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10 June 2024

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**RE: RESPONSES: Adequacy Review, Proposed Water Monitoring Plan, Leadville Mill,
Permit No. M-1990-057**

Patrick,

Responses to the Proposed Water Monitoring Plan dated June 6, 2024 are presented below.

1. The submitted materials appear to address items #9, #10, and #11 of the Division's letter dated April 11, 2024. Please provide a clear statement indicating what items are being addressed with this submission.

RESPONSE: The submitted materials address questions 9-11. In the interest of time, CJK submitted the SAP ahead of the AR responses so we can work with our independent laboratory to prepare bottles for Q1 2024 sampling.

With the responses to your later dated 6 June, we are now submitting our response to the Division's Water Specific Items AR dated April 11, 2024. This includes the updated (Version 2) SAP.

2. The analyte Table 2-2 should be revised to be consistent with Appendix B - Full parameter List for Hard Rock Sites (with Table Value Standards) from Regulation 41 from the Groundwater Monitoring: Sampling and Analysis Plan Guidance Construction Materials and Hard Rock Sites (September 2023). A copy of the Appendix B has been provided as an attachment to this letter. Please note field pH measurements are sufficient.

RESPONSE: This has been updated per Appendix B, Version 2.

3. Please note the Division only requires analysis for Total portion for some analytes while the majority of analytes are the Dissolved portion. If the Operator wants to sample for the Total portion in addition to the Dissolved portion that is at their own discretion.

RESPONSE: CJK commits to abide by the requirements shown in Appendix B from Regulation 41, Sampling and Analysis Plan Guidance.

4. Tables 2-2 and 2-3 contain analytes the Division does not require. Specifically, chlorophenol, phenol, asbestos, color, corrosivity, foaming agents, odor and total coliforms. If the Operator wants to sample for these analytes it is at their own discretion.

RESPONSE: These have been removed.

5. In Section 2.1.3 - Sample Procedures, please clarify what is in Appendix B3 and which Regulations are being referenced.

RESPONSE: This is a typo in the document. This reference is to the footnote in the “*Appendix B: Full parameter list for Hard Rock sites (with Table Value Standards) from Regulation 41, Tables 1-4*” in the Sampling and Analysis Plan Guidance, page 12.

6. Please update Section 4 – Water Monitoring Reporting to include a commitment to providing the Division a written report within five (5) working days when there is evidence of groundwater analytes exceeding applicable groundwater standards or permit conditions imposed to protect groundwater quality, in accordance with Rule 3.1.7(9). Please be advised, this notice requirement would apply to any exceedance of the groundwater monitoring standards set for monitoring wells. However, enforcement actions would only be pursued for exceedances at the approved point of compliance well.

RESPONSE: This is now included in Section 4.

Please contact me at 303-947-2499 or nmichael@unionmilling.com if I can be of assistance.

Sincerely,
On behalf of
CJK MILLING COMPANY LLC
By:
[signed]

Nick Michael

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RE: RESPONSES: Leadville Mill, Permit No. M-1990-057, Conversion Application No. 3 (CN-3), Groundwater and Surface Water Specific Adequacy Review

Lucas & Todd,

Responses to the Groundwater and Surface Water Specific Adequacy Review dated April 11, 2024 are presented below.

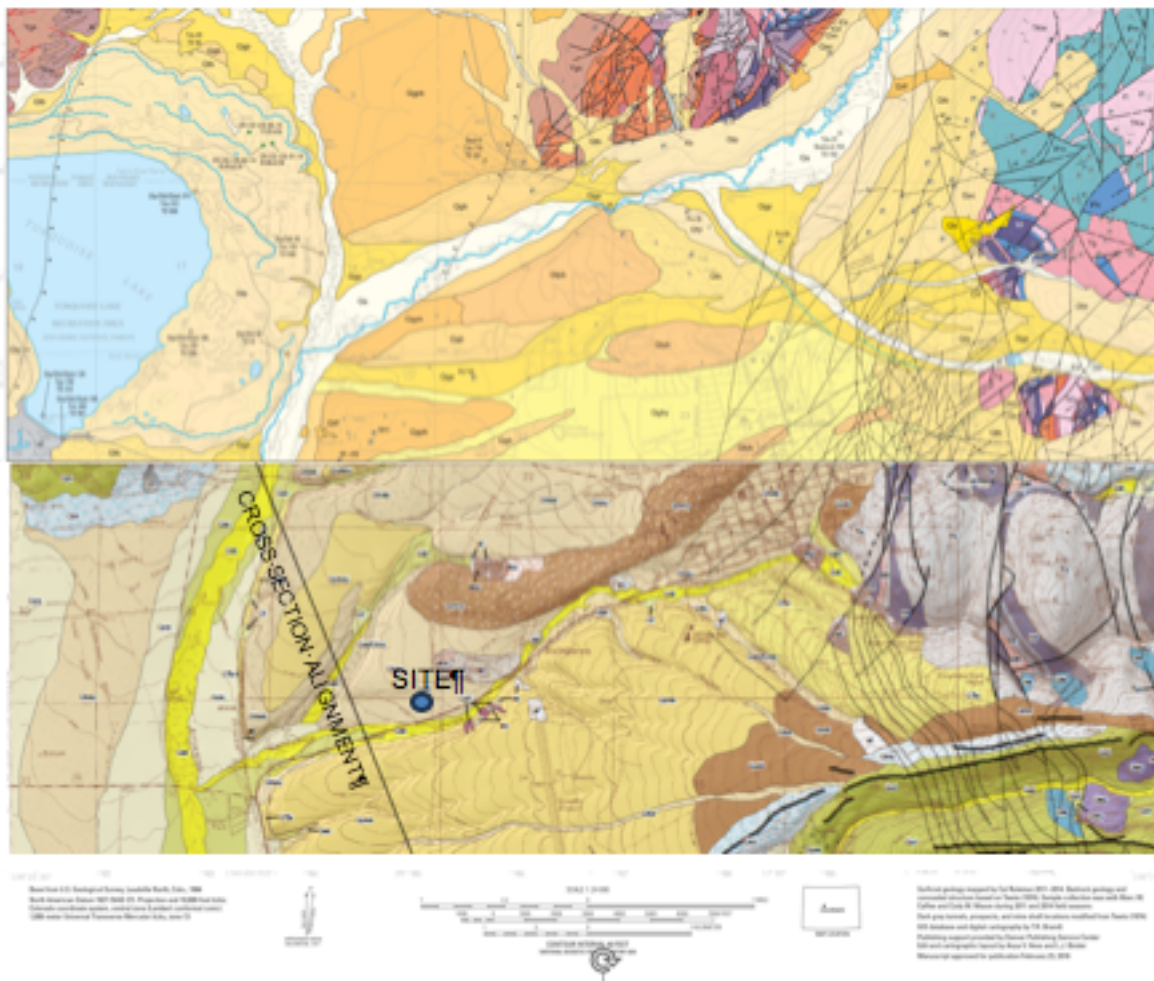
1. Pursuant to Rules 6.4.21(8)(b) and Rule 6.4.7(2)(b) please identify all known aquifers and related subsurface water-bearing fracture systems within two (2) miles of the affected lands. Description of the aquifer shall include characteristics such as transitivity, saturated thickness, stratigraphic units and other hydrologic characteristics.
2. Per Rule 6.4.21(8)(c) please describe all geologic media down to and including the uppermost aquifer under the proposed permit boundary. Description should be detailed enough to identify any impermeable layers in alluvium.
3. Per Rule 6.2.21(8)(d) please identify and locate on a map all known major fracture systems that affect rock formations under the permit boundary that have the potential to be impacted by proposed processes at the site.
4. Per Rule 6.4.21(8)(e) please provide an in-depth description and illustration of the groundwater hydrology within a two mile radius of the permit. The description and illustration should include at a minimum a hydrologic model (e.g. ModFlow) that clearly shows how groundwater flows through and around the proposed permit boundary and a prediction of where contamination would go should there be loss of containment at the site. Additionally, it should include maps and cross sections that depict geologic strata and fracture systems. The model shall be able to demonstrate the proposed point-of-compliance well, LW-MW-3, is suitable and meets all the requirements under Rule 3.1.7(6).

RESPONSE: The following addresses questions 1 -5.

The Leadville Mill is physically located in the southern part of the California Gulch Superfund Site (CGSS). The CGSS was studied extensively during the Remedial Investigation Phase in the 1990's. The Leadville Mill is within CGSS Operable Unit 9, Residential Soil. EPA deleted Operable Unit 9 from the NPL in September 2011.

The site is underlain by an unconfined alluvial aquifer (**Figure 1**). The material beneath the site was mapped by (McCalpin et al., 2012, see reference in Figure 1 below) as Qboy: Bull Lake outwash deposits, younger, that are an "undivided brown, crudely stratified alluvium containing well-rounded to sub-rounded boulders, cobbles, pebbles, and sand." Detailed geologic logging of the monitoring-well borings advanced during the CERCLA Remedial Investigation activities was limited because they were advanced using air- and mud-rotary techniques.

Figure 1: Geology and Fracture Locations

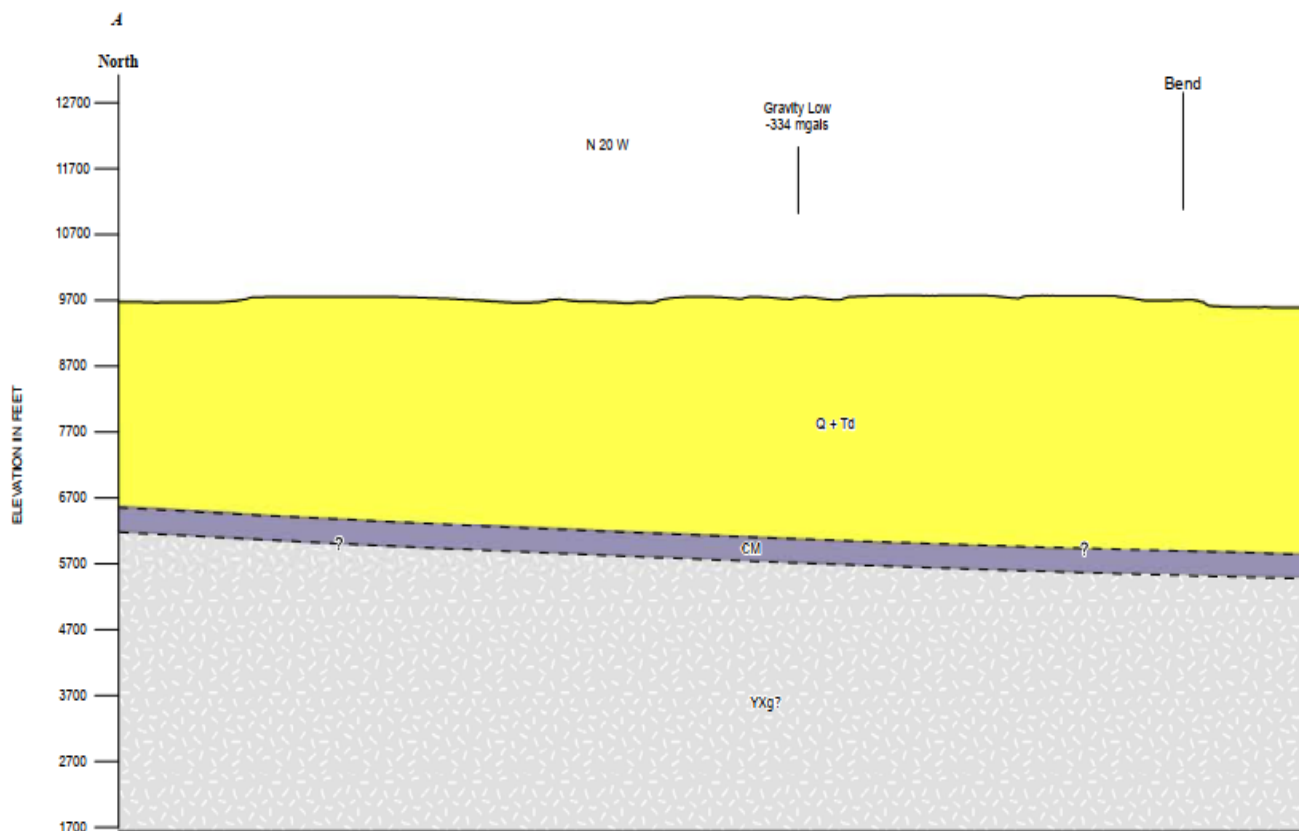


Note: This map combines two maps. The northern map (C. Ruleman, T. Brandt, M. Caffee, B. Goehring, 2018, Geologic Map of the Leadville North 7.5' Quadrangle, Eagle and Lake Counties, Colorado, US Geological Survey Scientific Map 3400.) is a published product prepared by the U.S. Geological Survey. It was included to show the relationship of the bedrock fracturing to the site. The southern map, containing the site, is an Open-File report of mapping completed by the Colorado Geological Survey (J. McCalpin, J. Funk, D. Mendel, 2012, Leadville South Quadrangle Geologic Map, Lake County Colorado, Colorado Geological Survey Open-File Report 12-06)

The boring logs for the wells proposed in the Mill groundwater monitoring plan were reviewed for evidence of fine-grained materials that could potentially act as confining layers. Only borings, situated up-gradient from the site in the Malta Tailings area, included discrete layers described as clay/silt mixtures, at depths from 80 to 85 feet below ground surface (see **Figure 3** for well location). The other two borings advanced in this area, MA1TMW3 and MA1TMW4, had intervals that were not logged as fine grained. Since all four of these borings were drilled in the same vicinity, this result indicates that the presence of extensive potentially confining deposits is highly unlikely.

The alluvial hydrogeologic unit relationship to fractures and estimated alluvium thickness is exhibited on **Figure 1** and **Figure 2**. **Figure 1** demonstrates that the nearest fracture is approximately 1.9 miles from the site, and it is inferred because it is buried beneath the alluvium. The cross-section shown in **Figure 2** shows that approximately 3,000 feet of alluvial materials separate the surface from the uppermost bedrock formation where fracturing, if it exists, would be present.

Figure 2: Cross Section Showing Approximate Thickness of Alluvium



A representative potentiometric surface map of alluvial wells immediately up-gradient, cross-gradient and down-gradient was generated to evaluate the hydrologic conditions surrounding the Leadville Mill. **Table 1** includes the water-level data used to generate the potentiometric surface shown in **Figure 3**.

The resulting groundwater gradient of 50-ft/1,620-ft, or 0.03-ft/ft, is sufficiently steep to negate concerns about substantial groundwater-flow deflections. Golder Associates (1996) estimated the alluvium hydraulic conductivity range in the Malta Tailings Area between 12 and 47 feet per day and the porosity between 0.10 and 0.35 (Golder, 1996, Table 3.1-1). The estimated advective groundwater velocity is estimated using the following parameters:

$$V = 0.03 \text{ (feet/foot)} * 12 \text{ (min)} \text{ or } 47 \text{ (max) feet/day} / 0.35 \text{ (max)} \text{ or } 0.1 \text{ (min)}$$

The resulting velocity values vary between 1.0 and 14 feet per day: both extremely high groundwater velocities that result from the steep gradient and the material's high primary hydraulic conductivity.

Figure 3: Groundwater Monitoring Wells and Potentiometric Contours

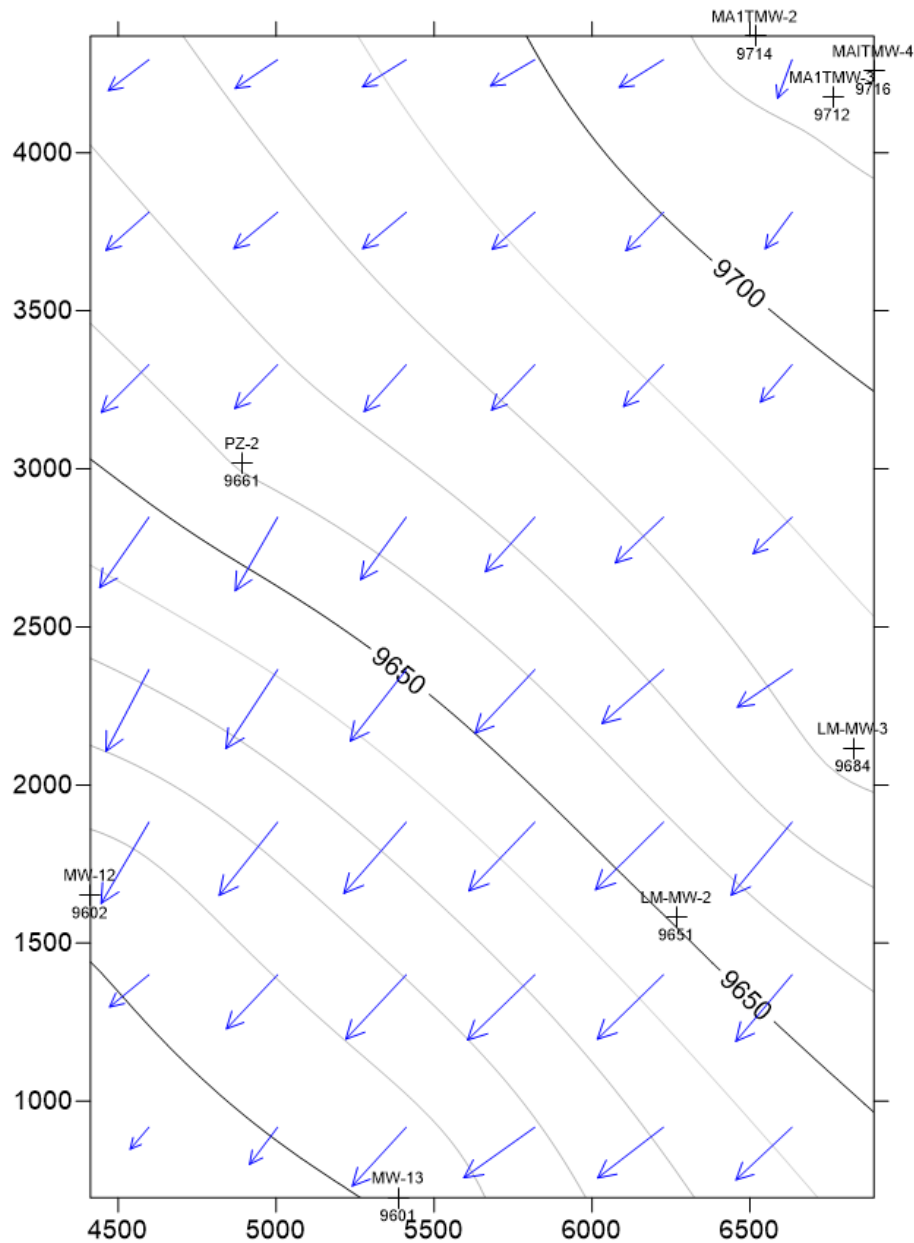


Table 1: Alluvial Monitoring Wells Surrounding Leadville Mill

Well	Depth	Casing Elevation	Well Completion	Potentiometric Surface Elevation
MA1TWM-1	169	9884.94	143-169	9732
MA1TWM-2	80	9783.67	55-80	9714
MA1TWM-3	94	9789.78	71-93	9712
MA1TWM-4	89	9796.01	64-89	9715
PZ-2	95		77-95	9717
MW-12	50	9615.40	8-50	9602
MW-13	100	9621.59	15-100	9601
MW-13a	25	9622.27	10-25	9604
MW-14	50	9530.49	10-50	9520
LM-MW-2	53	9701	42-52	9651
LM-MW-3	66	9744	56-66	9684

Groundwater flow in the alluvial aquifer was modeled using the Surfer© model with the kriging algorithm to generate a representative water table contour map. This model provides representative hydrologic results for the following reasons:

1. The Bull Lake outwash deposits, is generally isotropic given the porous groundwater flow conditions and lack of fine-grained materials and structural features.
2. The site lies in an area where the deposit extends aerially for considerable distances both up-gradient and down-gradient from the site, minimizing the possibility in abrupt geologic material changes.
3. The alluvium extends vertically several thousand feet, negating potential vertical effects on underlying materials.
4. The groundwater flow is steady state with no extensive up-gradient or down-gradient influences that need to be considered. In addition, the Mill does not plan to extract volumes of groundwater for commercial use, negating the need to model transient operational flow modifications.

The resulting modeling effort is depicted on Figure C. Monitoring well LM-MW-2, the proposed compliance well, lies directly downstream from the site in an optimal position to intercept any operationally-caused releases.

5. Please provide a discussion of how groundwater and surface water moving downgradient of the site will interact and potentially affect California Gulch which is approximately 600 feet from the permit boundary and Outfall #1.

RESPONSE: In its RI, Golder provided the following conclusion on interactions in the stream reach in question:

“Discharge of groundwater and spring flow to lower California Gulch (downstream from the City of Leadville sewage treatment plant) does not contribute significant volumes of water to the gulch. Head differential estimates suggest that lower California Gulch is a losing stream. This is generally consistent with earlier observations by the EPA. “

This conclusion establishes that contributions of groundwater flow beneath the site to California Gulch are negligible.

6. In Section 21.9.1 the Applicant states there are 510 domestic wells within a 2-mile radius and 11 wells are within 0.5 miles of the Mill. For all domestic groundwater wells downgradient of the site please provide a summary of construction information identifying which aquifer each well is utilizing. Please highlight the wells which are screened in the same first aquifer found immediately under the proposed permit boundary.

RESPONSE:

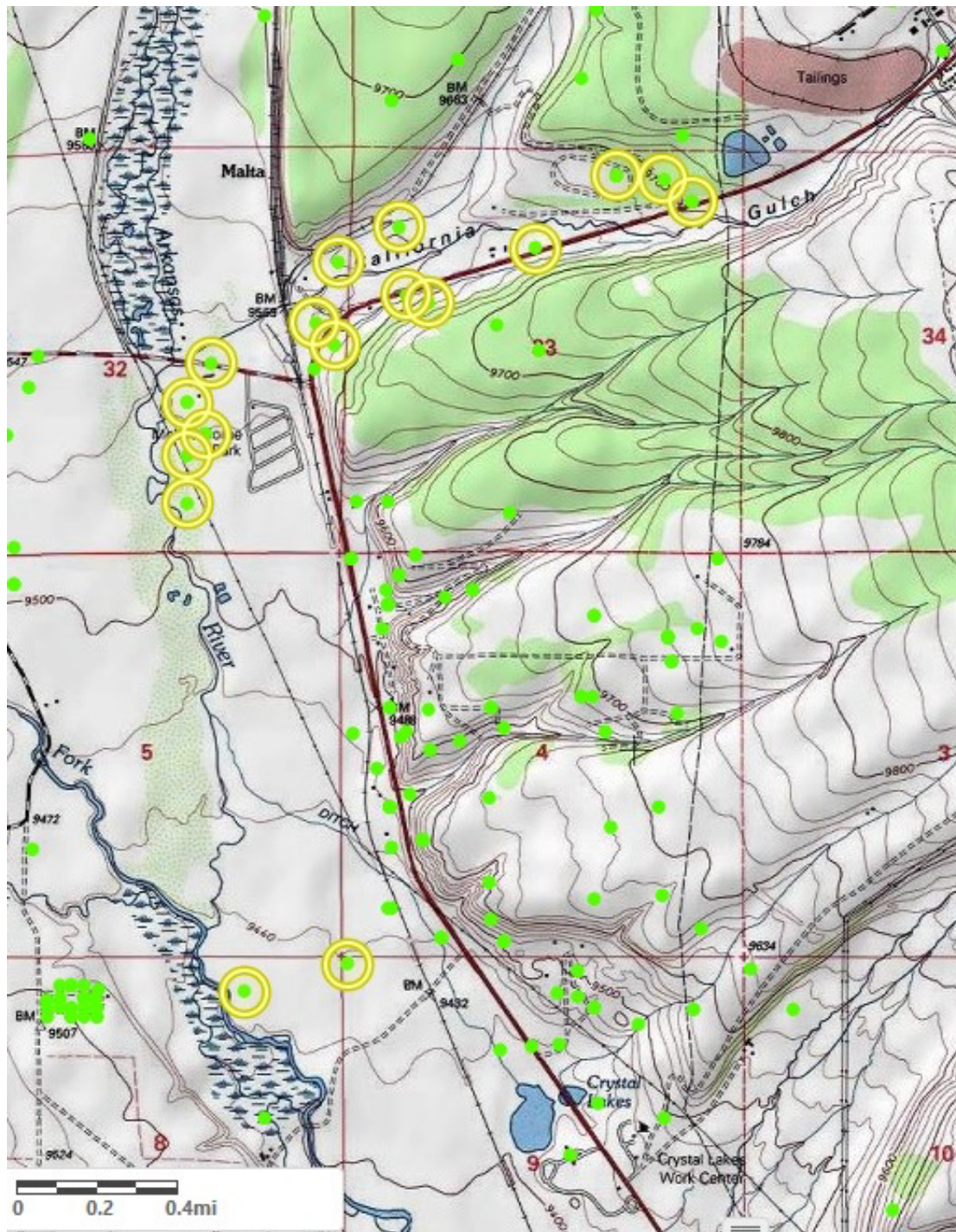
The selection of down-gradient wells is defined by the operational hydrogeologic conditions. Groundwater flowing beneath the site discharges into the California Gulch Alluvium and then into the Arkansas River alluvium, so the wells installed in these materials are included. The remaining wells are not in locations where they potentially tap this groundwater.

Figure 4 shows the 17 wells that meet these conditions within a 2-mile radius of the site, and their construction information is summarized in **Table 2**. All 17 of these wells tap alluvium.

Table 2: Description of Wells Installed in California Gulch or the Arkansas River Alluvium Within 2-Miles of Leadville Mill

Permit	Latitude	Longitude	Use	Well Constructed	Well Depth	Top Perforated Casing	Bot Perforated Casing	Yield	Static Water Level
295655-	39.228931	-106.3325	Monitoring/Sampling	2014-10-01	53	42	52		44
6616-	39.22816	-106.331177	Domestic	1960-08-15	42				6
83329-	39.229087	-106.334658	Household use only	1976-08-08	76				52
62698-	39.226457	-106.338454	Domestic	1972-08-18	55	35	55		30
65248-	39.224481	-106.343421	Domestic	1972-10-12	110	85	110		60
72878-	39.224757	-106.344469	Stock	1974-08-16	100	65	100	15	40
132745-	39.227231	-106.344806	Household use only	1983-09-23	92	77	92		35
270594-	39.225946	-106.347643	Household use only	2006-09-20	80	50	80	12	30
246080-	39.223762	-106.348713	Commercial	2002-12-20	80	45	80	12	31
245225-	39.222961	-106.347841	Household use only	2002-12-06	97	65	95	15	31
65708-	39.222273	-106.353585	Household use only	1972-11-13	39	27	39	15	12
5227-	39.220866	-106.354672	Domestic	1960-02-14	26				12
328193-	39.219738	-106.353837	Monitoring/Sampling	1970-11-16	49				
11188-F-R	39.218962	-106.35468	Commercial	2008-10-11	85	56	76	100	8
29205-MH	39.217241	-106.354702	Monitoring/Sampling	1996-10-09	75				14
204672-	39.199575	-106.352026	Household use only	1999-06-14	83	20	83		39
150406-	39.200568	-106.347204	Domestic		30				

Figure 4: Location of Wells Installed in California Gulch or the Arkansas River Alluvium Within 2-Miles of Leadville Mill



7. Pursuant to Rule 6.4.21(9)(a) please clearly state what are the existing and reasonably potential future groundwater uses on and within two (2) miles down-gradient of the affected lands.

RESPONSE:

The current (permitted) uses for the 17 wells are summarized on **Table 1**. Three of the wells, including the site point-of-compliance well, have monitoring uses, one well is categorized as stock watering, two wells have listed commercial uses, and the remaining 11 wells are for domestic use. There is no information on potential future uses.

8. Please provide additional information regarding the light red shaded background in Figure 21-1 indicating potentially contaminated groundwater and how it impacts groundwater quality results at the site and down gradient from the site. Additionally, how does this impacted groundwater affect the Applicant's ability to detect, or not, if there is a release of toxic material or designated chemicals at the site.

RESPONSE: The map in question originates from the Division of Water Resources mapping website. It is a state-wide map that is used to identify potential regional problems during initial site environmental investigations. The highlighted area includes the entire California Gulch Superfund site. This classification also includes the remaining superfund sites, the Rocky Mountain Arsenal, the Uranium and Mill Tailing Remediation Sites, and the State's voluntary cleanup sites.

9. Pursuant to Rule 6.4.21(12) please provide a sampling and analysis plan (SAP) that addresses how groundwater and surface water samples will be collected, how monitoring will be done during sampling (field parameters), and what quality assurance and quality control (QA/QC) protocols will be followed. At a minimum QA/QC protocols need to include the rate of collection of duplicate samples, rinsate blanks and field blanks. The Division recommends developing Standard Operating Procedures (SOPs) to include in the SAP to ensure samples are collected in an accurate and repeatable manner throughout the life of the permit. Additionally, individual tables need to be developed detailing what analytes each sample will be analyzed for and that samples corresponding regulatory limit for comparison.

Details such as collection of field parameters during monitoring, which field parameters will be monitored, filtering of samples, recording of groundwater levels prior to purging, and use of field sheets to record field sampling data on, will have to be submitted along with sample results, on quarterly basis. Please commit to providing the quarterly water monitoring reports by the following deadlines:

- First quarter report due by May 1st of every year.
- Second quarter report due by August 1st of every year.
- Third quarter report due by November 1st of every year.
- Fourth quarter report due by February 1st of the following year.

The Applicant is required to analyze groundwater samples for the most stringent of the criteria contained in Tables 1-4 of Reg.-41 (see Attachment 1 this attachment would be the Hard Rock Table from the Groundwater Monitoring Guidance doc). Surface water samples will be analyzed for the specific surface water standards listed in Colorado

Regulation Number 32 – Classification and Numeric Standards for Arkansas River Basin (Reg. 32) and Table Value Standards (TVS) in Colorado Regulation Number 31 – The Basic Standards and Methodologies for Surface Water (Reg. 31) for a minimum period of five quarters, to establish baseline conditions at the Site. Note the Division is expecting the Applicant to perform the necessary calculations to determine the TVS value, from Reg. 32, for comparison. Please include the hardness value used for each sample.

At the end of five quarters the Applicant may submit a Technical Revision to reduce the analyte list with sufficient justification.

RESPONSE: A revised sampling and analysis plan has been completed and is included as an appendix to this letter.

10. Pursuant to Rule 6.4.21(9)(b) the Applicant is to submit, at a minimum, groundwater quality data collected during five (5) successive calendar quarters to adequately characterize baseline conditions. This baseline data shall be sufficient to provide for the proper design of facilities, to serve as a basis for the evaluation of reclamation performance standards, and to ensure the adequacy of Environmental Protection Facility design, maintenance and operation. In Appendix 21-4 the Applicant provides the sample results for wells sampled beginning in the fourth quarter 2022 through the fourth quarter 2023, five total quarters. However, the results reported are for the total recoverable portion of the sample. This error should have been recognized by the Division before data collection began. The Division recognizes the oversight, however, requires groundwater sample results to be directly comparable to the Water Quality Control Commission's Regulation 41 - The Basic Standards for Ground Water (Reg. 41), specifically the most stringent criteria of Tables 1 through 4. The analytes listed in those tables are both total and dissolved with all of the metal analytes being dissolved. The data, as provided in Appendix 21-4, is insufficient to adequately characterize baseline conditions at the site. In conjunction with Item 9 of this review please commit to providing groundwater quality data collected in accordance with the requested SAP.

RESPONSE: These data are being collected per the SAP. This information will be provided to the Division during Q2-2025.

11. Pursuant to Rule 6.4.21(11)(a) the Applicant needs to provide a clear statement indicating the existing surface water receiving stream standards within two (2) miles, down-gradient of the affected lands. In Section 21.11 of Exhibit U the Applicant only provides the standards for California Gulch to the Arkansas River. The Arkansas River is within 1.4 miles of the proposed permit boundary and there are two different stream segments, one above and one below the confluence with California Gulch. In addition, please provide a map that clearly shows what other stream segments may be within 2 miles of the permit boundary. The standards provided should be sufficient enough to meet the requirements of Rule 6.4.21(11)(c).

RESPONSE: A revised sampling and analysis plan has been completed and is included as an appendix to this letter.

12. The Applicant did not submit any surface water data for locations that may be affected by operations at the site. Upon acceptance of the SAP requested in Item 9 of this review, and pursuant to Rule 6.4.21(11)(b) the Applicant needs to submit surface water quality and

flow data collected during a minimum of five (5) successive calendar quarters and such other additional data as may be necessary to adequately characterize baseline conditions.

RESPONSE: These data are being collected per the SAP. This information will be provided to the Division during Q2-2025.

13. Please commit to providing the Division a written report within five (5) working days when there is evidence of groundwater discharges exceeding applicable groundwater standards or permit conditions imposed to protect groundwater quality, in accordance with Rule 3.1.7(9). Please be advised, this notice requirement would apply to any exceedance of the groundwater monitoring standards set for monitoring wells. However, enforcement actions would only be pursued for exceedances at the approved point of compliance well.

RESPONSE: CJK Milling Company commits to providing the Division a written report within five (5) working days when there is evidence of groundwater discharges exceeding applicable groundwater standards or permit conditions imposed to protect groundwater quality, in accordance with Rule 3.1.7(9).

Please contact me at 303-947-2499 or nmichael@unionmilling.com if I can be of assistance.

Sincerely,
On behalf of
CJK MILLING COMPANY LLC
By:
[signed]

Nick Michael

Attachment: Sampling and Analysis Plan, Version 2

Cc:
GKnippa
SCraig
WCincilla
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CJK Milling Company, LLC

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WATER MONITORING PLAN

LEADVILLE MILL

PERMIT M1990-057

(VERSION 2)

Prepared by:

Union Milling Contractors, LLC

P.O Box 620490

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JUNE 2024

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1.0 INTRODUCTION

This water monitoring sampling and analysis plan (SAP) details the methods and procedures that will be used to collect and analyze representative groundwater and surface water samples at the Leadville Mill (LM) site in Lake County Colorado. Regulatory activities are governed by the Colorado Division of Reclamation Mining & Safety (Division).

The Facility is located at 13815 Highway 24 South, Leadville, Colorado in Lake County. This plan describes the activities that CJK Milling Company (CJK) will conduct at the groundwater monitoring locations as required under Rule 6.4.7. CJK will update this plan if changes in the groundwater monitoring well network occur or if conditions change that require plan revisions for Division review and approval.

2.0 WATER MONITORING

This section includes the details of groundwater monitoring at the LM.

2.1 GROUNDWATER

This section includes the details of groundwater monitoring at the LM.

2.1.1 SAMPLING WELL NETWORK

The monitoring well network consists of the 7 groundwater monitoring wells as summarized in **Table 2-1** and shown in **Figure 2-1**. Based on the of the hydrogeology at the Mill, wells BMW-1, PZ-4, MA1TMW-4 and LM-MW-3 are up gradient from the Landfill, while LM-MW-2, MW-13 and MW-13A are down gradient.

TABLE 2-1: MONITORING WELL INFORMATION

Well ID	Up Gradient Wells				Down Gradient Wells		
	LM-MW-3	BMW-1	MA1TMW-4	PZ-4	LM-MW-2	MW13	MW13a
Latitude (decimal degrees)	39.23045	39.24549	39.23606	39.24546	39.22897	39.22636	39.22630
Longitude (decimal degrees)	-106.33145	-106.30721	-106.33153	-106.30716	-106.33358	-106.34207	-106.34215
Completion Depth (ft)	66	1,244	85	137	53	100	25
Well Diameter (in)	4	2	4	2	4	2	2
Top of Casing (ft)	9,744.0	9,996.7	9,796.0	9,998.0	9,701.0	9,620.5	9,621.2
Ground Elevation (ft)	9,741.0	9,995.0	9,794.0	9,996.5	9,698.0	9,619.0	9,619.7
Approx Static Water Elev (ft)	9,683.9	9,978.7	9,718.3	9,897.3	9,650.5	9,594.3	9,600.2
Approx Static Water Level (ft)	60.1	18.0	77.7	100.7	50.5	26.3	21.0

FIGURE 2-1: LEADVILLE MILL & GROUNDWATER MONITORING WELL LOCATIONS



2.1.2 SAMPLING FREQUENCY & CONSTITUENTS

When sufficient groundwater is present in monitoring wells for sampling (i.e. one foot of water column or greater), the monitoring program will include sampling groundwater for analyses of the constituents in **Table 2-2** on a quarterly basis. Samples will be analyzed by a State certified lab. Parameters to verify groundwater stability, including pH, specific conductivity, and temperature, will be collected in the field.

If an existing monitoring well becomes dry and stays dry for a minimum of two (2) consecutive quarters, a new well will be drilled as close as possible based upon any drilling constraints. The data from this well will be combined to the existing database.

The analytical laboratory will report results to the method detection limit (MDL) for the project, including J-qualified (estimated) values. Laboratory analytical methods will be able to achieve a reporting limit (RL) equal to or less than the standards in **Table 2-2**. Any changes to the constituent list must be approved in writing by the Division prior to implementation. A sample volume may be limited due to a limited water column present in a monitoring well resulting in an insufficient sample volume for analysis of

all constituents. In this instance, procedures described in **Section 2.1.3** below will be followed, and analysis of a limited number of constituents will not be considered a change to the constituent list.

TABLE 2-2: CONSTITUENTS FOR GROUNDWATER SAMPLING^{1,2}

Analyte	Table Value Standard (mg/L, unless other units given)	Reg. 41 Table Reference (1-4)
pH Field (pH unit)	6.50 - 8.50	2 and 3
TDS	400 mg/L, or 1.25X background	4
Chloride - Dissolved	250	2
Fluoride - Dissolved	2	3
Nitrate (NO ₃)	10	1
Nitrite (NO ₂)	1.0	1
Nitrite + Nitrate as Nitrogen	10	1
Sulfate - Dissolved	250	2
Aluminum - Dissolved	5	3
Antimony - Dissolved	0.006	1
Arsenic - Dissolved	0.01	1
Barium - Dissolved	2	1
Beryllium - Dissolved	0.004	1
Boron - Dissolved	0.75	3
Cadmium - Dissolved	0.005	1
Chromium - Dissolved	0.1	1 and 3
Cobalt - Dissolved	0.05	3
Copper - Dissolved	0.2	3
Iron - Dissolved	0.3	2
Lead - Dissolved	0.05	1
Lithium - Dissolved	2.5	3
Manganese - Dissolved	0.05	2
Mercury - Dissolved	0.002	1
Molybdenum - Dissolved	0.21	1
Nickel - Dissolved	0.1	1
Selenium - Dissolved	0.02	3
Silver - Dissolved	0.05	1
Thallium - Dissolved	0.002	1
Uranium - Dissolved	0.0168 to 0.03	1
Vanadium - Dissolved	0.1	3
Zinc - Dissolved	2	3
Cyanide - Free	0.2	1
Beta and Photon emitters	4 mrem/yr	1
Gross Alpha	15 pCi/L	1

- (1) Source: Appendix B: Full parameter list for Hard Rock Sites (with Table Value Standards) from Regulation 41, Tables 1-4, Sampling and Analysis Plan Guidance, page 12, September 2023.
- (2) These analytes, at a minimum, will be tested for during the five (5) quarters of baseline monitoring. It will be up to the Operator/Permittee to submit a Technical Revision with proper justification to reduce the analyte list

2.1.3 SAMPLING PROCEDURES

In accordance with Appendix B of Regulation 41, CJK is required to conduct groundwater sampling at the groundwater monitoring well network locations quarterly when sufficient groundwater is present to collect a sample. Groundwater level measurements from each monitoring well will be collected during each monitoring event to prepare potentiometric surface maps.

Monitoring well LM-MW-2 is the Mill point of compliance well.

CJK will follow the sampling and analysis requirements below.

2.1.4 LEVEL MEASUREMENTS, EQUIPMENT DECONTAMINATION, & WELL INSPECTIONS

Groundwater level measurements will be collected from monitoring wells at the same frequency as sample collection. Prior to purging wells for groundwater sampling activities, depth to groundwater and total depth will be measured and recorded at all monitoring wells with a water level indicator. These measurements will be collected on the same day, moving from wells with the least impacted groundwater to most impacted to limit possible cross-contamination, LM-MW-2 will be the last well measured.

The water level indicator and other reusable equipment will be decontaminated prior to use and between monitoring wells by rinsing with distilled water. If deemed necessary, additional decontamination procedures may be used, as follows:

- Brush with bristle brush to remove gross particulates (as appropriate);
- Scrub thoroughly with a laboratory-grade phosphate-free detergent (e.g. Alconox®)/potable water solution;
- Rinse thoroughly with deionized, distilled, or potable water; and
- Allow equipment to gravity drain/air dry.

TABLE 2-3: BACKGROUND TDS VALUE (MG/L) MAX ALLOWABLE TDS CONCENTRATION

0 – 500:	400 mg/l or 1.25 times the background level, whichever is least restrictive
500 - 10,000	1.25 times the background value
>10,001 or greater	No limit

This information is provided in 5 CCR 1002-41.8 Table 4

The depth to groundwater and well total depth measurements will be measured to the nearest 0.00-ft and recorded on a field form. Each monitoring well will be inspected, and the condition of the well riser, lock, cap, casing, and concrete pad will be recorded on the field form, on a field sheet, or in a field log book.

If monitoring wells are found to have greater than 20% of the well screen obscured by sediment, the monitoring well should be re-developed following sampling or at least 24 hours before the next sampling event. Re-development of monitoring wells may also be necessary should observations collected during sampling activities indicate that re-development is needed (e.g. increase in turbidity, etc.).

PURGING

Prior to sampling groundwater from a monitoring well, purging is necessary to remove stagnant water from the well casing to allow representative sampling of formation groundwater.

Low-flow purging and sampling methods will be used, generally following the September 2017 USEPA guidance for low flow sampling (USEPA 2017). The low-flow purge method involves purging the well at a relatively low flow rate that minimizes drawdown, with the pump or tubing inlet located slightly above the midpoint of the screened interval of the well. The well will be sampled when water quality parameters are stable. At a minimum, temperature, pH, and specific conductivity will be measured in the field during purging. Proper calibration of the water quality parameter collection equipment will be conducted daily prior to use in accordance with the manufacturer's instructions for each monitoring event. Records of equipment type and the calibration will be included in the annual monitoring reports described in **Section 4.0**.

Efforts will be made to maintain a purging rate which minimizes drawdown. Per USEPA 2017, the drawdown will not exceed approximately 0.3-ft. If drawdown is greater than 0.3-ft, the flow rate will be lowered. If drawdown continues to be greater than 0.3-ft, this will be noted in the field records and CJK will contact the Division about utilizing a different purge method for future events.

Under this purging method, purging will be considered complete (and sampling will take place) when three consecutive field readings are within:

- Temperature: $\pm 1^{\circ}\text{C}$;
- pH: ± 0.2 standard units;
- Specific conductivity: $\pm 10\%$;

A minimum of one tubing volume, including the volume of water in the pump and any other chamber will be purged prior to recording of the water quality field measurements. During well purging, field parameters will be measured at a minimum frequency of five-

minute intervals. The pump's flow rate must be able to "turn over" at least one flow-through cell volume between measurements (e.g. for a 250-ml flow-through cell with a flow rate of 50-mm/min, the monitoring frequency would be every five minutes; for a 500-ml flow-through cell it would be every ten minutes). If the cell volume cannot be replaced in the five-minute interval, then the time between measurements must be increased accordingly.

If stabilization cannot be achieved, it will be noted on the field sampling form and purging will continue until the well is dry.

Bladder pumps will be used for the low flow sampling. Dedicated tubing will be used for each monitoring well and will be replaced as needed. All non-dedicated and reusable sampling equipment will be decontaminated between wells.

SAMPLE COLLECTION

Following purging at each monitoring well, samples will be collected for laboratory analysis. If a well purges dry, it will be allowed to recover and water samples will be collected after the groundwater has recovered a minimum of half of its original measured saturated thickness. The well will be sampled immediately after the groundwater level has recovered sufficiently to collect sample volume, up to 24-hours following purging.

The sample containers will be filled directly from the bladder pump tubing, and the flow rate will remain approximately the same as it was for purging.

For dissolved metals analysis, the analytical laboratory samples will be raw water placed in containers with no preservatives so they can be filtered in the lab. If samples are field-filtered, a disposable in-line filter housing equipped with a 0.45-micron filter will be used by connecting it to the discharge end of the pump tubing. New filters will be used for each well for each event.

Upon collection, samples will be put in a cooler with ice to cool them to approximately 4°C until they arrive at the analytical laboratory. Samples will be either shipped or hand delivered to the laboratory. The samples will be kept under strict chain-of-custody protocol as follows:

- The laboratory chain-of-custody will be completed in the field as the samples are collected and all applicable data fields will be populated accurately;
- Samples will remain in the Sampler's custody until shipment or delivery to the laboratory; and
- Sample coolers that are shipped will have custody seals and will be shipped for overnight delivery to an appropriately accredited analytical laboratory.

2.1.5 QUALITY CONTROL & VALIDATION

QUALITY CONTROL SAMPLING

Sampling will include the following quality control samples that will be collected, as required, during each monitoring event.

- Trip Blanks: Provided by the analytical laboratory that remain in the sample collection cooler to allow for assessment of possible contaminant introduction as the sample cooler travels from the analytical laboratory to the field and back to the analytical laboratory. There will be one trip blank per cooler containing the VOC samples. The trip blank(s) will be obtained from the analytical laboratory and will not be opened by any party other than the environmental laboratory.
- Equipment Blanks: A sample collected in the field using distilled water that is poured through the non-dedicated sampling equipment, after it has been decontaminated, and captured in the sample containers to allow for assessment of potential contaminant introduction through the non-dedicated sampling equipment. This also allows for assessment of decontamination procedures conducted on non-dedicated sampling equipment. A minimum of one equipment blank per sampling event will be collected.
- Field Duplicates: A duplicate sample collected in the field from a pre-specified groundwater sampling well. Based on well placement, the field duplicate will be collected from LM-MW-2 unless otherwise specified. A minimum of one field duplicate per sampling event will be collected, if sufficient water volume is available.
- Matrix Spike/Matrix Spike Duplicates (MS/MSD): MS/MSD aliquots from the Mill will be collected at the discretion of the groundwater professional and are utilized to evaluate potential site-specific groundwater matrix interferences.

DATA VALIDATION

The laboratory will prepare a Level II Quality Assurance/Quality Control (QA/QC) data report which includes method blanks, duplicate analyses, laboratory control samples, and MS/MSD samples for the constituents and analytical methods. CJK is responsible for reviewing the laboratory QA/QC and determining if the results are valid and acceptable for use. Review of the laboratory QA/QC and sample analyses will include sample receipt, holding times, method blanks, laboratory control samples, MS/MSDs, continuing calibration samples, surrogate recoveries, duplicates, equipment blanks, and trip blanks as applicable.

Upon receipt of the analytical results, general (i.e. Tier 1) analytical data validation, including checks and evaluation, will be performed. At a minimum, data validation will consist of the following:

- Overall data completeness;
- A review of laboratory qualified data;
- Comparison of trip blank and equipment results to sample results;
- Comparison of field duplicate results to original sample results;
- Comparison of method blank results to sample results; and
- Review of Level II laboratory QA/QC sample results.

Results of the data review will be documented and if necessary, used to initiate additional review by the laboratory or possible addition of qualifiers of the analytical data by the reviewer.

FIELD RECORDS

The following information will be maintained either on field forms or in a field notebook as part of the groundwater monitoring record:

- Date and time;
- Weather conditions (e.g. ambient air temperature, recent precipitation, wind);
- Monitoring well number/identification;
- Sample number with date and time of sampling;
- Sampler name(s) and organization;
- Instrument calibrations (date, time, calibration method used, and calibration criteria achieved);
- Wellhead inspection records;
- Measured depth to groundwater;
- Measured well total depth;
- Calculated water volume residing in the casing prior to sampling;
- Volume of water purged;
- Purge rate, method, and volume;
- Purge parameters (pH, temperature, specific conductivity, ORP, etc.);
- Method of sample preservation; and

- Notes regarding any unusual circumstance or events that occurred during sampling that may affect the sample results.

2.2 SURFACE WATER

2.2.1 SAMPLING LOCATIONS

The surface water sampling network includes the four grab-sample locations shown on **Figure 2-2** and **Figure 2-3** and summarized in **Table 2-4**. The four sampling points include:

- **CG1:** This sampling point is located upstream of the facility in California Gulch just north of the intersection of US Highway 285 and Lake County Road 23A.
- **CG2:** This sampling point is located downstream of the facility in California Gulch immediately above the confluence with the Arkansas River.
- **AR1:** This sampling point is located in the Arkansas River immediately above its confluence with California Gulch.
- **AR2:** This sampling point is located in the Arkansas River immediately below its confluence with California Gulch.

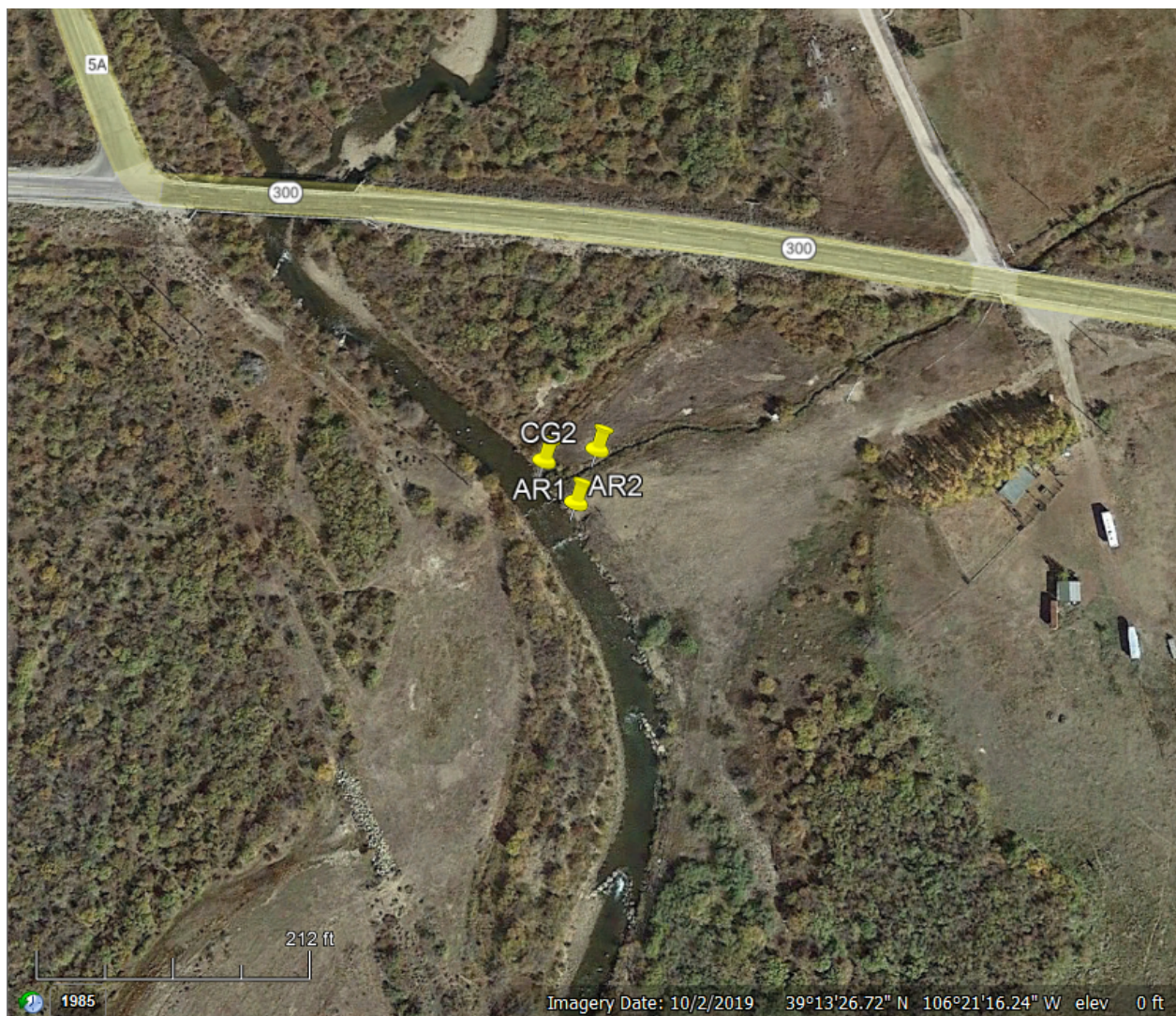
TABLE 2-4: SURFACE WATER SAMPLING LOCATION SUMMARY

Identifier	Location	Stream Segment	Latitude	Longitude
California Gulch				
CG1	Upstream, of proposed facility	6	39.2527	-106.3202
CG2	Downstream near Arkansas River Confluence	6	39.2219	-106.3559
Arkansas River				
AR1	Upstream of California Gulch Confluence	2b	39.2219	-106.3560
AR2	Downstream of California Gulch Confluence	2b	39.2218	-106.3559

FIGURE 2-2: SURFACE WATER SAMPLING LOCATION CG1



FIGURE 2-3: SURFACE WATER SAMPLING LOCATION CG2, AR1 & AR2



Surface Water Standards are defined by stream segment in 5 CCR 1002-32, Regulation No. 32 Classifications and Numeric Standards for the Arkansas River Basin.

Locations CG1 and CG2 are in Segment 2b: Mainstem of the Arkansas River from a point immediately above California Gulch to a point immediately above the confluence with Lake Fork.

- Locations AR1 and AR2 are in Segment 6: Mainstem of California Gulch, including all tributaries, from the source to the confluence with the Arkansas River.

2.2.2 SAMPLING FREQUENCY & CONSTITUENTS

The program includes sampling all four surface-water locations on a quarterly basis. Samples will be analyzed by a State certified lab. The field parameters pH, specific conductivity, and temperature, will be collected at each sample point for each event.

All four locations have the same analytical suite, but locations AR1 and AR2 have different standards than CG1 and CG2 because they are located in different stream reaches.

Figure 2-4 shows the analytes and standards for Segment 2b, mainstem of the Arkansas River from a point immediately above California Gulch to a point immediately above the confluence with Lake Fork.

FIGURE 2-4: CONSTITUENTS & STANDARD FOR SEGMENT 2b¹

2b. Mainstem of the Arkansas River from a point immediately above California Gulch to a point immediately above the confluence with Lake Fork.						
COARUA02B	Classifications	Physical and Biological			Metals (ug/L)	
Designation	Agriculture	DM		MWAT	acute	chronic
Reviewable*	Aq Life Cold 1	Temperature °C	CS-I	CS-I	Arsenic	340
	Recreation E		acute	chronic	Arsenic(T)	7.6
Qualifiers:		D.O. (mg/L)	---	6.0	Cadmium	TVS
Other:		D.O. (spawning)	---	7.0	Chromium III	TVS
		pH	6.5 - 9.0	---	Chromium III(T)	100
		chlorophyll a (mg/m ²)	---	TVS	Chromium VI	TVS
		E. Coli (per 100 mL)	---	126	Copper	TVS
					Iron(T)	1000
		Inorganic (mg/L)			Lead	TVS
			acute	chronic	Manganese	TVS
		Ammonia	TVS	TVS	Mercury(T)	0.01
		Boron	---	0.75	Molybdenum(T)	150
		Chloride	---	---	Nickel	TVS
		Chlorine	0.019	0.011	Selenium	TVS
		Cyanide	0.005	---	Silver	TVS
		Nitrate	100	---	Uranium	varies*
		Nitrite	---	0.05	Zinc	SSE*
		Phosphorus	---	---	Zinc	SSE*
		Sulfate	---	---		
		Sulfide	---	0.002		

(1) Table Value Standards. These standards vary.

Figure 2-5 shows the analytes and standards for Segment 6, mainstem of the Arkansas River from a point immediately above California Gulch to a point immediately above the confluence with Lake Fork.

FIGURE 2-5: CONSTITUENTS & STANDARD FOR SEGMENT 6

6. Mainstem of California Gulch, including all tributaries, from the source to the confluence with the Arkansas River. Mainstem of St. Kevin's Gulch from the source to the confluence with Tennessee Creek.					
COARUA06	Classifications	Physical and Biological		Metals (ug/L)	
Designation	Agriculture	DM	MWAT	acute	chronic
Reviewable	Recreation N				
Qualifiers:		acute	chronic		
Other: *Uranium(acute) = See 32.5(3) for details. *Uranium(chronic) = See 32.5(3) for details.	D.O. (mg/L)	---	---	Arsenic	---
	pH	---	---	Cadmium	---
	chlorophyll a (mg/m ²)	---	---	Chromium III	---
	E. Coli (per 100 mL)	---	630	Chromium VI	---
				Copper	---
				Iron	---
				Lead	---
				Manganese	---
				Mercury(T)	---
				Molybdenum(T)	---
				Nickel	---
				Selenium	---
				Silver	---
				Uranium	varies*
				Zinc	---

The two figures are directly copied from the applicable regulations. The standards for analytes with the TVS descriptor are table value standards that are derived from the site-specific field data.

Figure 2-6 shows the equations used to generate these standards.

FIGURE 2-6: TABLE VALUE STANDARDS FOR APPLICABLE CONSTITUENTS

TABLE VALUE STANDARDS (Concentrations in µg/L unless noted)					
PARAMETER ⁽¹⁾	TABLE VALUE STANDARDS ⁽²⁾⁽³⁾				
Aluminum(T)	Acute = $e^{(1.3695 \ln(\text{hardness}) + 1.8308)}$ pH equal to or greater than 7.0 Chronic = $e^{(1.3695 \ln(\text{hardness}) - 0.1158)}$ pH less than 7.0 Chronic = $e^{(1.3695 \ln(\text{hardness}) - 0.1158)}$ or 87, whichever is more stringent				
Ammonia ⁽⁴⁾	Cold Water = (mg/L as N) Total $acute = \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$ $chronic = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * MIN(2.85, 1.45 * 10^{0.028(25 - T)})$ Warm Water = (mg/L as N) Total $acute = \frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH - 7.204}}$ $chronic (Apr 1 - Aug 31) = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * MIN(2.85, 1.45 * 10^{0.028(25 - T)})$ $chronic (Sep 1 - Mar 31) = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * 1.45 * 10^{0.028 * (25 - MAX(T, 7))}$				
Cadmium	Acute(warm) ⁽⁵⁾ = $(1.136672 - (\ln(\text{hardness}) * 0.041838)) * e^{(0.9789 \ln(\text{hardness}) - 3.443)}$ Acute(cold) ⁽⁵⁾ = $(1.136672 - (\ln(\text{hardness}) * 0.041838)) * e^{(0.9789 \ln(\text{hardness}) - 3.866)}$ Chronic = $(1.101672 - (\ln(\text{hardness}) * 0.041838)) * e^{(0.7977 \ln(\text{hardness}) - 3.909)}$				
Chlorophyll a ⁽⁶⁾	See 31.17 TVS for Aquatic Life and/or Recreation and Direct Use Water Supply (DUWS).				
Chromium III ⁽⁷⁾	Acute = $e^{(0.819 \ln(\text{hardness}) + 2.5736)}$ Chronic = $e^{(0.819 \ln(\text{hardness}) + 0.5340)}$				
Chromium VI ⁽⁷⁾	Acute = 16 Chronic = 11				
Copper	Acute = $e^{(0.9422 \ln(\text{hardness}) + 1.7408)}$ Chronic = $e^{(0.8545 \ln(\text{hardness}) + 1.7428)}$				
Lead	Acute = $(1.46203 - (\ln(\text{hardness}) * 0.145712)) * e^{(1.273 \ln(\text{hardness}) + 1.46)}$ Chronic = $(1.46203 - (\ln(\text{hardness}) * 0.145712)) * e^{(1.273 \ln(\text{hardness}) + 4.705)}$				
Manganese	Acute = $e^{(0.3331 \ln(\text{hardness}) + 6.4676)}$ Chronic = $e^{(0.3331 \ln(\text{hardness}) + 5.8743)}$				
Nickel	Acute = $e^{(0.846 \ln(\text{hardness}) + 2.253)}$ Chronic = $e^{(0.846 \ln(\text{hardness}) + 0.0554)}$				
Nitrogen ⁽⁶⁾	See 31.17 TVS for Aquatic Life and/or Recreation.				
Phosphorus ⁽⁶⁾	See 31.17 TVS for Aquatic Life and/or Recreation.				
Selenium ⁽⁸⁾	Acute = 18.4 Chronic = 4.6				
Silver	Acute = $0.5 * e^{(1.72 \ln(\text{hardness}) - 6.52)}$ Chronic = $e^{(1.72 \ln(\text{hardness}) - 9.06)}$ Chronic(Trout) = $e^{(1.72 \ln(\text{hardness}) - 10.51)}$				
Temperature	TEMPERATURE TIER	TIER CODE	SPECIES EXPECTED TO BE PRESENT	APPLICABLE MONTHS	TEMPERATURE STANDARD (°C)
	Cold Stream Tier I	CS-I	brook trout, cutthroat trout	June – Sept.	MWAT 17.0 DM 21.7
				Oct. – May	9.0 13.0

The analytical laboratory will report results to the method detection limit (MDL) for the project, including J-qualified (estimated) values. Laboratory analytical methods will be able to achieve a reporting limit (RL) equal to or less than the standards in **Figure 2-4** and **Figure 2-5**. Any changes to the constituent list must be approved in writing by the Division prior to implementation.

3.0 STATISTICS & MONITORING PROGRAMS

Once sufficient baseline data are collected or additional wells installed in the future, currently anticipated to consist of five (5) samples, one or more statistical methods will be specified to evaluate the monitoring constituent data for potential impacts from the waste placement. The statistical methods will require Division approval. The statistical analysis methods will be presented in the annual monitoring reports described below in **Section 4.0**.

Presentation of the statistical analysis will include a discussion of observations that may affect the sampling program and below description of statistical analysis (e.g. seasonality, trends in data, spatial variability, and management of non-detects). Should baseline data indicate changes to the sampling schedule, statistical analysis methods, or verification sampling plan are necessary, a modified plan will be required to be submitted for review and approval by the Division.

The statistical method used will be protective of human health and the environment, and will take the following into consideration:

- Distribution of the data for each constituent;
- Seasonal influences on the data;
- Data trends; and
- Data outliers.

Once the statistical methods are established, groundwater data will be evaluated following each monitoring event to determine if a statistically significant increase (SSI) over background has occurred for each constituent and at each monitoring well. Statistical analysis for the identification of SSIs is not required to be performed for select cations (magnesium, sodium, potassium, calcium), select anions, (carbonate, bicarbonate, total alkalinity, chloride, sulfate, nitrate, nitrite), or field parameters (pH, specific conductivity, temperature, or total organic carbon). Statistical analysis to identify SSIs are also not required to be performed for VOCs. An initial SSI is defined by either a constituent result exceeding the Division-approved statistical limit, or for VOCs, any detection above the practical quantitation limit/RL.

CJK will determine if there has been an initial SSI within 30 days of receiving the finalized laboratory analytical report and completion of data quality review/data validation. If an initial SSI is identified, CJK will notify the Division in writing within 14 days. For an initial SSI, confirmatory samples to verify the SSI will be conducted

within 90 days of the original sample collection event during the next monitoring event, or as approved by the Division.

If one or more verified SSIs are identified, CJK will take the following actions:

1. Documentation of the verified SSIs will be placed in the operating record and sent to Division;
2. Establish an assessment monitoring program within 90 days; or
3. CJK may demonstrate to Division that a source other than the Mill is responsible for the SSIs.

The baseline data will be reviewed periodically (every two to three years) to determine if recent results that are not statistically significant can be incorporated into an updated baseline dataset for the determination of new statistical limits. The rationale for updating statistical limits will be presented to the Division for review and approval prior to use for the identification of SSIs.

4.0 WATER MONITORING REPORTING

CJK will provide 3-quarterly and 1-annual monitoring reports that include surface and groundwater information by the following deadlines.

- First quarter report due by May 1st of every year.
- Second quarter report due by August 1st of every year.
- Third quarter report due by November 1st of every year.
- Fourth quarter report due by February 1st of the following year.

The annual monitoring reports will provide appropriate documentation of each groundwater monitoring event. At a minimum, the annual monitoring reports will contain text, tables, figures, and appendices as summarized in the following lists.

In addition, CJK commits to provide the Division with a written report within five (5) working days of acceptance of the validated laboratory report indicating evidence of exceedance of groundwater standards.

TEXT DISCUSSIONS

- Background information;
- Well inspection, groundwater level and total depth measurements summary, groundwater characteristics, and flow direction;
- Well purging and sampling summary;
- Field and laboratory QA/QC and data validation summary;
- Groundwater monitoring and statistical analysis results including trends and outliers and a list of identified initial and/or verified SSIs;
- If conducted, a description of the new or revised statistical limits;
- Discussion of surrounding land use changes;
- Management of IDW;
- Deviations from this monitoring plan or problems encountered, including any maintenance items identified and performed on the groundwater monitoring network; and
- Recommendations and conclusions.

TABLES

- Groundwater monitoring well construction and survey information;
- Groundwater levels, calculated groundwater elevations, and measured total depths;
- Field data and analytical results summary with comparison to the applicable regulation 41 standards or if not established, USEPA RSLs; and
- Statistical analysis summary.

FIGURES

- Mill location map;
- Mill map with groundwater monitoring locations;
- Potentiometric surface maps as applicable; and
- Groundwater elevation time series plot (hydrographs).

APPENDICES

- Field Forms;
- Laboratory reports including chain-of-custody documentation;
- Statistical summary for each constituent in each well (baseline period, % non-detects, trends, outliers, data distribution, statistical method, statistical limit, as applicable);
- Statistical graphs and plots as applicable, including trend charts;
- Tabulated historical groundwater analytical and elevation results, including the current year's results; and
- Statistical limit summary.