 30 (3).
    c. Chiou, B.J., Youngs, R. R. (2014). Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, Vol. 30 (3).
37. Please provide the natural frequency of the TSF.
38. On Page 237 of the Hermosa APP PDF file , Table 4.1 - Probabilistic Design Accelerations presented the PGA for different return period the values is around half of the values for the nearby mining site (Copper World). See "Site-Specific Seismic Hazard Analyses and Development of Design Ground Motions for Rosemont Copper World Project, Arizona" which can be downloaded @ https://static.azdeq.gov/wqd/app_copperworld_app_att.zip) . Please explain the reason for difference between UHS of the two- close mining site.

**Other**

Comment numbers 39 through 41 pertain to clarification of information presented in the application.

39. The application indicates that the expansion of TSF1 will provide an additional capacity of approximately 5.4 Mcy of total storage capacity. However, the "Material to be stored in the TSF1" is presented 6.9 Mcy. Explain the discrepancy and revise as necessary.
40. What does TSF-AD in Table 5.2 mean represent?

41. Information pertaining to quantities or volumes of filtered tailings, waste rock, construction cut, and miscellaneous materials presented in Appendix A Design Criteria does not seem to match the application of the existing permit. Explain the discrepancy of revise as necessary.

Comment numbers 42 through 45, pertain to contingency plan requirements per A.A.C. R18-9-A204.

42. The Contingency Plan (see Section 3 and 4) indicates that in the event of the freeboard is approaching the established limit or there is a potential for overtopping of the Underdrain Collection Pond, the solutions may be recycled back into the TSF. Explain where the solutions will be placed on the TSF, and confirm that the Engineer of Record (EOR) has approved this contingency action. Indicate a maximum volume that may be placed on the TSF during such events as discussed above, and provide the rationale.
43. In the application include Operation and Maintenance (O&M) actions that will be taken by field staff when O&M actions are to implemented during inspections as required by the permit.
44. Please provide the Failure Mode and Effects Analysis (FMEA) for the TSF and monitoring for mitigation of the FMEA for the TSF.
45. In the Contingency Plan, include a description of procedures, personnel, and equipment proposed to mitigate unauthorized discharges.

**Consequences of Failure to Submit Required Information**

Your response to the above listed items must be received by ADEQ **on or before 6/4/2024**. Failure to submit any of the above required information by the deadline may result in initiation of the denial process for this APP amendment application.

**How to Submit**

Please submit your response to this letter in electronic format to the ADEQ Project Manager; no hard copy is required. Original financial assurance documents should be submitted to Ian Lies at the address below.

E-mail to: Chauhan.Vimal@azdeq.gov
If document(s) are too large to email, notify ADEQ Project Manager to request a ShareFile link to upload document

Original Financial Assurance documents:
Arizona Department of Environmental Quality
Attention: Ian Lies, Business and Finance
1110 W. Washington Street, Phoenix, AZ 85007

Thank you for your efforts to comply with Arizona's environmental requirements. Should you have any comments or questions regarding this matter, please do not hesitate to contact me at (602) 771- 4362 or Chauhan.Vimal@azdeq.gov.

Sincerely,

DocuSigned by:
Vimal Chauhan
E894720EA36C41C...

Vimal Chauhan, Project Manager
Groundwater Protection and Reuse Section
Aquifer Protection Permit (APP) Unit

cc: Ethan Leiter, Manager, APP Unit
Ardy Sharifabadi, Senior Geotechnical Engineer
Dan Reeder, Principal Hydrogeologist
Paul Nazaryk, South32 Hermosa Inc.