HUDBAY

September 20, 2023

Mr. Ardeshir Sharifabadi
Project Manager
APP Unit, Groundwater Protection Value Stream
Water Quality Division
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, Arizona 85007

RE: Copper World Project – Aquifer Protection Permit Application – Response to "Inadequate Response to a Comprehensive Request for Additional Information" Letter dated June 23, 2023

Dear Mr. Sharifabadi:

This letter transmits responses to the Inadequate Response to a Comprehensive Request for Additional Information (IR Comprehensive Request) issued to Copper World, Inc. (Copper World) for the Copper World Project (Project) by the Arizona Department of Environmental Quality (ADEQ) on June 23, 2023. An application for an area-wide aquifer protection permit (APP) was submitted to ADEQ on September 21, 2022, for the Project. ADEQ issued a Comprehensive Request for Additional Information (RAIS) letter to Copper World on February 27, 2023.

On April 21, 2023, Copper World submitted a response to the RAIS letter that contained responses to all 71 Items in ADEQ's February 27, 2023 letter. Per ADEQ's June 23, 2023 letter, there are 28 items that require additional information. This letter provides responses to these items along with supporting documentation.

ADEQ's requests are repeated below along with responses. Responses are either embedded entirely in this letter or summarized in this letter with details provided in a separate attachment. Additionally, a single compiled document is not provided due to size.

General Items

General Items covered Items 1 through 6 in ADEQ's original February 27, 2023, Comprehensive Request.

Item 1: (Closure & Post-Closure)

a. In relation to costs in Appendix N, please confirm that the cost of revegetation is covered under ASMI and the cost of soil cover placement is included in the APP cost.

Response: The cost of revegetation is included in the ASMI cost estimate and the cover placement on the tailings and heap leach is included in the APP closure cost estimate. The cost for placement of cover on non-APP facilities would be included in the ASMI cost estimate. Cover placement costs are shown on the Heap Leach tab and Tailings tab within the SRCE spreadsheet. A summary table from each of these tabs is provided in ***Table 1-1*** *and as Exhibit 1 in* ***Attachment 1*** *Response to ADEQ APP Question 1 Copper World Project (WSP 2023).*

Table 1-1 Screenshots from SRCE Leach Pads and Tailings tabs from Exhibit 1 in Attachment 1

Leach Pads - Cost Summary				
	Labor	**Equipment**	**Materials**	**Totals**
Drain Installation	$1,155	$810	$5,850	$7,815
Grading Costs	$0	$0	N/A	$0
Cover Placement Cost	$0	$0	N/A	$0
Topsoil Placement Cost	$548,569	$1,363,596	N/A	$1,912,165
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$549,724**	**$1,364,406**	**$5,850**	**$1,919,980**
Revegetation Cost	$0	$0	$0	$0

Tailings - Cost Summary				
	Labor	**Equipment**	**Materials**	**Totals**
Embankment Regrading Cost	$0	$0	N/A	$0
Tailings Surface Grading Cost	$170,012	$690,463	N/A	$860,475
Cover Placement Cost	$0	$0	N/A	$0
Topsoil Placement Cost	$3,278,926	$8,587,687	N/A	$11,866,613
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$3,448,938**	**$9,278,150**	**$0**	**$12,727,088**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$3,448,938**	**$9,278,150**	**$0**	**$12,727,088**

b. Please provide a table that lists the closure cost for each facility separately.

Response: ***Table 1-2*** *provides the cost for each APP related facility or item. The cost estimate amounts also include the changes based on ADEQ's comments. The updated SRCE model output is provided in* ***Attachment 1*** *Response to ADEQ APP Question 1 Copper World Project (WSP 2023) also with an explanation of the changes.*

Table 1-2 Closure and Post-Closure Costs for the Project Facilities

Facility	*Labor*	*Equipment*	*Materials*	*Total*
		Closure		
Process Pond (Total)	**$84,590**	**$195,578**	**$0**	**$280,168**
Primary Settling Pond	*$22,783*	*$68,470*	*$0*	*$91,253*
Pregnant Solution Pond	*$2,723*	*$8,184*	*$0*	*$10,907*
Raffinate Pond	*$14,056*	*$27,603*	*$0*	*$41,659*
Reclaim Pond	*$14,056*	*$27,603*	*$0*	*$41,659*
Process Area SW Pond	*$14,056*	*$27,603*	*$0*	*$41,659*
HLF North SW Pond	*$2,723*	*$8,184*	*$0*	*$10,907*
HLF South SW Pond	*$14,193*	*$27,931*	*$0*	*$42,124*
Heap Leach Facility	**$549,724**	**$1,364,406**	**$5,850**	**$1,919,980**
Tailing Storage Facilities (TSF)	**$3,448,938**	**$9,278,150**	**$0**	**$12,727,088**
TSF-01	*$2,650,122*	*$7,128,822*	*$0*	*$9,778,944*
TSF-02	*$798,816*	*$2,149,328*	*$0*	*$2,948,144*
Drainage	**$1,234,744**	**$279,749**	**$623,303**	**$2,137,796**
Solid Waste Disposal				**$50,235**
Construction Management	**$882,488**	**$825,237**	**$19,879**	**$1,727,604**
Mob/Demob	**$201,254**	**$0**	**$0**	**$201,254**
Indirect Costs				**$7,549,782**
Subtotal	**$6,401,738**	**$11,943,120**	**$649,032**	**$26,593,907**
		Post - Closure		
Monitoring	$4,324,428	$1,859,601	$687,623	$6,872,119
Process Fluid Stabilization	$28,199,233	$16,880,189	$4,257,125	$49,336,547
Indirect Costs				*$14,300,545*
Subtotal				*$70,509,211*
Total Closure and Post-Closure Costs				
Total				*$97,103,118*

*Further details of changes/updates made to the Project closure and post-closure costs are provided in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project (WSP 2023).*

According to Page 8 (12 PDF) of Appendix M/Attachment 1, the HLDE (Hazardous Load Determination Equation) is a model that has been jointly developed by the Nevada Division of Environmental Protection, the Bureau of Land Management, and the mining industry in Nevada.

a. Provide data to support the selection of the key assumption for the "HLDE Model Output for HLP" including:

- Saturated Hydraulic Conductivity (Ks)
- Residual Water Content (θr)
- θS (saturated moisture content)
- θapp (active application moisture content)
- θhist (moisture content of historic part at PFS start)
- ɣ (empirical drainage parameter)

*Response: The inputs into the HLDE model for the heap leach facility are based on the Guidance Document – Heap Leach Draindown Estimator and Process Fluid Cost Estimator (BLM and BMRR, 2023) (see Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project). These parameters were selected since site specific data is not available. Refinement and updates to the heap leach facility HLDE model will be completed as testing data and operational data become available. The HLDE model, along with process fluid*

cost estimator (PFCE), will be updated at the same time as the reclamation cost estimate updates, which will occur throughout the life of the mine. The assumptions made for the selected values are provided below:

- *Saturated Hydraulic Conductivity was an assumed value based on the guidance document (see Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project) (less than 100).*
- *Residual Water Content is assumed to be slightly above the water content of crushed ore (5%). This number will be determined and updated as needed in the HLDE model following completion of column tests on the leach material.*
- *Saturated Moisture Content (Θs) was a mid-point value from the guidance document (see Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project) (0.20 to 0.30).*
- *Active Application Moisture Content was based on the following guidance document (see Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project) statement "should be slightly less the Θs".*
- *Moisture Content of Historic Part of HLP is assumed to be less than the moisture content of the active portion. Since this portion of the HLP is not actively being leached, a percentage of the solution has had time drain from the ore; thus, the value is assumed to be less than the active portion. As needed, refinements to this number will be made following completion of column testing.*
- *Gamma was calculated using the guidance document procedures, which is provided as part of Item 1c below. The guidance document procedure is provided in Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project.*

b. It appears that there is a discrepancy between the weather data presented in the "HLDE Model Output for HLP" on PDF page 30 of Appendix M and the data in "20220921 APP Application_Copper World-Main Application" Table 3.01 (page 40 PDF) and 3.03 (page 42 PDF). In order to ensure the accuracy of the drawdown curve for Monthly Evaporation Data & Precipitation in the "HLDE Model Output for HLP", update the data to resolve this discrepancy. Similar discrepancy exists for the "HLDE Model Output for TSFs".

*Response: The weather data in the HLDE models for both TSFs and the HLP have been changed to reflect the monthly values provided in Appendix M of the September 2022 APP Application. The revised HLDE models for the HLF and TSFs are provided in Attachment 3 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project.*

c. It appears that the drawdown curve for the "HLDE Model Output for TSFs" on page 36 and on page 39 (drawdown curve reaches zero from year 7 to year 8) does not extend to an asymptotic line close to zero. Provide an explanation for the reason or update the model to reach an asymptotic line close to zero.

*Response: In development of the HLDE model for the TSFs, the method for calculating the gamma value (γ) was derived from the provided HLDE model notes (see below for **Note from HLDE Model**) and the guidance document (see Attachment 2 in **Attachment 1** Response to ADEQ APP Question 1 Copper World Project). As additional data is developed through column testing or infiltration testing of the tailings material, this information will be input into the model as needed. These results will then be used in revisions to the closure plan and associated cost estimate. Updates to the closure plan/cost estimate will occur throughout the life of the mine on a schedule per ADEQ requirements. This schedule is anticipated to be every 5 years.*

Note from HLDE Model
"The value for gamma (γ) is related to the pore size distribution of the material being tested. The more uniform the pore size and fine the particles, the smaller the value of γ. The larger and more variable the pore size, the larger the γ value. Once the values for the other parameters have been determined, from either site-specific data or the appropriate laboratory or field testing, the gamma value can be calibrated to reflect the operational conditions of the heap leach pad. This can be done by adjusting the γ value until the draindown rate at the beginning of the curve is relatively similar to the actual operational flow rate observed during operations. While

adjusting γ, make sure that pumping capacity is set to 0. With crushed ore the value is typically less than 10, while run-of-mine ores typically have higher γ values."

d. The STANDARDIZED RECLAMATION COST ESTIMATOR model used is based on Nevada, as outlined in Appendix M / Attachment 1. The model is for September 27, 2017 at https://nvbond.org/ "Standardized Reclamation Cost Estimator, https://ndep.nv.gov/land/mining/reclamation/reclamation-costestimator. Version 1.4.1." Please provide all of the adjustments that have been assigned to the model to be used for Arizona (track change and basis of the change - unit change).

Response: Nevada cost data were generally used for the Copper World closure and reclamation cost estimates with some adjustments for Arizona. Prevailing wage rates and fringe benefits from southern Nevada were used since these are the default data used in the Standard Reclamation Cost Estimator (SRCE) and are similar to or slightly higher than Arizona prevailing wage rates. Zone and area adjustments were based on travel distance from the Tucson City Hall to the Copper World Project site. Professional and technical labor rates were sourced from RS Means and Wood PLC. Indirect labor costs, including unemployment and workman's compensation insurance and Social Security/Medicare, were sourced from RS Means and industry averages. State payroll tax costs were based on Arizona regulations. Equipment rental rates from southern Nevada were used as these were similar to equipment rental rates in the Tucson, Arizona area. The cost of off-road diesel was based on Tucson-area costs. Other closure/reclamation materials and miscellaneous costs were sourced from the SRCE default cost data.

Item 2: (Contingency Plan):

a. This item does not require any further action at this time. ADEQ will include the Compliance Schedule Item (CSI) that mandates the submission of the following updated documents to ADEQ at least once every three years or within 90 days of any earlier updates. The following documents must be approved by the Engineer of Record (EOR) for the facilities:

- TSF Contingency Action Plan (Attachment 2A)
- EPRP (Attachment 2B)
- Failure Modes and Effects Analysis Report (Attachment 2C)
- TSF Dam Safety Review (Attachment 2D)
- Tailings Operation, Maintenance, And Surveillance (OMS) Manual (Attachment 3A) (EOR involvement and Input)
- Heap Leach Facility Operation, Maintenance, And Surveillance (OMS) Manual (Attachment 3B)

Response: Copper World acknowledges that this item will be included as a compliance item. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Additionally, and as part of overall responses related to ADEQ's June 23, 2023 letter, the following documents were updated and included as part of this submittal:

- *Tailings Operation, Maintenance, And Surveillance (OMS) Manual (see **Attachment 2**)*
- *Heap Leach Facility Operation, Maintenance, And Surveillance (OMS) Manual (see **Attachment 3**)*
- *Failure Modes and Effects Analysis Report (see **Attachment 4**)*

b. Provide a timeline for the development and implementation of the OMS, ERP, and CQA as outlined in Attachment 2C, "Failure Modes and Effects Analysis Report Copper World Project – TSF and HLF."

*Response: **Table 2-1** below presents a timeline proposed for the development (or update) and implementation of the OMS, ERP, and CQA that are referenced in the "Failure Modes and Effects Analysis Report Copper World Project – TSF and HLF".*

Table 2-1 Timeline Proposed for Development and Implementation of OMS, ERP, and CQA

Project Stage	*OMS*		*ERP*		*CQA*	
	Development[1]	*Implementation*	*Development*[1]	*Implementation*	*Development*[1]	*Implementation*
Pre-construction	*X*	-	*X*	-	*X*	-
Construction	-	-	-	*X*	-	*X*
Operation	-	*X*	-	*X*	-	-
Closure	-	*X*	-	*X*	-	*X*
Post-Closure	-	-	-	*X*	-	-

[1] *After the stage of Pre-construction Stage, all plans will be revisited and optimized as needed prior to implementation.*

c. As part of the ERP provided as the Attachment 2B April 21, 2023 submittal, please provide a dam breach analysis for the TSFs.

Response: A hypothetical dam breach analysis has been prepared for the Project. Please see the memorandum titled The Estimation of Non-Newtonian Precipitation-Induced Dam Breach Failure Analyses for Proposed TSF-1 and TSF-2 in ***Attachment 5*** *of this letter.*

Item 3: (Operation, Maintenance, and Surveillance (OMS) Plan):

a. To reduce the risk of failure, the instrumentation plan should consider the results of the failure model analysis. Given that the perimeter of TSF1 is approximately 6.5 miles and TSF2 is around 4 miles, please provide a revised plan or justification to ADEQ for why 6 piezometers for TSF1 and 8 piezometers for TSF2 are sufficient to monitor the approximately 10.5 miles of dam (see Item 26 regarding piezometers for cell2).

Response: The locations of the Vibrating Wire Piezometers (VWPs) are based on the locations of critical sections used for the slope stability analyses. Those section locations were selected based on WSP's judgment of the most critical TSF embankments. Moreover, VWPs have been added along additional section lines of TSF 1 Cell 1, TSF 1 Cell 2, and TSF 2 Cell 2. A piezometer (third sensor) was also incorporated along each section line. A further description of the proposed VWPs is provided in ***Attachment 2*** *Tailings Operation, Maintenance, and Surveillance Manual (WSP, 2023). Also see* ***Item 16*** *and* ***Attachment 6*** *of this letter for piezometer details/locations.*

b. Please provide a revised plan or justification to ADEQ for the location of the piezometers selected for TSF1 to support the Potential Failure Modes (PFM) provided in Attachment 2C "Failure Modes and Effects Analysis Report".

Response: A Revised Tailings Operation, Maintenance, and Surveillance Manual is provided in ***Attachment 2****. Also see* ***Item 16*** *and* ***Attachment 6*** *this letter for piezometer locations.*

c. Please provide a detailed annual monitoring plan (including depth and number of vibrating wire piezometer installations) for the Tailings Storage Facility (TSF) on the annual deposition plan / progression plan.

Response: The plan view of the VWPs proposed for the TSF's is presented on each of the Annual Progression Plan figures provided in ***Attachment 6****. These figures show the annual progression of the piezometers. Additionally, a typical section showing the piezometer locations at depth is provided in the Tailings Operation, Maintenance, and Surveillance Manual (WSP, 2023) in* ***Attachment 2*** *of this letter. Also see* ***Illustration 16-2*** *in* ***Item 16*** *below.*

d. The proposed piezometers are required to be assigned an alert level that corresponds to quantifiable performance objectives. This ensures their effectiveness in monitoring stability, consistency with the design assumptions, and detecting adverse conditions at an early stage. Provide alert levels for all of the proposed TSF piezometers.

Response: Current stability analyses show satisfactory factors of safety well above the design criterion under static conditions. Therefore, development of triggering levels based on lowered factors of safety that correspond

*to alert levels is not realistic (i.e., calculated triggering levels will be extremely high and unreachable in the future). Regardless, a set of preliminary triggering levels is presented in **Attachment 2** Tailings Operation, Maintenance, and Surveillance Manual (WSP, 2023) based on WSP's knowledge of the Project and experience from similar applications. However, it is noted that these triggering levels are preliminary and subject to change as the Project is advanced.*

e. Provide a plan view of the pipelines that transport seepage from the collection trenches to the Primary Settling Pond for reuse in the sulfide ore processing circuit. As stated on page 12 of the tailing OMS manual PDF, "Seepage will be pumped from the seepage collection trenches to the Primary Settling Pond for reuse in the sulfide ore processing circuit."

*Response: **Attachment 7** Seepage Collection System Design (WSP, 2023) provides details related to the TSF seepage collection system. The drawing set in **Attachment 7** shows the general location of the piping system that returns seepage (and stormwater) from the tailings facilities to the Primary Setting Pond.*

f. Please clarify the discrepancy with EOR receiving monthly reports and that dataloggers are reviewed quarterly as stated on Page 18 of the Tailings Operation, Maintenance, And Surveillance (OMS) Manual PDF "The piezometers are transmitted from the dataloggers automatically and reviewed quarterly or as needed. The piezometer measurements are transmitted to the EOR on a monthly frequency or as required."

*Response: A revised statement was included in the updated Tailings, Operation, Maintenance, and Surveillance Manual provided in **Attachment 2**. See Section 5.2.3 Piezometer "The piezometer data are transmitted from the dataloggers automatically and reviewed monthly or as needed. The piezometer measurements are transmitted to the EOR on a monthly frequency or as required."*

Item 4: (Provide an organizational chart for the operation, surveillance, closure, and post-closure…): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 5: (Consider a Compliance Schedule Item (CSI)...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 6: (Provide a figure that shows the footprint and boundary…): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Engineering Items

Engineering Items covered Items 7 through 20 in ADEQ's original February 27, 2023, Comprehensive Request.

Item 7: (The application asks for exemptions...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 8: (Base of the information provided...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 9: (The WR Facility (WRF) types of material...):

a. Based on the response to item 9a, provide a detailed annual progression of the mine life, including the location where various materials (NAG, AG and PAG) will be placed and a material mass balance for each type of material.

*Response: A presentation of the waste rock material placement on an annual basis is provided in **Attachment 8** Waste Rock Placement – Annual Layouts (Hudbay, 2023). As is described in Attachment 5 Waste Rock Handling Plan (ADEQ Response letter, April 21, 2023), the Project's waste rock facility will contain three different types of materials. Non-acid generating (NAG) waste rock, potentially acid generating (PAG) waste rock, and acid generating (AG) waste rock. As noted in the Waste Rock Handling Plan, PAG and AG materials will be encapsulated with a minimum of 50 feet of NAG materials both on the base and on top, as well as a minimum of 30 feet of NAG material on the final slopes of the WRF.*

b. Based on the information provided, there seems to be a discrepancy between the amount of waste rock mined listed in Attachment 5 (Page 10 of PDF) and G.3 App (Page 11 of PDF). On Attachment 5 mentioned every 1,000,000 tons of waste rock mined will be tested and G.3 App mentioned every 500,000 tons of waste rock mined. Provide explanation of the discrepancy and the correct value for the waste rock mined will be tested.

Response: Attachment 5 Waste Rock Handling Plan (ADEQ Response letter, April 21, 2023) makes reference to a testing frequency for acid-base accounting (ABA) analysis of every 1,000,000 tons of waste rock mined. This updated Waste Rock Handling Plan was submitted in April 2023 as a revised document and supersedes that presented in the September 2022 APP application. Appendix G, Pg 869 has the original submission of 500,000 tons of waste rock mined from September 2022.

ABA testing will be done for every 1,000,000 tons of waste rock mined as stated in the Waste Rock Handling Plan (WRHP) (ADEQ Response letter, April 21, 2023). See the WRHP for further details. Additionally, the waste rock materials are classified into their respective categories (NAG, PAG, or AG) as part of daily or ongoing blasthole assay sampling and testing. Assay information is uploaded into the mining database/block model and used to categorize the mined materials into ore or waste rock. The waste rock is further categorized based on the formula/approach described in the Waste Rock Handling Plan.

c. In order to adequately characterize the waste rock within each respective geologic unit, please indicate the geological units that will be assessed with respect to the quantity of waste rock to be mined.

Response: The geological units used to assess and quantify NAG waste rock are limestone, marble, and skarn. For quantifying PAG waste rock, monzonite and porphyry are assessed.

d. This item does not require any further action. ADEQ will include the Compliance Schedule Item (CSI) to provide the data to ADEQ and require approval before changing the testing amount as mentioned in "The

amount of testing will vary thereafter based on the trend that is identified and proven by our model, or if we see a change in waste material based on blasthole testing". (Page 11 of PDF Attachment 5)

Response: Copper World acknowledges that this item will be included as a compliance item. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

e. Provide the cross-section of the proposed waste rock material placement for NAG, PAG, and AG in the pit, as well as the method used for their placement. Additionally, please explain how you would ensure the placement and thickness of the NAG in relation to AG and PAG material are maintained.

*Response: **Attachment 8** Waste Rock Placement – Annual Layouts (Hudbay, 2023) provides the cross-section of the proposed waste rock material placement for NAG, PAG, and AG materials. As noted above, the waste rock and ore will be categorized based on the assays collected from blasthole testing; this includes the characterization of NAG, PAG, and AG waste based on their geochemistry.*

This assay data is evaluated by Hudbay geology team to ensure proper designation of the materials. The designation is then uploaded to a real-time mining dispatch system or staked by surveyors in the field. After the material is designated, mining operations will proceed to load and haul the various material types to their assigned destinations.

The designated areas for PAG and AG placement will be controlled by Hudbay engineering and survey team to ensure that these materials are placed on a minimum base of 50 feet of NAG material. Similarly, through surveying, there will be a minimum final 50 feet cover on top of any PAG or AG materials, with a minimum of 30 feet covering the slopes. This will be ensured by the survey team through either GPS or drone surveying.

Item 10: (Based on the Preliminary Geologic Hazards Assessment report...):

a. Provide a description of a typical closure method and include drawings showing plan and cross-section views for adits and mine shafts that are known or will be discovered during operation.

*Response: The most common approach for closing mine workings will be backfilling with non-acid generating (NAG) material. Differences in the backfilling approach will depend on the size and location of the mine feature. A general closure approach for underground workings at the Copper World Project site can be found in the memo titled Typical Closure Methods for Underground Workings (**Attachment 9**; Hudbay, 2023). Detailed closure designs of these underground mine features will be performed as needed before construction, such as for mine features located within the footprint of Tailings Facility No. 1.*

b. This item does not require any further action. ADEQ will include the Compliance Schedule Item (CSI) that requires providing closure data for each adit and mine shaft inside the TSF and HLF footprints to ADEQ.

Response: Copper World acknowledges that this item will be included as a compliance item. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 11: (Preliminary geologic hazard assessment reports...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 12: (Water in the upstream stormwater collection...):

The accuracy of the water elevation assumption on both the TSF and HLF can have a major impact on their stability. Alluvium is typically characterized as loose and unconsolidated sediment, and is classified as a relatively young deposit in geologic time. To ensure the integrity of the storm water collection system under the HLF and TSF, the following items should be provided:

a. Provide the annual pipe settlement calculation for the pipes located beneath the TSF and HLF that aligns with the annual progression plan/deposition plan.

*Response: Elastic settlement calculations were performed along all of the planned stormwater conveyance pipe corridors (Section 3.0 in **Attachment 10** Stormwater Conveyance Pipe Settlement Analyses (WSP, 2023). Additionally, Section 4 in **Attachment 10** presents an evaluation of time-dependent settlements and annual settlements for a typical section under TSF-1.*

b. The provided settlement calculation is only considered elastic settlement in Attachment I.8, for example. Please provide the long-term foundation settlement due to loading of TSF and HLF during construction of these facilities.

*Response: An evaluation of long-term (time-dependent) foundation settlement has been provided in Section 4 in **Attachment 10** Stormwater Conveyance Pipe Settlement Analyses (WSP, 2023) for a typical section under TSF-1. The results indicate that the majority of consolidation due to annual incremental loading occurs within the first year after application of the initial lift (see Table 4-2 in **Attachment 10**). Consideration of this consolidation effect and long-term settlement is not anticipated to be significant for the Stormwater Conveyance Pipe design for the Project.*

c. Provide site specific consolidation data such as coefficient of consolidation (Cv) and Compression Index (CC) for the alluvium material.

*Response: See **Attachment 10** Stormwater Conveyance Pipe Settlement Analyses (WSP, 2023).*

d. The Modulus of 2,000 kips per square foot (ksf) utilized in the calculation is a value obtained from a textbook. Provide site-specific tests or justify/confirm the relevance and accuracy of this value.

*Response: An elastic modulus of 2,000 ksf was confirmed to be conservative based on the in-situ penetration testing (SPT) results from drillhole data as discussed in Section 2.4 in **Attachment 10** Stormwater Conveyance Pipe Settlement Analyses (WSP, 2023).*

Item 13: (Site Water Management report...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 14: (The property boundary and TSF footprints...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 15: (Calculate the magnitude of sulfate impacted water...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 16: (Please provide the following regarding the tailings stacking height):

a. Please provide a detailed annual deposition plan or progression plan that supports the information provided in Table 16-1 of the RAIS response. An example of such a plan can be found in Attachment 7 of the AMEC Dry Stack TSF Design Report, specifically on pages 73 through 95 of the report (Item 22a).

Response: An annual mine plan has been prepared to support a Class 4 cost estimate in accordance with the practices recommended by The Association for the Advancement of Cost Engineering (AACE) International (C4).

*The annual progression plan is presented in **Attachment 6** of this letter shows the TSFs, HLF, WRF, and the mine pits at the end of each operational year.*

b. Please provide a comprehensive plan for annual deposition throughout the life of the mine. This plan should include the location of the decant pond as well as the progression of the construction of the TSF.

*Response: The annual mine plan included in **Attachment 6** shows the progression of both TSFs throughout the life of the mine. The annual mine plan shows the limits of the decant ponds, referred to as supernatant pools, for each year at each of the five TSF cells.*

c. Please provide an annual mass balance for the TSF, which should include Cyclone sand, Fine tailings, and compacted berm materials. Additionally, please provide a filling curve to depict the progression of filling activities over time.

*Response: The estimated tonnage of tailings and heap ore placed in the TSFs and HLF, respectively, are provided on an annual basis on the progression figures in **Attachment 6**. An annual filling curve for the two TSFs is also presented in **Illustration 16-1** below. The illustration presents the cumulative fine tailings going into the impoundments and the cumulative cyclone sand tailings used to construct the TSF embankments. Also see **Table 16-1** for these materials quantities.*

As noted on Drawing No. 1042026 Tailings Storage Facility 1 Starter Dam Plan (Attachment I.10 of the September 2022 APP application), "TSF-1 starter dams are constructed with local borrow material (borrow areas 1, 2, and 3)", while the starter dams for TSF-2 will be constructed of local borrow material, or mine waste. The required fill (compacted berm materials) for each starter dam is:

- *TSF 1 Cell 1 – 2,704,000 tons (Year 0)*
- *TSF 1 Cell 2 – 1,585,000 tons (Year 0)*
- *TSF 1 Cell 3 – 1,677,000 tons (Year 1)*
- *TSF 2 Cell 1 – 1,381,000 tons (Year 4)*
- *TSF 2 Cell 2 – 2,760,000 tons (Year 4)*

Illustration 16-1 Tailings Storage Facilities Filling Curve

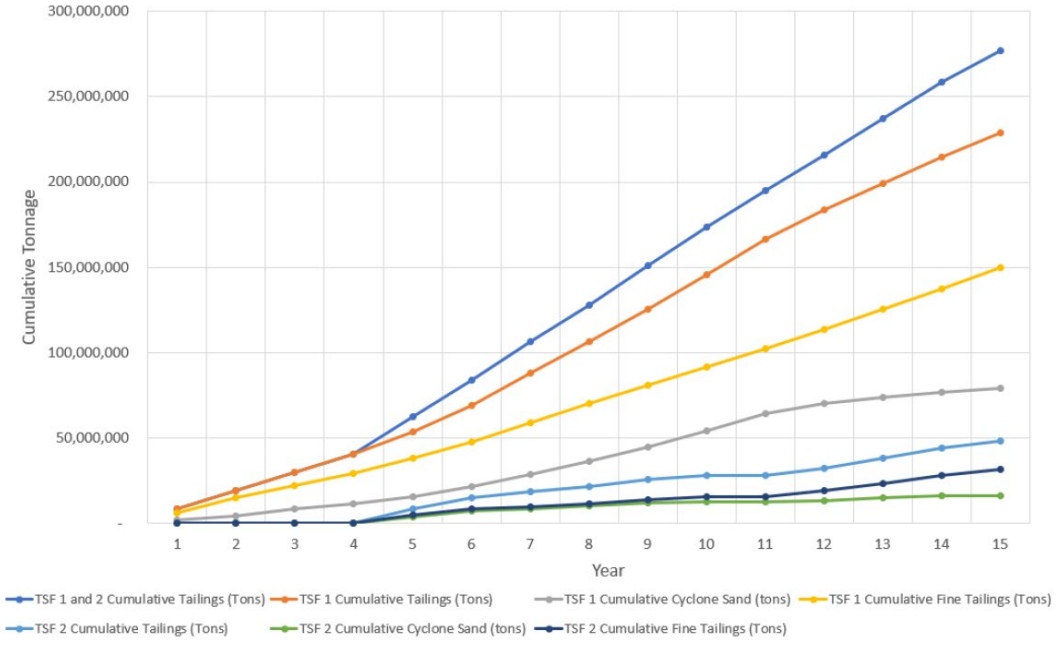


Table 16-1 Annual Mass Balance for the Tailings Storage Facilities

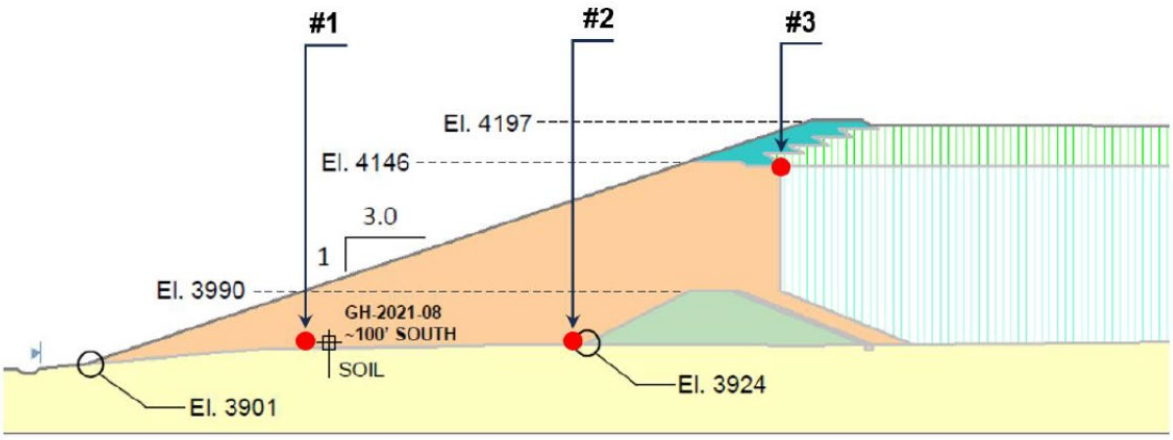
Year	*TSF-1 Cumulative Tailings (tons)*	*TSF-1 Cumulative Cyclone Sand (tons)*	*TSF-1 Cumulative Fine Tailings (tons)*	*TSF-2 Cumulative Tailings (tons)*	*TSF-2 Cumulative Cyclone Sand (tons)*	*TSF-1 Cumulative Fine Tailings (tons)*
1	*8,1146,894*	*2,016,732*	*6,130,162*	*0*	*0*	*0*
2	*19,221,121*	*4,274,045*	*114,947,076*	*0*	*0*	*0*
3	*29,978,946*	*8,168,221*	*21,810,725*	*0*	*0*	*0*
4	*40,412,458*	*11,409,519*	*29,002,939*	*0*	*0*	*0*
5	*53,656,354*	*15,796,771*	*37,859,583*	*8,560,449*	*3,795,920*	*4,764,529*
6	*68,779,367*	*21,244,734*	*47,534,633*	*115,154,264*	*7,033,262*	*8,121,002*
7	*87,834,478*	*28,699,402*	*59,135,076*	*18,458,179*	*8,685,950*	*9,772,229*
8	*106,172,309*	*36,272,935*	*69,899,374*	*21,441,621*	*10,163,608*	*11,278,013*
9	*125,684,668*	*44,756,668*	*80,928,000*	*25,410,311*	*11,836,674*	*13,573,637*
10	*145,524,190*	*53,907,218*	*91,616,972*	*28,191,308*	*12,429,016*	*15,762,292*
11	*166,581,588*	*64,150,498*	*102,431,089*	*28,191,308*	*12,429,016*	*15,762,292*
12	*183,801,814*	*70,103,265*	*113,698,549*	*32,116,790*	*13,260,190*	*18,856,600*
13	*199,171,841*	*73,966,851*	*125,204,991*	*37,836,823*	*14,677,634*	*23,159,189*
14	*214,289,327*	*76,848,337*	*137,440,991*	*44,104,507*	*15,931.318*	*28,173,189*
15	*228,759,113*	*79,219,131*	*149,539,983*	*48,142,921*	*16,339,614,*	*31,803,307*

d. The proposed monitoring instruments are required to be assigned an alert level that corresponds to quantifiable performance objectives. This ensures their effectiveness in monitoring objectives, consistency with the design assumptions, and detecting adverse conditions at an early stage. Provide the typical alert levels for the monitoring instruments in the TSFs. This may include but not be limited to vibrating wire piezometers, slope indicator, standpipe, prisms, InSAR etc.

Response: The design of the TSFs includes two sets of three piezometers for each of the five TSF cells. The three piezometers for each set will be installed at the locations where stability is critical, as shown in ***Illustration 16-2****. The first two piezometers (denoted #1 and #2 in* ***Illustration 16-2****) will be installed in the downstream cyclone dam embankment prior to the deposition of cyclone sands. The third piezometer will be installed near the dam crest once the TSFs begin the upstream embankment construction. A low and high trigger level has been developed for each set of piezometers with the first two being 20 and 40 ft of head, respectively. The third one has a lower trigger level of 10 and 20 ft of head for the low and high trigger levels, respectively. Piezometers will be read monthly or on an as-needed basis. Piezometer locations are shown on the annual progression plans in* ***Attachment 6****.*

Additional operational requirements of the TSFs, including monitoring observations, particle size distributions of the cyclone tailings, and surveys are included in the Tailings Operation, Maintenance, and Surveillance Manual in ***Attachment 2*** *of this letter (WSP, 2023). Actions to be performed if one of the trigger levels is exceeded, or if unusual observations are detected, are presented in the Emergency Preparedness and Response Plan, provided in Attachment 2 of the April 21, 2023 ADEQ RAIS response letter.*

Illustration 16-2 Typical TSF Cross Section Showing Piezometer Locations



e. As stated on page 10 of the April 21 response letter, it is assumed that excessive pore pressures are unlikely to form during this stage of the TSF operation. To support these assumptions and ensure the safety of the operation, please provide a comprehensive monitoring plan that verifies and tracks pore pressures during operation. This plan should include specific monitoring techniques and the frequency of monitoring (including but not limited to CPTs, drilling, etc.), as well as contingency measures in case of unexpected pore pressure changes.

*Response: See response **Item 16d** in this letter.*

Item 17: (Provide an estimate of water content during tailings placement...):

a. There appears to be a discrepancy between the information provided in Table 17-1 of the April 21 and the Appendix J Site water balance for cyclone sand tailings. To address this discrepancy, please provide an updated water balance that includes separate columns for water releasing from cyclone sand tailings, fine tailings, and whole tailings. This updated water balance should provide a detailed breakdown of water release from each of these sources, allowing for a more accurate assessment of the overall water balance of the site.

*Response: An updated water balance summary table is provided in **Attachment 11** (Water Balance. ADEQ Comments Items 17 and 20. Technical Memorandum). The water balance has been updated with the flow rate of water in the various streams of tailings. The original water balance was provided to ADEQ in the September 2022 APP application.*

Four (4) columns were added to the left side of the water balance summary table that includes the following: water in the tailings discharged from the mill, water in the thickened tailings (whole tailings), water in the cyclone tailings, and water in the fine tailings discharged to the TSF.

As a note, tailings are sent to a thickener prior to being pumped to the tailings facility. The thickener reduces the water in the tailings discharged from the mill to the tailings facility by approximately 58%.

Item 18: (Provide an analysis discussing if the tailings (and HLF, and WRF) composition is expected to degrade or become chemically altered, weathered, and aged): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 19: (Provide more information on the materials...):

a. Provide a detailed material specification and gradation that is acceptable for use as cover material. An example of such specifications can be found in Attachment 7 of the AMEC Dry Stack TSF Design Report on page 183, specifically in Appendix C.1.

*Response: **Attachment 12** provides the Preliminary Technical Specification for Earthworks Material and Construction (WSP, 2023). Cover Fill specifications are provided in Section 2.1.8.7 of **Attachment 12**.*

b. Based on Attachment 6, it appears that the majority of borrowed material will be sourced within the footprint of the TSF1. Additionally, Attachment 13 of the April 21 response letter indicates that the Cell 1 and 2 area will be covered with tailings within the first year, with Cell 3 being covered by the end of the second year. To facilitate the efficient use of borrowed material and cover the designated areas within the specified timeframe, please provide the location of the stockpile(s) for cover material as well as the geometry of the stockpile(s).

*Response: **Attachment 13** provides **Figure 19-1** Proposed Growth Media Stockpile Design (WSP, 2023). These stockpile locations are preliminary and may be modified and/or relocated to meet Project needs. Stockpiles would be constructed with 3H:1V slopes and stabilized (revegetated) until needed.*

c. Provide the results of tests conducted to determine the availability of required quantity and suitability of the borrow material for use as cover material.

*Response: Material requirements for the cover material (Cover Fill) as presented in the Preliminary Technical Specification for Earthworks Material and Construction (see **Attachment 12**) allows for the use of the majority of on-site alluvium. Additionally, refer to Attachment 6: Alluvial Cover Materials - Copper World Project Surface Facilities (TSFs and HLF" of "Copper World Project – Aquifer Protection Permit Application – Response to RAIS Letter" dated April 21, 2023), for an evaluation of the quantity of cover materials required for closure and reclamation of the heap leach and tailings facilities. Material test results are also provided in the following documents:*

- *(Wood, 2021) Geotechnical Site Investigation Memorandum – Heap Leach, Tailings and Waste Rock Facilities, Rosemont Copper World Project (dated December 1, 2021 (Appendix I.6 of the September APP application)*
- *(WSP, 2023) Supplemental Geotechnical Site Investigation Memorandum (dated September 13, 2023) (see **Attachment 14** of this letter)*

Item 20: (Has the water management plan considered...):

a. As mentioned on page 8 of Appendix E, the water balance for the Project site is based on an annual average rainfall of 19.73 inches from the Helvetia Weather Station data. However, it is important to take into consideration both wet and dry years to ensure the integrity of the water management system. "Wet and Dry year water balance is to maintain the integrity of our water management system during a wet year and ensure sufficient sources of water during a dry year.

*Response: The water management plan has been assessed for average, wet and dry climate conditions. The wet and dry scenarios were evaluated using 30 percent more or less precipitation than the average annual site precipitation of 19.73 inches, respectively. The wet and dry scenarios were modeled for every year of operations. Summary tables for the wet and dry climate scenarios are presented in **Attachment 11** (Water Balance. ADEQ Comments items 17 and 20. Technical Memorandum. WSP, 2023). The Flow ID numbers shown in these tables correspond to the ID's provided on the flow diagrams also presented in **Attachment 11**. Under all three scenarios, the site is in a negative water balance condition (no excess water).*

The sensitivity evaluation indicated that a deficit still occurred during wet conditions. This scenario assumed the use of all permitted and/or available groundwater and surface water sources. During dry conditions, this deficit is larger. Water demands will be managed by the mine operation, or additional water will be obtained. Mitigation measures may also include reducing the tailings production rate or reducing the heap irrigation rate.

Table 20-1 *provides a summary of the side wide freshwater makeup requirements during the peak demand years of 5 to 8 for each climate case, where the water balance calculation indicates a deficit. Water consumption will be monitored throughout operations and water balance calculations updated as needed to predict and mitigate operational constraints.*

Table 20-1 Site Wide Makeup Water Deficits During the Life of the Mine

	Climate Scenario		
	Dry (ac-ft/year)	***Average (ac-ft/year)***	***Wet (ac-ft/year)***
Year 5	*1,407*	*729*	*50*
Year 6	*1,891*	*1,156*	*421*
Year 7	*1,573*	*806*	*40*
Year 8	*1.558*	*816*	*74*

b. To improve clarity and facilitate the movement of water flow through our system, please provide a simplified site-wide water balance flow chart showing inputs and outputs for each APP facility as applicable. An example can be found in the Attachment 18 Tetra-tech-leaching facilities design (pdf Page 57 of the report).

Response: Simplified site-wide water balance flow charts have been created and are presented in ***Attachment 11*** *(Water Balance. ADEQ Comments items 17 and 20. Technical Memorandum. WSP, 2023). The Flow ID numbers shown on the flow charts correspond to flow values presented in Attachments 1, 2, and 3 of* ***Attachment 11*** *(Water Balance. ADEQ Comments items 17 and 20. Technical Memorandum. WSP, 2023).*

c. Please provide a water balance demonstrating taking into consideration all inputs and outputs to demonstrate appropriate sizing of each proposed pond to be permitted in the APP such as Pregnant Leach Solution (PLS) Pond, HLF North Stormwater Pond, HLF South Stormwater Pond, Raffinate Pond, Reclaim Pond, Process Area Stormwater Pond and Primary Settling Pond.

Response: Pond sizing memorandums have been prepared and are presented in ***Attachment 11*** *(see Attachments 5, 6, and 7 of the Water Balance. ADEQ Comments items 17 and 20. Technical Memorandum. WSP, 2023).* ***Table 20-2*** *presents a summary of pond sizes.*

Table 20-2 Pond Sizing Summary

Pond	*Required Storage Volume (ac-ft)*	*Pond Storage Volume Below Freeboard (ac-ft)*	*Attachment Number in the Waler Balance Memo (see Attachment 11 of this Letter)*
Pregnant Leach Solution (PLS)[1]	*18.92*	*43.71*	*5*
HLF North Stormwater[1]	*55.67*	*43.85*	*5*
HLF South Stormwater[1]	*55.67*	*43.71*	*5*
Raffinate[2]	*18.26*	*18.24*	*6*
Reclaim[2]	*19.03*	*18.25*	*6*
Process Area Stormwater[2]	*15.81*	*18.82*	*6*
Primary Settling	*44.93*	*46.50*	*7*

1. *The PLS and HLF Stormwater ponds have a combined capacity below freeboard of 131.41 ac-ft, which exceeds the combined three ponds capacity requirement of l30.25 ac-ft.*
2. *The Raffinate, Reclaim, and Process Area Stormwater ponds have a combined capacity below freeboard of 55.32 ac-ft, which exceeds the combined three pond capacity requirement of 53.10 ac-ft.*

d. The application included the following statement "Some of the critical mine facilities are designed to withstand an extreme storm event such as storms with a return frequency of 1:1,000-year". Provide clarification regarding the response to Item 20 in the 20220921 APP Application_Copper World-RAIS PDF, as to the specificity of the facilities that are designed to withstand extreme storms.

Response: The HLF and the two TSFs are designed with upgradient surface water management facilities to withstand the 1 in 1,000 year, 24-hr storm event. Facilities are primarily surface water diversion channels, berms, and culverts, but will include any required appurtenances such as revetment armoring, headwalls, and earthworks. Additionally, stormwater control structures remaining at closure will be designed to this same criteria.

Additionally, the Plant Site is located on an elevated platform with facilities constructed upgradient. Facilities within the Plant Site are therefore protected from large storm events.

Geotechnical Engineering Items

Geotechnical Engineering Items covered Items 21 through 48 in ADEQ's original February 27, 2023, Comprehensive Request.

Item 21: Potential Failure Modes (PFM)):

a. Please provide a justification for using three categories for consequence and likelihood instead of five categories. Alternatively, you may provide an updated Attachment 2C that explains the rationale behind using three categories? For reference, please see the example provided in https://www.resolutionmineeis.us/sites/default/files/references/gannett-fleming-2020.pdf.

*Response: The Failure Modes and Effects Analysis Report (FMEA) has been revised with a five-by-five category risk matrix and updated as Revision 1 (see **Attachment 4**).*

b. Regarding Potential Failure Mode 2 - TSF Upstream Raise Failure (PFM 2) mentioned on page 4 of Attachment 2C (page 7 of PDF), please provide a rationale for not proposing any site investigation, such as Cone Penetration Testing (CPT).

*Response: By design, static liquefaction of the upstream portion of the raises should not occur. Proper handling and placement of the tailings (as implemented in the CQA program) and operation (as implemented in the OMS) would preclude the conditions for static liquefaction of the tailings to develop. However, if deviations from the design, construction, or operations plan were to occur, that could lead to static liquefaction of tailings. Regular surveillance is proposed in the Tailings Operation, Maintenance, and Surveillance Manual (Section 5.2 in **Attachment 2**). The surveillance is accomplished through visual inspection and thorough instrumentation monitoring. If unexpected conditions arise during operations, or additional characterization data are required during future design activities, more instrumentation and investigation may be implemented on an as-needed basis. The additional investigation and instrumentation could include activities such as dam movement monitoring and cone penetration testing (CPT).*

c. Regarding Potential Failure Mode 9 - Saturation of Heap Leach Ore (PFM 9) described on page 5 of Attachment 2C (page 8 of PDF) which states "Deterioration of heap leach ore resulting in reduced percolation/permeability of the ore could result in saturation of the heap material. This could result in stability of the heap leach material being compromised". This statement appears to contradict the response to Item 37. Please provide a general mitigation plan to resolve in case of saturation of the heap material.

*Response: The response to item 37 is in reference to saturation of the foundation materials and the HLF liner system. Potential Failure Mode 9 is related to saturation and stability of the heap leach ore stack and not the foundation materials. An updated Heap Leach Facility Operation, Maintenance, and Surveillance Manual (see **Attachment 3.** WSP, 2023) is provided with mitigation actions addressing potential saturation of the heap material.*

Item 22: (Provide the reference material...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 23: (Provide TSF deposition planning and material balance …):

The assumption of a 400 ft beach distance is critical for conducting the seepage analysis and piezometric line conclusion in the stability analysis, please provide following items:

a. Please provide the annual progression of the Tailings Storage Facility (TSF) for the entire life of the mine. A sample of this information can be found on pages 69 to 96 of the AMEC Dry Stack TSF design.

*Response: As presented in **Attachment 6**, an annual mine plan (progression plan) has been prepared to support a Class 4 cost estimate in accordance with the practices recommended by AACE International (C4). The annual progression plan shows the TSFs, HLF, WRF, and the mine pits at the end of each operational year throughout the entire life of mine (LOM).*

b. Please provide a tailings mass balance that includes sand and borrow source material for the Life of Mine (LOM), matched with the expected mine production. A sample of the required information can be found on page 95 of the AMEC Dry Stack report.

*Response: **Illustration 16-1** and **Table 16-1** of **Item 16** present the tailings mass balance throughout the life of the mine. This mass balance includes the cumulative tailings sent to each TSF along with the cumulative cyclone and fine tailings. Construction of each cell's starter dam will consist of imported fill or mine waste rock (not tailings). The estimated Engineered Fill quantities are also presented in **Item 16** of this response letter. Engineered Fill will be sourced from onsite borrow areas.*

Item 24: (Provide a contingency plan...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 25: (Provide information for the starter dam design):

a. Please provide the definition and material specifications, such as gradation and plasticity index, for the soil-like material. A sample of this information can be found on page 185 of the AMEC Dry Stack TSF design.

*Response: **Attachment 12** provides the document title Preliminary Technical Specification for Earthworks Material and Construction (WSP, 2023)*

b. On page 88 of the 20220921 APP Application_Copper World-Main Application, it states that the Alluvium material in the project area consists of unconsolidated sand and gravel deposits that are variable in nature due to the formation. The document also mentions that water in the shallow alluvium occurs temporarily during or following substantial and prolonged storm events. Please provide justification as to why limited laboratory test data is considered sufficient for the selection of materials for the TSF start dam and cover.

*Response: A supplementary geotechnical investigation has been completed. See **Attachment 14** (WSP, 2023) for a summary of 2023 geotechnical characterization results. These additional laboratory test results were considered in the development of the preliminary technical specifications for earthworks provided in **Attachment 12**.*

c. Based on the available data in the AMEC Dry Stack TSF design report, direct shear tests were performed on the non-plastic soil samples and the friction angle was found to be as low as 33. Additionally, literature suggests that shear strength can be as low as 28 depending on the plasticity index. In order to ensure the stability and safety of the tailings storage facility, it is essential to have accurate shear strength data for alluvium samples with plasticity index values similar to that of GT-2022-13 at a depth of 0-2.5. Therefore, please provide the required shear strength data for the requested alluvium sample.

*Response: The referenced Dry Stack TSF is located at a site that is a significant distance away from the sites of currently planned two TSF facilities and the HLF. As shown in the summaries of the 2021 investigation and recent 2023 supplementary investigation (**Attachment 14**. WSP, 2023), a significant presence of high-plasticity clay was not encountered in either campaign.*

Item 26: (Provide a detailed stability monitoring plan...):

a. Please provide justification for the absence of Vibrating Wire (VW) piezometers in TSF1 – Cell 2.

*Response: VWPs are proposed for TSF-1 Cell 2. Refer to the Tailings Operation, Maintenance, and Surveillance Manual (**Attachment 2**. WSP, 2023) for the proposed instrumentation plan for the TSFs. Also see the annual progression plans in **Attachment 6** for piezometer locations within TSF-1 and TSF-2.*

b. Please provide typical cross-sections and installation depths for Vibrating Wire (VW) piezometers during the raising of the TSF.

*Response: The Tailings Operation, Maintenance, and Surveillance Manual (**Attachment 2**. WSP, 2023) provides a typical cross-section showing the proposed piezometer locations (depths). Also see the annual progression plans in **Attachment 6** for a plan view of the planned piezometer locations within TSF-1 and TSF-2. **Illustration 16-2** of this letter also shows a typical cross section of the planned piezometer installation locations.*

c. This item does not require any further action at this time. ADEQ will include a CSI for the TSFs that a site investigation using CPT and piezometers information needs to be provided to ADEQ approximately every three years.

Response: Copper World acknowledges that this item will be included as a compliance item. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 27: (Provide the downstream sand placement...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 28: (**Provide a plan for minimizing the risk of static liquefaction...):** No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 29: (Provide the criteria for selecting the two cross sections...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 30: (Provide justifications for using different…):

1. Please provide the calculation used to determine the natural frequency period 0.18 from Graph 4-56 page 84 of Appendix I-1 for TSF, HLF and WRF.

Response: Figure 4-56 of the TSF Stability Analysis Memo (Appendix I.1 of the September APP application) references the response spectral curve that was used to estimate acceleration based on the calculated time period. The small circle pointed out on the curve is just a typical call-out. i.e., it does not reference a specific number. Time periods usually vary with slope sections and are estimated based on the slope configurations and shear wave velocity of the dam fill material. Per the TSF Stability Analysis Memo, the two sections (TSF-1B and TSF-2B) were selected based on their potential to impact a roadway open to the public; and therefore having the potential to impact public safety and human life. For this calculation, the highest dam (H_dam) was calculated as the difference between the height of the crest (H_crest) and the foundation of the starter dam (F_starter).

Also involved in the calculation is the shear wave velocity associated with the dam fill material. The shear wave velocity (V_s) of compacted dam fill or cyclone sands was assumed to be a Class C or D condition, respectively, per the reference from the USGS Paper 1551-A, "The Loma Prieta, California, Earthquake of October 17, 1989

– Strong Ground Motion". These selections assumed classification of the compacted dam fill as stiff clays or dense sandy soils with a typical average shear wave velocity of 950 ft/sec and cyclone sand being loose or soft soils with a typical average shear waste velocity of 500 ft/sec. The fundamental period (T_s) of the configuration is calculated in Bray and Travasarou (2007) by the equation below:

$$T_s = 2.6\frac{H_{dam}}{V_s}$$

The spectral acceleration at a degraded period equal to 1.5 times the fundamental period, or Sa(1.5T_s), was compared using the median spectra on Figure 4-56 from the TSF Stability Memo. Both conditions of Class C and D were evaluated based on the above procedure inputs, and the higher value of the two cases was conservatively presented as the output in Table 4-9 of the TSF Stability Memo (Appendix I.1 of the September APP application).

2. Table 5 of the report shows that the value for 10,000 years is 0.396, and half of that value would be 0.198. Please explain how to arrive at the value of 0.17g using the information from Table 5.

Response: The 0.396g represented in Table 5 from the LCI (2022) is a spectral acceleration which is different from the design peak ground acceleration (PGA). Per recommendations from Hynes-Griffin and Franklin (1984) as listed in the TSF Stability Analysis Memo (Appendix I.1 of the September APP application), the PGA value should be used for the pseudo-static analyses instead of spectral accelerations.

Item 31: (Provide the justifications for including alluvial...):

a. Alluvium refers to loose and unconsolidated materials, such as clay, silt, sand, gravel, or organic matter, that are deposited by flowing water. Alluvium can be found in riverbeds, floodplains, deltas, alluvial fans, or other areas where water runs or overflows. It is considered a relatively young deposit in geological time. Please provide a settlement analysis for the undrained system, including long-term foundation settlement.

*Response: As discussed in Section 3.0 (**Attachment 7**. WSP, 2023), there is no overburden pressure over the Perimeter Seepage Collection Trenches, and the collection trenches are proposed to end in bedrock or other competent and low-permeable native material; therefore, incurred future settlements are anticipated to be insignificant. As for the TSF underdrains, the design gradients as summarized in the design sheets in **Attachment 7** are all steeper than 3%, and potential changes due to foundation settlement from future loading of tailings are not anticipated to significantly affect the performance of the TSF underdrains. See Section 3.0 in **Attachment 7** TSF Seepage Collection System Design (WSP, 2023).*

As the majority of the foundation consists of alluvium with a wide range of permeability based on 3 tests, provide the following items:

c. Please clarify/justify the 98% versus 80% of the following statement in Appendix H and Appendix M / Attachment 1. "Solution not captured by the seepage collection system would infiltrate into the bedrock below the TSFs. Based on seepage modeling of the seepage collection system, approximately 98% of seepage from the TSF will be captured and reused in the process circuit." – Page 8 (12 pdf) Appendix M / Attachment 1. "According to Appendix H, page 9 of the PDF, it is mentioned that "80 percent" of the water will be collected, which needs to be updated.

*Response: The seepage collection system is designed to achieve 98% recovery. See **Attachment 7** TSF Seepage Collection System Design (WSP, 2023).*

d. A separate column in Table 5 of Appendix E, page 71 (Site Water Balance) should be provided to show the amount of captured water.

*Response: As shown in the column labeled "Water in Thickened Tailings Discharged to Cyclone" with a Flow ID of 7 in the Water Balance results table in Attachment 2 of **Attachment 7** TSF Seepage Collection System Design (WSP, 2023), 4658 gpm of water is in the tailings stream (coarse and fine) during a production rate of 60,000 tpd. A maximum annual average of 1551 gpm is being returned from the TSFs as shown in the column*

labeled "Decant and Seepage Water to PS Pond" with a Flow ID of 8 ***(Attachment 7)****. The flow rate of return water (Flow ID 8) considers the following:*

- *Water loss interstitially within the tailings*
- *Water loss to evaporation from the supernatant pool and tailings surfaces*
- *Seepage loss into the subsurface below the foundation*
- *Water added to the system from precipitation*

See ***Attachment 7*** *TSF Seepage Collection System Design (WSP, 2023).*

e. Provide detailed information regarding the seepage collection system, including the depth of the trench to the bedrock or entire TSF plan view, material specification for the backfill, and location of the discharge pump to the settling pond (Figure 13 of Appendix E, page 42)

Response: See the attached seepage collection system design in ***Attachment 7*** *TSF Seepage Collection System Design (WSP, 2023), including the depths of the perimeter seepage collection trenches, the location of the planned seepage collection trenches, and the discharge pump locations. Material specifications for the drain rock are presented in Section 2.1.8.4 in the Preliminary Technical Specification for Earthworks Material and Construction in* ***Attachment 12*** *(WSP, 2023).*

Item 32: (Provide the plan view map for construction...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 33: (Provide a plan view map...):

a. Please provide a definition and material specification for the term 'Loose alluvium/colluvium materials" that will be removed from drainages throughout the entire footprint of TSF and HLF.

Response: See Section 2.1.4 in the Preliminary Technical Specification for Earthworks Material and Construction in ***Attachment 12*** *(WSP, 2023) for the loose alluvium/colluvium material specification.*

b. Please provide a geotechnical material specification for "Unsuitable alluvium/colluvium".

Response: See Section 2.1.4 in the Preliminary Technical Specification for Earthworks Material and Construction in ***Attachment 12*** *(WSP, 2023) for the unsuitable alluvium/colluvium specification.*

Item 34: (Annotate the cross sections...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 35: (Provide justification for the phreatic line...):

a. Response (c) states that "the undrained shear strength of the tailings was assumed based on a review of data in published literature." Please provide the table that contains a summary review of the data in published literature, and justify why the assumption is conservative for the project.

*Response: See **Table 35-1** below from Vick (1990) referenced in Appendix I.1 Tailings Storage Stability Memorandum of the September 2022 APP application (Wood, 2022a). This table displays different material types and associated geotechnical properties.*

Table 35-1 Typical Total-Stress Strength Parameters (reproduced from table 2.9 of Vick, 1990)

Material	*Initial Void Ratio*	*Total Friction angle (degree)*	*Total Cohesion (psf)*	*Source*
Copper tailings, all types	*-*	*13-18*	*0-2,000*	*Volpe, 1979*
Copper Beach Sands	*0.7*	*19-20*	*700-900*	*Wahler, 1974*
Copper Slimes	*0.6*	*14*	*1,300*	*Volpe, 1975*
Copper Slimes	*0.9-1.3*	*14-24*	*0-400*	*Wahler, 1974*
Copper Slimes	*1.1*	*14*	*0*	*Unpublished*

*Figure 4-3 in the Tailings Storage Stability Memorandum (Wood, 2022a. September 2022 APP application) shows the selected lowest bound with data plotted from **Table 35-1**, which also included the following values used to produce the curves:*

- *"Copper All Type Tailings – Average, Volpe, 1979": Cohesion = 1,000 psf and friction Angle = 15.5 degrees*
- *"Copper Slime Case 1, Volpe 1975": Cohesion = 1,300 psf and friction angle = 14 degrees*
- *"Copper Slime Case 2, Average, Wahler 1974": Cohesion = 200 psf and friction angle = 19 degrees*
- *"Copper Slime Case 3, Unpublished": Cohesion = 0 psf and friction angle = 14 degrees*

Based on the above and the comparison shown in Figure 4-3 of the Tailings Storage Stability Memorandum (Wood, 2022a. September 2022 APP application), this material property selection approach is considered conservative since the lowest bound was used for the analysis.

Item 36: (Provide supporting data...):

a. Provide the material specifications for the embankment/structural fill and the overliner.

*Response: See Section 2.1.8.2 and Section 2.1.8.6 in the Preliminary Technical Specification for Earthworks Material and Construction in **Attachment 12** (WSP, 2023), respectively, for the embankment/structural fill and the overliner specifications.*

Item 37: (In the evaluation of the HLF. Stability Analysis...): See above – Item 21.c

Response: See the response to Item 21c.

Item 38: (The bench slope for HLF...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 39: (Provide the data. Stability Analysis Heap Leach Facility...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 40: (Provide justification for using the circular failure for the HLF...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 41: (Provide justification...):

a. Since the thickness of alluvium is highly variable based on the limited results presented in Table 2-1 in Attachment 20, provide an isomap that shows the top of the bedrock and the thickness of alluvium for the TSF and HLF.

*Response: An isopach map of the alluvium thickness was prepared for the HLF and TSF areas and is provided in **Attachment 15** (WSP, 2023). The following data were used to develop the thickness isopach map:*

- *Test pits and boreholes of the 2021 investigation as documented (Appendix I.6 of September 2022 APP Application. Wood, 2021).*
- *Test pits and boreholes of the 2023 investigation that was recently completed (**Attachment 14**).*

Item 42: (Provide supporting data...):

a. This item does not require any further action at this time. ADEQ will include the Compliance Schedule Item (CSI) that requires providing waste rock strength data throughout the operation when more information becomes available.

Response: Copper World acknowledges that this item will be included as a compliance item. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

b. Provide sensitivity analysis with the lower number as the data is limited for the current project.

*Response: For Foundation Soil characterization, additional laboratory tests have been performed as a part of the supplementary geotechnical investigation completed in 2023 (see **Attachment 14**). These results further support the assumed strength of Foundation Soil used previously in the WRF Stability Memorandum (Wood 2021b,* Appendix I.3 in the September 2022 APP application*). **Figure 42-1** (see **Attachment 16**) provides a summary of strengths from the direct shear tests against the shear strength of Foundation Soil used in the original analyses (Wood 2021b). The dashed line represents the shear strength used in the original analysis.*

A sensitivity study was performed with the following alternative strengths selected as hypothetical cases:

- *Case 1: Assume Foundation Soil with a shear strength characterized with a zero cohesion and 35-degree friction angle (which is 1 degree lower than the design value that was used in the WRF Stability Memorandum, Wood 2021b). For Waste Rock, it was conservatively assumed to be entirely composed of coarse-grained alluvium/colluvium soils with a shear strength characterized with a zero cohesion and 35-degree friction angle (which is 2 degrees lower than the Waste Rock design value that was used in the WRF Stability Memorandum, Wood 2021b).*
- *Case 2: Assume Waste Rock entirely as a Rockfill of "Low density, poorly graded, weak particles" which represents the lowest boundary of rockfills studied by Leps, T.M. (1970), "Review of Shearing Strength of Rockfills", Journal of the Soil Mechanics and Foundation Division, American Society of Civil Engineers, SM4, Vol. 96, July 1970.*

*Results of the sensitivity study are presented in **Figures 42-3 through 42-14** (see **Attachment 16**) and summarized in **Table 42-1** below. Calculated factors of safety from the sensitivity study all meet or exceed the slope design criteria presented in the WRF Stability Memorandum (Wood 2021b). For static conditions, the minimum FoS is 1.3, and for pseudo-static conditions the minimum FoS is 1.0. For reference, the FoS numbers presented in Wood (2021b. Appendix I.3 in the September 2022 APP Application) are also shown in **Table 42-1**.*

Table 42-1 Summary of Sensitivity Study with Alternative Strengths

Section ID	Wood (2021)		Case 1 – Calculated FOS		Case 2 – Calculated FOS	
	Static	Pseudo-Static	Static	Pseudo-Static	Static	Pseudo-Static
WRF01	1.44	1.31	1.34	1.24	1.71	1.55
WRF02	1.36	1.24	1.32	1.21	1.59	1.46
WRF03	1.59	1/44	1.48	1.34	1.73	1.56

Item 43: (Provide justification. Pit slope design Study…): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 44: (For joint structure evaluation...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 45: (Provide a report presenting details. Rosemont Pit...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 46: (Provide details for any dewatering program...):

a. Based on the results of the groundwater model, it is predicted that the phreatic surface (represented by the yellow contour in Attachment 22, Figure 46-2) will recede by over 300 feet from the slope face in the Gila formation in cross section R4, as indicated by the Pre-Feasibility Slope Design Study. However, it should be noted that the pore pressure displayed in Figure 46-2 is not consistent with the stability shown in Figure H18 (page 307 of I.5 Pit Slope Design.pdf). Please provide the updated stability analysis for cross section R4 the Rosemont pit, taking into account the new pore pressure analysis.

   Response: An updated slope stability analysis was performed by WSP for cross section R4 using the results of the dewatering scenario based on the Project's groundwater model (see document titled Copper World Project – Rosemont Pit – Dewatering Scenario [Piteau, 2023] in Attachment 21 of the April 21, 2023 RAIS response letter). For reference, the location of cross section R4 is shown in ***Figure 46-1*** *(see* ***Attachment 17****). As shown in* ***Figure 46-2****, the updated stability analyses indicate marginally higher factors of safety as compared with the results from Figure H18 (page 307 in Attachment I.5 Pit Slope Design of the September 2022 APP application).*

   *The factors of safety are marginally higher in the updated slope stability analysis (****Figure 46-2****) because the phreatic surface, represented by the line between the yellow and gray contour, is different from the phreatic surface assumed in the original analysis (see Figure H18, page 307 in Attachment I.5 Pit Slope Design of the September 2022 APP application). The phreatic surface in the updated analysis is lower in the Gila formation, i.e., the phreatic surface is drawn down by the simulated dewatering wells in this pit sector.*

   Additionally, the pore pressures from the groundwater model dewatering scenario used in the updated analysis are lower than those assumed in the original analysis (see Figure H18 page 307 in Attachment I.5 Pit Slope Design of the September 2022 APP application). The original analysis included a water table representation of the pore water pressures, and hydrostatic pore water pressures below the water table were assumed (see Figure H18 page 307 in Attachment I.5 Pit Slope Design of the September 2022 APP application).

Item 47: (Provide justification...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 48: (Provide QA/QC for all the discharging facilities...):

The underdrain seepage collection system is crucial for maintaining stability and capturing water in the TSF.

a. Please provide a plan view, longitudinal profile and cross sections that includes the detailing of the installation depth of the underdrain seepage collection system under the TSF.

*Response: See response to Item 31 and **Attachment 7** TSF Seepage Collection System Design (WSP, 2023).*

General Hydrogeology Items

General Hydrology Items covered Items 49 through 63 in ADEQ's original February 27, 2023 Comprehensive Request.

Item 49: (The DIA based on the groundwater modeling indicates...): The response is satisfactory.

In the event of an exceedance at a POC location, the permit will require the permittee to investigate and implement mitigation measures, which will be treated as a corrective action. The pumpback scenario presented in Appendix F.2 was a hypothetical scenario, and it is assumed that wells would be installed and operated in a more targeted manner. ADEQ recommends conducting additional simulations to demonstrate the area of influence and capture for single well scenarios.

*Response: Based on ADEQ's recommendation, Piteau used the Project groundwater model (Water Quantity Impacts Assessment. Appendix F.2 of the APP application, September 2022) to demonstrate the area of influence and capture zone for single pump-back wells. Three hypothetical pump-back wells were set up in the model to represent three different hydrogeology scenarios (**Attachment 18** Figure 49-1). The pump-back wells and their hydrogeology are summarized below:*

- *fPBW-14 (North well), Tertiary Intrusive, K = 3.066E-02 ft/d*
- *fPBW-22 (Center well), Paleozoic Carbonate, K = 2.035E-02 ft/d*
- *fPBW-28 (South well), Precambrian bedrock, K = 3.589E-02 ft/d.*

The locations of the hypothetical pump-back wells were planned sufficiently distant from each other to prevent interference. The wells were simulated to be 800 ft deep with a screen across the bottom 700 ft (model layers 1 through 5). Each well was simulated to pump at a rate of 20 gpm.

A total of fifty-two particles were placed in the center of layer 1 along a north-south line in the western part of the TSF-1 facility; one particle was placed in each model grid cell along the north-south line. The particles were simulated to be released on the first day of mining and were tracked until capture by their respective pump-back well. A total of twenty-seven particles were captured by the three pump-back wells.

The particle traces define the capture zone for each hypothetical pump-back well. The approximate capture zone widths for the three scenarios are:

- *fPBW-14 (North well), 1,664 ft*
- *fPBW-22 (Center well), 848 ft*
- *fPBW-28 (South well), 1,100 ft*

The average capture zone width is about 1,200 ft. These results are consistent with the conceptual hydrogeology and the assumptions used for this modeling scenario. The differences between the three examples illustrate that several factors contribute to capture zone geometry. Small variations in hydraulic conductivity and hydraulic gradient can result in capture zone width variations of a factor of two or more.

Item 50: (Per A.RS. § 49-244, the POC is defined as a vertical plane downgradient...):

No further comments on these items. The information provided for POC locations 7 through 10 is adequate. The information describing the proposed well screen intervals is acceptable.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 51: (TSF: The standard deviation sensitivity analysis...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 52: (HLP: The composite seepage chemistry...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 53: (Broadtop Butte Pit: The sensitivity analysis...): See below - Item 58.

Response: See response to Item 58.

Item 54: (Copper World Pit: Simulated pore water chemistry...): See below - Item 58.

Response: See response to Item 58.

Item 55: (Heavy Weight Pit: The modeling results...): See below - Item 58.

Response: See response to Item 58.

Item 56: (Elgin Pit: The modeling results...): See below - Item 58.

Response: See response to Item 58.

Item 57: (Peach Pit: The modeling shows...): See below - Item 58.

Response: See response to Item 58.

Item 58: (The facilities in items 51 through 57 are listed as discharging facilities...):

The response describes mitigation strategies for the mine pits following closure and in post-closure as including possible pore water monitoring, low flow pumping to maintain capture, and the use of covers to limit precipitation. If these are the preferred mitigation methods, and are found to be required, they should be included in the general closure strategy updates and accounted for in the closure cost estimates. At the time of closure if these are to be implemented, details regarding well design and installation, pumped water management, and the cover design will need to be included in the closure plan."

Response: The April 21, 2023 response letter provided mitigation strategies for the mine pits should concerns arise related to potential groundwater degradation due to constituents elevated above Arizona Aquifer Water Quality Standards (AWQS) in the satellite pits (Peach, Elgin, Heavy Weight, Copper World, and Broadtop Butte) following the cessation of pit dewatering.

Updates to the closure plan and associated costs, in conjunction with updates to the groundwater and geochemical models, will be performed throughout the life of the Project. Should these refinements indicate a definitive concern related to the potential for AWQS exceedances at point of compliance (POC) well locations following the cessation of pit dewatering, updated closure strategies and associated mitigation would be incorporated into the closure cost estimates at that time.

The assumed schedule for updates to the closure plan and closure cost estimate is every 5 years.

Item 59: (What is the buffering capacity...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 60: (Please demonstrate that the locations of the proposed POCs...):

a. Please clarify the response if these companion monitoring wells described in the original application or provided as new information.

Response: The companion monitoring wells were introduced in response to Item 60 in the April 21, 2023 RAIS response letter. These companion wells were not included in the original September 2022 application.

Project facilities will be monitored for compliance with AWQS at the POC monitoring locations. As necessary, groundwater monitoring will also be augmented using non-POC facility monitoring wells (or companion monitoring wells) in areas where POC wells are very close to private land boundaries. These companion wells would be located upgradient of its corresponding POC well. Placement would be closer to the facility footprint to provide advanced notification of groundwater quality changes that could affect compliance at a POC well.

b. If these companion wells are included in the post closure plan, the cost of monitoring will need to be added to the facility closure estimate updates.

*Response: The monitoring costs associated with these companion wells were added to the post-closure cost estimate. See **Item 1 and Attachment 1** for updated closure and post-closure costs. A total of ten (10) POC wells are assumed along with 10 companion wells.*

Item 61: (The applicant has stated that the Rosemont Pit will not be a discharging facility...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 62: (Please provide a detailed summary that describes the mine pits...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 63: (A.A.C. R18-9-A202(A)(8)(b)(vii) and (viii); please provide data/documentation...):

a. It appears that Attachment 4 does not cover the characterization of soil or vadose zone in the TSF or HLP areas. It is recommended that the characterization of the potential for pollutants to leach from soils or the vadose zone should take into account pollutants that may be present in the soil even if they are not the result of spills or similar incidents. ADEQ will include the Compliance Schedule Item (CSI) to provide a characterization plan (which can consist of a more detailed study of site history or the collection and analysis of representative soil samples), within the footprints of the TSFs and HLP.

Response: Alluvium and abandoned mined land material samples were collected for geochemical characterization from the TSF and HLP areas of the Copper World Project during two separate field seasons. Geochemical characterization of alluvium and slag materials were previously provided in the following documents:

- *Characterization of alluvium materials provided in Appendix G.2 of the September 2022 APP application (Piteau, 2022). See memorandum titled Supplemental Geochemical Samples for Copper World Project (Piteau, 2022).*
- *Characterization of the Columbia Smelter slag material provided in Attachment 4 of the April 21, 2023 response letter to ADEQ. See memorandum titled Waste Rock Placement on Historic Slag (Geochemical Solutions, 2023).*

Additional alluvium samples were collected in June 2023 from within the footprints of the tailings and heap leach areas in addition to samples taken in and around the abandoned Bulldozer Mine area. The abandoned Bulldozer Mine is located within the footprint of Tailings Facility No. 1.

*Analytical test results for these additional samples are provided in **Attachment 19** in a memorandum titled Copper World Project Baseline Soil and Surface Materials Sampling and Analysis (Piteau, 2023).*

Although this work was intended to be done as a compliance item, a sampling and analysis program and associated memorandum were completed to fulfill the requirements of this item.

Discharge Impact Analysis - Groundwater Modeling Items

Discharge Impact Analysis – Groundwater Modeling Items covered Items 64 through 71 in ADEQ's original February 27, 2023 Comprehensive Request.

Item 64: (In Section 3.3 (Model Calibration...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 65: (The predictive modeling...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 66: (Please provide a comparison...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 67: (Appendix F.2 states...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 68: (Please provide a figure showing the domain of the model...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 69: (Please provide a more in-depth summary...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 70: (Please provide additional particle tracking simulations...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Item 71: (Please provide cross-sectional views of the model-simulated groundwater elevation...): No further comments on this item.

Response: Copper World submitted a satisfactory response for this item on April 21, 2023. ADEQ does not require further comments on this item (ADEQ IR Comprehensive Requests, letter dated June 23, 2023).

Please do not hesitate to contact me at (520) 495-3527 (office), (520) 260-3490 (cell) or via e-mail at david.krizek@hudbayminerals.com if you have any questions regarding this response.

Sincerely,

David Krizek

David Krizek, P.E.

Senior Manager, Environmental & Permitting

Attachments:

Attachment 1: Response to ADEQ APP Question 1 Copper World Project. Technical Memorandum (WSP. August 30, 2023)

Attachment 2: Tailings Operation, Maintenance, and Surveillance Manual (WSP. September 15, 2023)

Attachment 3: Heap Leach Facility Operation, Maintenance, and Surveillance Manual (WSP. September 13, 2023).

Attachment 4: Failure Modes and Effects Analysis Report (WSP. August 18, 2023)

Attachment 5: Estimation of Non-Newtonian Precipitation-Induced Dam Breach Failure Analyses for Proposed TSF-1 and TSF-2 (WSP. September 8, 2023)

Attachment 6: Annual Progression Plans (WSP. September 11, 2023)

Attachment 7: TSF Seepage Collection System Design (WSP. September 18, 2023)

Attachment 8: Waste Rock Placement – Annual Layouts (Hudbay. September 14, 2023)

Attachment 9: Typical Closure Methods for Underground Workings (Hudbay. September 14, 2023)

Attachment 10: Stormwater Conveyance Pipe Settlement Analyses (WSP. September 18, 2023)

Attachment 11: Water Balance. ADEQ Comments items 17 and 20. Technical Memorandum (WSP. September 18, 2023)

Attachment 12: Preliminary Technical Specification for Earthworks Material and Construction (WSP. September 13, 2023)

Attachment 13 Figure 19-1 Proposed Growth Media Stockpile Design (WSP. September 13, 2023)

Attachment 14: Supplemental Geotechnical Site Investigation Memorandum Copper World Project (WSP. September 13, 2023)

Attachment 15: Isopach Map (WSP, 2023)

Attachment 16: Item 42 Figures 42-1 to 42-14 – WRF Stability Analysis

Attachment 17: Item 46 Figures 46-1 to 46-2 – Pit Slope Cross Sections

Attachment 18: Figure 49-1 TSF-1 Capture Zone Estimation (Piteau. August 2023)

Attachment 19: Copper World Project Baseline Soil and Surface Materials Sampling and Analysis. Technical Memorandum (Piteau. September 1, 2023)