

Troilus Mine

Surface Water Quality Model

Prepared for:



Troilus Gold Corporation

1155 René-Lévesque Boulevard West, Suite 3300,
Montreal, QC H3B 3X7

Prepared by:

BluMetric Environmental Inc.

1500 du Collège Street
Saint-Laurent, QC H4L 5G6

Project Number: 240433

June 2025

Acronyms

ARD	Acid Rock Drainage
PAG	Potentially Acid Generating
NP	Neutralization Potential
SI	Saturation Index
EDMC	Empirical Drainage Chemistry Model
pF	Powder Factor
fR	Residual Nitrogen
fN	Nitrogen Forms as Provided by Explosive Products
K^{INT}	Intrinsic Equilibrium Constants



Table of Contents

1.	Introduction	1
1.1	Geochemical context	1
2.	Geochemical Modeling and Simulation Strategy	2
2.1	Modeling Approach	2
2.2	Regulatory framework	3
2.3	Year 21 Infrastructure	3
2.4	Hydrology	4
2.5	Geochemical Source Terms	4
2.6	Baseline conditions	5
2.7	Dissolved and Total Aqueous Concentrations	6
2.8	Explosives and Expected Nitrogen Contribution	6
2.9	Simulations	9
3.	Geochemical Model Results	14
3.1	Oxidation of aqueous Fe ²⁺	14
3.1.1	Fe ²⁺ oxidation conditions	14
3.1.2	Fe ²⁺ oxidation rates	15
3.2	Water quality predictions	15
4.	Model Limitations and Assumptions	23
5.	Closing Statement	26
6.	References	27

List of Figures

Figure 1 :	Nitrogen speciation depending on pH and Eh conditions in a Fe-S system at 25°C (Dockrey et al., 2015).	7
Figure 2:	Block Diagram showing the conditions and methodology used for the geochemical model. Purple arrows indicate the direction of the flow and where the geochemical conditions were modelled. Mixing fractions were determined by total monthly flows for each component, based on the hydrological assessment (see Section 2.3 for details).	13
Figure 3 :	Iron speciation depending on pH and pE conditions (Stumm and Morgan, 1981)	14
Figure 4 :	Fe ²⁺ oxidation over time for the effluent solution with a pH of 6.5 under atmospheric oxygen conditions. Red and green lines indicate Fe ²⁺ and Fe ³⁺ concentrations, respectively.	15
Figure 5 :	Predicted versus baseline water hardness for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively.	17

Figure 6 :	Predicted versus baseline dissolved sulphate concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. _____	18
Figure 7 :	Predicted versus baseline pH conditions for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. _____	18
Figure 8 :	Predicted versus baseline dissolved aluminium concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	19
Figure 9 :	Predicted versus baseline dissolved copper concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	19
Figure 10 :	Predicted versus baseline dissolved iron concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	20
Figure 11 :	Predicted versus baseline dissolved nickel concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	20
Figure 12 :	Predicted versus baseline dissolved nickel concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	21
Figure 13 :	Box plot showing predicted vs baseline water quality parameters for HST/CC_calcite_pH8 scenarios. Federal and provincial guidelines are indicated by dashed horizontal lines. _____	22

List of Tables

Table 1 :	Nitrogen speciation observed from the collected waters at the existing pits 87 and J4. Also including the speciation _____	8
Table 2 :	Phases that are likely to precipitate ($SI > 1$) _____	12
Table 3:	Summary of intrinsic equilibrium constants (K_{INT}) for Cd, Co, Cu, Ni, Pb and Zn adsorption onto iron and aluminum oxides. _____	12



List of Figures (at the End of the Document)

Figure A: Year 21 proposed infrastructure.

List of Tables (at the End of the Document)

Table A: General Chemistry. Baseline Conditions.

Table B: Dissolved Metals. Baseline Conditions.

Table C: General Chemistry. Historical Conditions. Effluent Solutions at Sedimentation Ponds in Equilibrium with Calcite. Mineral Precipitation was Allowed. Effluent pH of 8.

Table D: Dissolved Metals. Historical Conditions. Effluent Solutions at Sedimentation Ponds in Equilibrium with Calcite. Mineral Precipitation was Allowed. Effluent pH of 8.

Table E: General Chemistry. Climate Change Conditions. Effluent Solutions at Sedimentation Ponds in Equilibrium with Calcite. Mineral Precipitation was Allowed. Effluent pH of 8.

Table F: Dissolved Metals. Climate Change Conditions. Effluent Solutions at Sedimentation Ponds in Equilibrium with Calcite. Mineral Precipitation was Allowed. Effluent pH of 8.

Table G: General Chemistry. Historical Conditions. Mineral Precipitation was Allowed. Effluent pH of 8.

Table H: Dissolved Metals. Historical Conditions. Mineral Precipitation was Allowed. Effluent pH of 8.

Table I: General Chemistry. Historical Conditions. No Precipitation. Effluent pH of 8.

Table J: Dissolved Metals. Historical Conditions. No Precipitation. Effluent pH of 8.

Table K: General Chemistry. Climate Change Conditions. Mineral Precipitation was Allowed. Effluent pH of 8.

Table L: Dissolved Metals. Climate Change Conditions. Mineral Precipitation was Allowed. Effluent pH of 8.

Table M: General Chemistry. Climate Change Conditions. No Precipitation. Effluent pH of 8.

Table N: Dissolved Metals. Climate Change Conditions. No Precipitation. Effluent pH of 8.

Table O: General Chemistry. Historical Conditions. Mineral Precipitation was Allowed. Effluent pH of 6.5.

Table P: Dissolved Metals. Historical Conditions. Mineral Precipitation was Allowed. Effluent pH of 6.5.

Table Q: General Chemistry. Historical Conditions. No Precipitation. Effluent pH of 6.5.

Table R: Dissolved Metals. Historical Conditions. No Precipitation. Effluent pH of 6.5.

Table S: General Chemistry. Climate Change Conditions. Mineral Precipitation was Allowed. Effluent pH of 6.5.

- Table T:** Dissolved Metals. Climate Change Conditions. Mineral Precipitation was Allowed. Effluent pH of 6.5.
- Table U:** General Chemistry. Climate Change Conditions. No Precipitation. Effluent pH of 6.5.
- Table V:** Dissolved Metals. Climate Change Conditions. No Precipitation. Effluent pH of 6.5.



1. Introduction

The Troilus Mine was originally operated from November 1996 to April 2009. The mine was an open pit operation for the extraction of gold, copper, and silver, with a production of over 2 million oz of gold and approximately 70,000 t of copper. Upon closure, a significant amount of the site infrastructure was left in place (AGP; NI 43-101, 2024).

The new development will be an open pit operation, including the Z87, J, X22, and SW mineralized zones, with a cut-off grade of 0.3 g/t AuEQ for all zones. The estimated tonnage to be mined during the mine life is 1550 Mt.

To reopen the mine and assess the potential environmental impacts, it is important to build a model to predict the quality of the water that will be in contact with the waste rock, tailings, and pit walls, as well as to predict water quality at the receiving environments and pathways. As requested by Troilus, the water quality was predicted for year 21 of operations, with the reasoning being that the accumulation of waste rock and tailings will be the greatest, with pit dewatering still occurring for X22, 87, and J open pits.

1.1 Geochemical context

As discussed in Chapter 5 of the Environmental and Social Impact Assessment (ESIA), full-scale monitoring of previous operations demonstrates that the mined Troilus rock did not generate acid rock drainage (ARD), contrary to what most static and some kinetic tests predicted, i.e. that the rock would be potentially acid-generating (PAG). Minesite Drainage Assessment Group (MDAG) carried out an assessment of all geochemical test work carried out to date, to assess the discrepancy between observed conditions and predictive geochemical test work. Previous studies have concluded that ARD potential ranged from none to the appearance after several years, or even after only 1,500 years of exposure (MDAG, 2024 a, b, c).

The results from the MDAG reports (2024a, b, c) indicated that the ARD discrepancy can be explained by the methods used to analyze the neutralization potential (NP) of the mined rock. Standard testing to determine NP consists of a 24-hour titration test (known as the Sobek-test) with the purpose of determining the NP of mainly Ca- and Mg-carbonates that might be present in the tested rock. However, the Sobek test was not designed to estimate NP that might occur from the dissolution of recalcitrant alkaline silicate phases, such as the plagioclase mineral series.

Detailed mineralogical testing, including standard testing (such as: X-ray diffraction, QEMSCAN, optical mineralogy), combined with novel methods (Raman spectroscopy), demonstrated that Troilus rock has a significant abundance of plagioclase minerals (up to 54 wt.%), in particular bytownite (4 wt.%) and oligoclase (26 wt.%). The distinction of specific mineralogy within the plagioclase minerals was of great importance, given the drastic differences in the dissolution rates from each different phase, ranging from single to several orders of magnitude. NP estimations based on dissolution rates indicated that the bytownite will be responsible for 81% of the NP provided by silicate minerals found in Troilus rock. The NP of bytownite, and other plagioclase minerals, was not accurately estimated by the Sobek test, which explains the discrepancy between the geochemical test work carried out to date and observed conditions. Based on the study carried out by MDAG, the bulk Troilus rock will not release ARD; however, smaller-scale amounts could do so. Please refer to Chapter 5, for details regarding the geochemical context of the Troilus rock.

2. Geochemical Modeling and Simulation Strategy

2.1 Modeling Approach

The mass-balance models were developed using PHREEQC v3.7.3 and the In11.dat thermodynamic database (Parkhurst, 1995). The In11.dat database was used since it contains the solution species and thermodynamic properties for major and trace elements. The In11.dat covers temperature and pressure ranges from 0.01–100 °C at 1 bar, and 100–300°C at water vapor saturation pressure. This database uses the ideal gas law for gas fugacity coefficient and applies to solutions with an ionic strength less than one molal. Additions or modifications to the thermodynamic database included the definition of solid phases, including ferrihydrate $[\text{Fe}(\text{OH})_3]$, $\text{Al}(\text{OH})_3(\text{a})$, $\text{Fe}(\text{OH})_3(\text{a})$, and schwertmannite $[\text{Fe}_8\text{O}_8(\text{OH})_6(\text{SO}_4)\cdot n\text{H}_2\text{O}]$.

All solutions analyzed have an ionic strength of less than one molal. PHREEQC can handle different ionic strengths, pH, pressures, and temperatures of the solutions. In PHREEQC, the mass equations are written in terms of activities, where the equilibrium constant of each reaction is assumed to apply at all ionic strengths.

Saturation indices (SI) were evaluated by PHREEQC. A positive SI ($\text{SI} > 0$) indicates that the mineral is saturated with respect to the solution. However, SI does not consider kinetic boundaries (either for dissolution or precipitation). Therefore, a positive SI does not guarantee that saturated minerals will form within finite time constraints. The amount of precipitation of each mineral (q_i) is calculated with PHREEQC by defining an equilibrium condition of $\text{SI} = 0$, which may be coupled with kinetic restriction expressions. PHREEQC calculates the moles of precipitates that occur in 1 L of water.

2.2 Regulatory framework

Results from baseline conditions and from the predictive water quality model were compared against regulatory criteria, including the following:

- Maximum Authorized Concentrations of Prescribed Deleterious Substances (MDMER, 2002).
- Final effluent discharge point requirements (Directive 019, 2025): Determines the maximum concentration of water quality parameters in accordance with the acute lethal toxicity levels in rainbow trout (*Oncorhynchus mykiss*) and daphnia (*Daphnia magna*).
- Provincial surface water quality criteria for the short- and long-term protection of all aquatic organisms: Acute toxicity criterion (CVAA): maximum concentration of a substance to which aquatic organisms can be exposed for a short period without suffering serious adverse impacts.
- Chronic aquatic life criterion (CVAC): the highest concentration of a substance that will not produce adverse effects on aquatic organisms (and their offspring) when exposed daily throughout their lives.
- Canadian Water Quality Guidelines (CEQGs) for the Protection of Aquatic Life (Canadian Council of Ministers of the Environment): These guidelines are intended to protect all forms of aquatic life and all aspects of aquatic life cycles, including the most sensitive life stage of the most sensitive species over the long term from anthropogenic stressors such as chemical inputs or changes to physical components. They provide the science-based benchmark for a nationally consistent level of protection for aquatic life in Canada.

2.3 Year 21 Infrastructure

Figure A shows the projected mine infrastructure for year 21 of operations. The figure shows the locations of waste rock piles, pits, tailings storage facility (TSF), ore stockpile, sedimentation ponds, and other infrastructure. The figure also contains the water management infrastructure, where contact and non-contact water is defined. All contact water and water from the dewatering of the pits will be directed to the sedimentation ponds before being discharged into the environment.

The ore stockpile located directly north of Lake B was moved from being immediately adjacent to the water rock pile WD-87-1 (location shown on Figure A). This change in the design was done in February 2025 and was not incorporated in the water quality prediction model.

2.4 Hydrology

Total monthly flow for all water courses and catchments within the project area (including the dewatering of the pits) was used to calculate the mixing fractions for the water quality model. Water storage in diversion channels and creeks was neglected, given that it is virtually nonexistent when compared to the total monthly flows. Water storage was considered for Lake A, based on the data obtained from the hydrological assessment (see Chapter 11 of the ESIA).

Two scenarios were considered for estimating the hydrological regime:

- HST: Historical climate conditions projected for year 21 of operations
- CC: Climate change scenarios predicted for year 21 of operations

2.5 Geochemical Source Terms

Geochemical source terms were developed by MDAG (2024c). The source term models were developed using an empirical drainage chemistry model (EDCM). The EDCM uses pH and sulphate correlations to determine the water quality parameters for the expected mining effluent. The data used to construct the EDCM consisted of all geochemical test work carried out to date, as well as data from the monitoring program conducted during previous large-scale operations at Troilus. The recorded total and dissolved species were used for the EDCM. The output of the EDCM was defined by linear correlations, based on the maximum aqueous species reported. Therefore, the output of the EDCM is considered a conservative approach to estimate the mining effluent.

The composition of the predicted mining effluent is dependent on pH conditions (see Chapter 5 for details). The effluent pH conditions during previous operations at Troilus were circum-neutral, with a pH range of 6–8. Troilus has included as an attenuation measure the application of limestone to the sedimentation ponds, should the pH of the solutions at the sedimentation ponds drop below 8. The inputs for the effluent water quality for the predictive water quality model were defined by a pH of 8. The pH conditions used for the model are in agreement with the pH range from the humidity cells test that was carried out during operation for waste rock and tailings samples (BII, 2000). The water quality predictions presented in Chapter 13 are only applicable if the pH is maintained at 8 throughout the life cycle of the mine operations.

The developed EDCM models do not provide individualized concentrations for each of the designed mine structures during year 21, or the applicable hydrological regime of each structure. Rather, the EDCM provides the maximum concentrations of aqueous species that are expected for all mining effluent regardless of origin and hydrological regime (i.e. no differentiation between

waste rock effluent, pit walls, or tailings seepage). Therefore, the composition of all contact water (water in contact with the waste rock and ore deposits, and seepage water from the tailings facility) was defined by the outcome of the EDCM, regardless of the projected mine infrastructure.

2.6 Baseline conditions

Monitoring data from 2019 to 2022 was used to define end members for the water quality prediction model. The data range was chosen to avoid carrying baseline conditions that reflect the previous mining operations. Data from 2022 was the most recent data available to BluMetric. The model included water quality data from the following monitoring stations (Figure A):

- Lac Amont (E7)
- E4
- Lac A (E3)
- Pit 87
- Pit J4

The results from the predictive water quality model were compared against provincial and federal regulatory criteria, baseline conditions, including the stations used as inputs to the water quality model, as well as the following monitoring stations:

- E2
- E3
- E5

All analyzed parameters with values below detection limit (bdl) were treated as: $bdl/\sqrt{2}$ (Corghan, 2003).

The baseline data were treated conservatively, given the approach used to develop the geochemical source terms. The values used for each of the stations mentioned above consisted of summing twice the standard deviation to the average values for trace element concentrations. The average values were used for the major cation and anion data to avoid major changes in the general water chemistry parameters. Reported concentrations for total metals were used in place of dissolved metals. Therefore, any reported exceedances that have been reported in the monitoring program have been carried into the model. A summary of the exceedances of water quality parameters compared to baseline conditions is provided in Chapter 13.4.4.

2.7 Dissolved and Total Aqueous Concentrations

The mass balance model only predicts dissolved species concentrations. However, water quality inputs from baseline conditions (including pit dewatering) are in total concentrations. Effluent composition was determined from maximum aqueous concentrations derived from the geochemical test work and the monitoring program, including both dissolved and total concentrations. Therefore, the dissolved concentrations provided by the mass balance model reflect total concentrations, and the model results were used for comparison with regulatory criteria.

2.8 Explosives and Expected Nitrogen Contribution

Explosives are commonly the major contributor of nitrogen in contact waters at mines that use ammonium nitrate explosives. The primary components of these explosives are ammonium and nitrate. Under ideal blasting conditions, nitrogen species are completely oxidized to nitrogen gas. Nitrogen in residual explosives is highly soluble and can be mobilized by water flushing unlined blast holes or from flushing explosives transported to waste rock spoils. The speciation of nitrogen is dependent on pH and redox conditions (Figure 1). Nitrate is the most abundant nitrogen species that results from residual nitrogen from explosives.

Geochemical source terms for nitrogen and its species are derived from operational data and monitoring data. The following components are required to define the source terms for nitrogen:

- Type of explosives and powder factor (Pf)
- Estimation of blasting residual (fR)
- Hydrological regime
- Tonnage of materials to be extracted via explosives.

The residual nitrogen content can be determined by empirical analysis of analogous mining operations. Values in literature indicate a fR range between 1% from ammonium nitrate/fuel oil (ANFO) explosives to 5% from emulsion explosives (Mahmood et al., 2017). Based on the feasibility study (AGP; NI 43-101, 2024), emulsion explosives with a Pf of 0.31kgN/t will be used for the feed and waste material. To maintain a conservative approach, as discussed in Sections 2.5 and 2.6, nitrogen loadings will be calculated assuming the use of ANFO explosives, with an fR value of 4.5%. For reference, the nitrogen source terms developed for the Crawford project (Lorax, 2024) and for the Elk Valley Regional Water Quality Model (SRK, 2021) were 2.7–2.9%, and 4.5%, respectively. fR is a variable factor that it is site-specific and needs to be corroborated during operations to confirm or modify the assumptions made for the water quality predictive model.

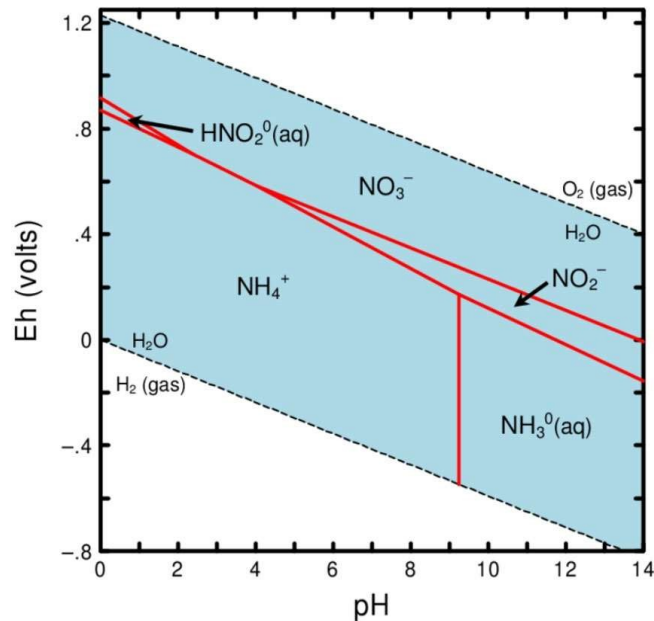


Figure 1 : Nitrogen speciation depending on pH and Eh conditions in a Fe-S system at 25°C (Dockrey et al., 2015).

The processes that control the speciation of nitrogen are complex and depend on several factors that include the distribution of nitrogen in the explosive mixtures, the oxidation efficiency to nitrogen dioxide gas during blasting, microbially-mediated enzymatic reactions, ion exchange processes along the flow paths, and pH and redox conditions (Figure 1). Nitrogen speciation was determined through empirical observations from the existing monitoring program. The data available to BluMetric, obtained from the monitoring program described in Section 2.6 (excepting the data from the pit water), does not contain nitrogen speciation and therefore could not be used to estimate the expected speciation. Water quality parameters obtained from the water at pits 87 and J4 contained nitrate, nitrite and total ammonia (Table 1). For reference, the nitrogen speciation from the collected water from the existing pits 87 and J4 is similar to that reported for the Crawford project (leachate from the stockpiles; Lorax, 2024).



Table 1 : Nitrogen speciation observed from the collected waters at the existing pits 87 and J4 (including the speciation)

Project	Nitrogen Speciation (% as N)		
	Total Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)
Troilus (Pits 87 and J4)	2.0%	97.3%	0.7%
Crawford (Impoundment facility and stockpiles)	0.7%	98.9%	0.4%

The total residual nitrate loadings can be estimated using:

$$\text{NO}_3 \text{ (kgNO}_3\text{/year)} = V(n) \cdot pF \cdot fN \cdot fR \quad (1)$$

where, fN is the nitrogen form as provided by explosive products. Typical values are 0.31 and 0.25 for ANFO and emulsion explosives, respectively. The resulting nitrate loadings were estimated to be 4.6 gNO₃/t. Loadings can be converted to concentrations by multiplying the amount of contact water that is predicted for all the different infrastructure designed for the new operations. Following the approach from the EDCM (Section 2.5), the nitrate concentrations were provided irrespective of the individual infrastructure, but rather by accounting for all contact water, and including all waste rock and feed to be extracted during the future mine operations.

Nitrate and ammonia concentrations were estimated as follows:

$$[\text{NO}_2] \text{ (mg/L)} = f_{\text{NO}_2} \cdot [\text{NO}_3] \quad (2)$$

$$[\text{NH}_3] \text{ (mg/L)} = f_{\text{NH}_3} \cdot [\text{NO}_3] \quad (3)$$

where f_{NO_2} and f_{NH_3} are the fraction between nitrate and ammonia against nitrate concentrations, based on Table 1.

Data from the monitoring program during previous mining operations at Troilus will increase the accuracy of nitrogen loadings and speciation predictions provided in this section. Data available to BluMetric for the period of previous operations are limited to BS-2 and PR-1. Data do not include nitrite concentrations. Therefore, there will be uncertainty in the defined fraction values (Table 1) to predict the speciation of nitrogen in surface water bodies. It is recommended that the nitrogen predictions be revised using data obtained from previous operations or that the model be calibrated with data that will be obtained during future operations.

The conditions reflected on Table 1 are only representative of oxidizing atmospheric conditions, and therefore, the nitrogen speciation estimation provided in this document does not apply to reductive conditions that might occur during winter months or leachate that originates from saturated materials (e.g. tailings within the impoundment).

Hydrological lag time was not considered for developing nitrogen source terms.

Nitrogen speciation was also calculated using the PHREEQC model under ambient and reductive conditions. The predicted nitrite and ammonia concentrations from the model were, in all cases, lower than when using Equations 1–3. Therefore, nitrogen concentrations were calculated using the empirical model and the equations mentioned above.

2.9 Simulations

Batch simulations were carried out by mixing end-member solutions described in Sections 2.5 and 2.6 and considering equilibrium conditions with mineral and gas phases. This method has been used to predict the water quality at several mine sites that discharge acid drainage into the environment (Mosley et al., 2015, Balistrieri et al., 2007, and Ryskie et al., 2024, Vandenberg et al., 2011).

For these simulations, atmospheric CO₂ and O₂ concentrations were considered during the spring to fall months. No gas exchange was considered during the winter months (including degassing). Mixing fractions were calculated for each junction based on the total monthly flow of water of each stream/contributor, based on the hydrological model (details in Chapter 11). Figure 2 shows the approach used for the geochemical model. Figure A shows all the modelled junctions, projected mine infrastructure, and the differentiation between contact and non-contact water. The geochemical conditions applied can be summarized as follows:

- All baseline and effluent solutions were assessed for their charge balance between cations and anions. Solutions with a charge balance error +/-10%, were corrected by varying calcium concentrations.
- All solutions (baseline, effluents, and predicted) were analyzed for solubility limits of mineral phases. All phases with a SI>0 were individually assessed to determine the likelihood of precipitation.
 - The estimation of solubility limits by PHREEQC is based on thermodynamic properties and does not account for kinetic limitations. Therefore, not all saturated phases are likely to precipitate.

- The phases that the model predicts are likely to precipitate are provided in **Erreur ! Source du renvoi introuvable.** The phases provided in this table are only those that are likely to precipitate based on available literature (MDAG, 2024c, Jonsson et al., 2005, Elghali et al., 2021, Ugwu and Sherman, 2019):
- Surface complexation modelling: substitution of metals with major elements within potential precipitates was modelled.
 - Surface area values were considered at 600 m²/g, and the following surface site densities:
 - Fe(OH)_{3(a)}: 0.005 and 0.2 mole/mole for strong and weak sites, respectively.
 - Al(OH)_{3(a)}: 0.033 mole/mole for strong sites.
 - Surface complexation sites are defined by the amount of iron oxide (Fe(OH)_{3(a)}) and aluminum oxide (Al(OH)_{3(a)}) precipitates.
 - Adsorption of major and minor ions onto Al(OH)_{3(a)} and Fe(OH)_{3(a)} was modelled using surface complexation constants from the generalized two-layer model (Dzombak and Morel, 1990; Karamalidis and Dzombak, 2010; **Erreur ! Source du renvoi introuvable.**).
- All contact water parameters were defined by the EDCM (see Section 2.5).
 - Where non-contact water was clearly distinguished (i.e., catchments that only contain overburden piles or beyond the Project Development Area; Figure A).
 - Solutions originated at SO5, D10b, and D06b were assumed to have similar water quality as those reported for Lake Amont, given that they will only be influenced by overburden materials.
- Mixing fractions were determined by the hydrological HEC-HMS model (see Chapter 11 for details). Water storage at the Bibou diversion channel was not considered in the model, given that the cumulative volume of water flowing through the channel is orders of magnitude larger than its storage capacity.
 - Water storage was considered for Lake A. All incoming solutions into the lake were mixed with the initial storage volume. The water quality at the lake was modelled for two consecutive years until year-after-year monthly steady-state conditions were achieved at the lake. Baseline water quality parameters were used as the initial water quality for the water stored at the lake.
- The following scenarios were modelled:
 - **HST_pre_pH8**: Historical Conditions. Mineral precipitation was allowed. Effluent pH of 8.
 - **HST_calcite_pH8**: Historical Conditions. Effluent solutions at sedimentation ponds in equilibrium with calcite. Mineral precipitation was allowed. Effluent pH of 8.
 - **HST_nopre_pH8**: Historical Conditions. No precipitation. Effluent pH of 8.

- **CC_pre_pH8:** Climate Change Conditions. Mineral precipitation was allowed. Effluent pH of 8.
- **CC_nopre_pH8:** Climate Change Conditions. No precipitation. Effluent pH of 8.
- **CC_calcite_pH8:** Climate Change Conditions. Effluent solutions at sedimentation ponds in equilibrium with calcite. Mineral precipitation was allowed. Effluent pH of 8.
- **HST_pre_pH65:** Historical Conditions. Mineral precipitation was allowed. Effluent pH of 6.5.
- **HST_nopre_pH65:** Historical Conditions. No precipitation. Effluent pH of 6.5.
- When applicable, the effluent solution with a pH of 8 was equilibrated with calcite and dolomite to simulate the resulting water chemistry that may result if liming application is carried out.
- All solutions were equilibrated at the monthly temperature average for the Troilus site (AGP; NI 43-101, 2024). To avoid freezing of the effluent solutions that are discharged to the environment during the winter months, the temperature for winter months was defined as 3°C.
 - Water quality predictions for winter months beyond Lake A were not provided, given that water flow during the winter months is negligible, compared to during non-winter months.
- To assess the oxidation rate of Fe²⁺, the kinetic restriction for Fe²⁺ oxidation by O₂ provided by Palandri and Kharaka (2004) was used:

$$\frac{dm_{Fe^{2+}}}{dt} = -(2.91E - 9 + 1.33E12 a_{OH}^2 P_{O_2})m_{Fe^{2+}} \quad (4)$$

where t is time in seconds, a_{OH}^2 is the activity of the hydroxyl ion, $m_{Fe^{2+}}$ is the total molality of ferrous iron in solution, and P_{O_2} is the oxygen partial pressure (atm).

- Kinetic boundaries were defined for the oxidation of Fe⁺². Precipitation of all saturated phases (SI>0) occurs immediately.

Table 2: Phases that are likely to precipitate (SI>1)

Phases	Formula
Al(OH)3(a)	Al(OH)3
Aragonite	CaCO3
Barite	BaSO4
Dolomite	CaMg(CO3)2
Gypsum	CaSO4·2H2O
Hydroxylapatite	Ca5(PO4)3(OH)
Saponite-Ca	Ca0.17Mg3Al0.34Si3.66O10(OH)2
SiO2(a)	SiO2
Fe(OH)3(a)	Fe(OH)3

(a) indicates that the phase is amorphous.

Table 3: Summary of intrinsic equilibrium constants (K_{INT}) for Cd, Co, Cu, Ni, Pb and Zn adsorption onto iron and aluminum oxides.

Element	Iron oxides ^a		Aluminium oxides ^b
	Log K _{INT} ¹	Log K _{INT} ²	Log KINT
Cd	0.47	-2.9	0.25
Co	-0.46	-3.01	-2.52
Cu	2.89	0.6	-2.73
Ni	0.37	-2.5	-
Pb	4.65	0.3	0.37
Zn	0.99	-1.99	-0.96

- indicates non applicable; aDzombak and Morel, 1990; bKaramalidis and Dzombak, 2010

K_{INT}^1 : $Hfo_sOH + Me^{2+} = Hfo_sMe^{++} + H^+$

K_{INT}^2 : $Hfo_wOH + Me^{2+} = Hfo_wMe^{++} + H^+$

Where Hfo_sOH and Hfo_wOH are strong and weak oxide surface sites for iron oxide sites, respectively, and Me²⁺ is a free metal ion.

KINT: $Hao_OH + M^{2+} = Hao_OM^{++} + H^+$

Hao_OH are aluminium oxide surface sites.



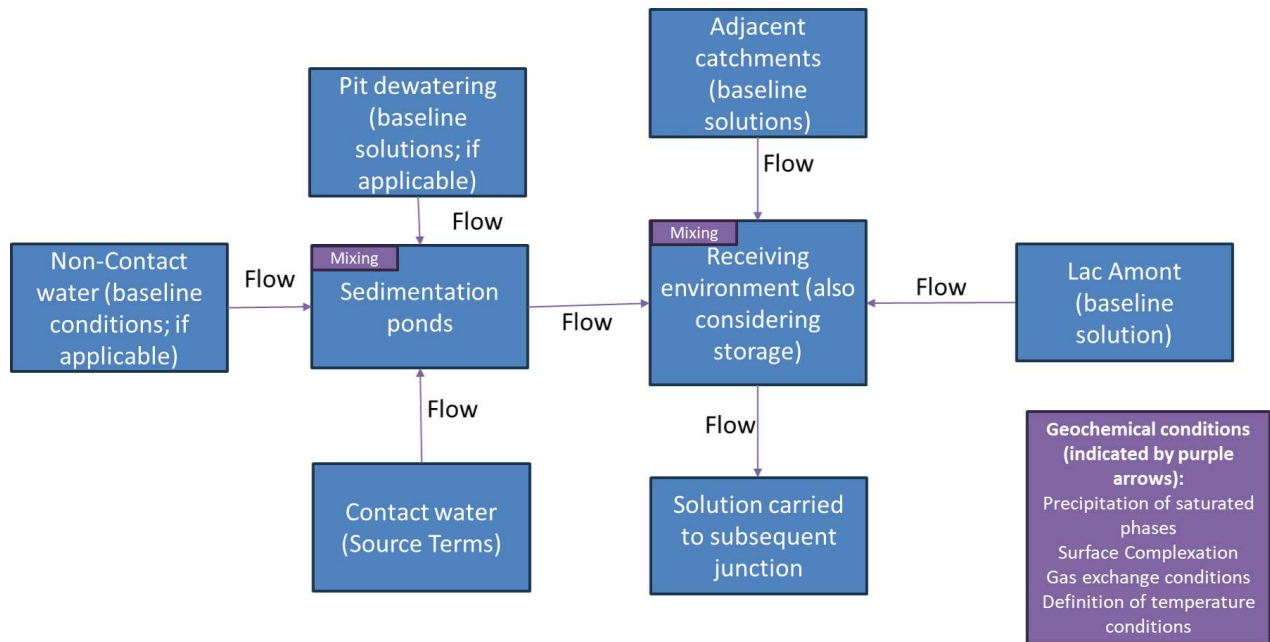


Figure 2: Block Diagram showing the conditions and methodology used for the geochemical model. Purple arrows indicate the direction of the flow and where the geochemical conditions were modelled. Mixing fractions were determined by total monthly flows for each component, based on the hydrological assessment (see Section 2.3 for details).

3. Geochemical Model Results

3.1 Oxidation of aqueous Fe²⁺

3.1.1 Fe²⁺ oxidation conditions

The oxidation of metals in natural waters is affected by the formation of ion-pairs or complexes and by pH conditions (Millero, 1985). The oxidation of Fe²⁺ occurs an order of magnitude slower at pHs below 6. The precipitation of iron phases is mainly dependent on the iron speciation, oxidation, and pH conditions (Figure 3). Under oxidizing conditions, Fe(OH)₃(a) is the most abundant phase for pH above 3.5.

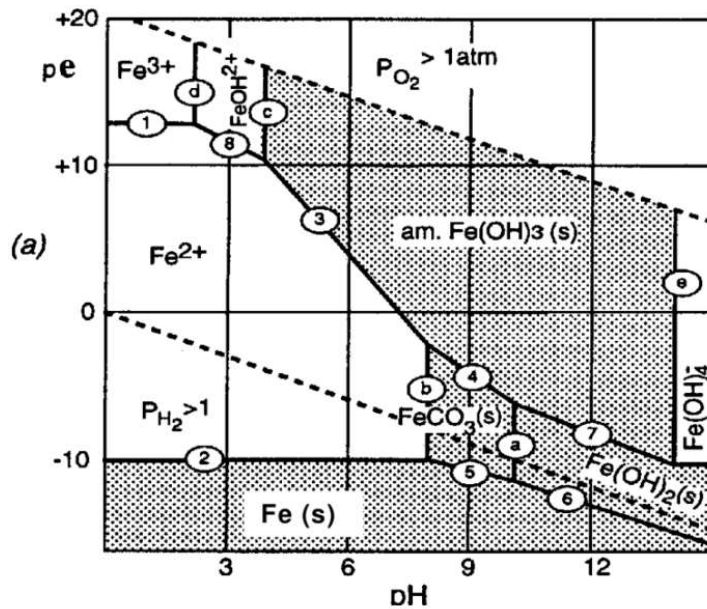


Figure 3 : Iron speciation depending on pH and pE conditions (Stumm and Morgan, 1981)

The oxidation of Fe²⁺ and iron precipitates can be simplified as:



3.1.2 Fe²⁺ oxidation rates

The effluent solution determined with the EDCM (Section 2.5) was used to analyze the rate of Fe²⁺ oxidation and iron oxide precipitation. For this simulation, an effluent solution with a pH of 6.5 was used. Figure 4 shows the model results when applying the kinetic boundaries provided in Section 2.9 to the effluent solution. An almost complete oxidation of Fe²⁺ is obtained in less than one day. The resulting solution is supersaturated with respect to Fe(OH)₃(a) (SI>3). If precipitation of Fe(OH)₃(a) is allowed, all Fe³⁺ is removed from the solution. The limiting factor for the precipitation of iron oxides is the oxidation rate of Fe²⁺. Given that the oxidation of Fe²⁺ under the studied conditions occurs within a day, the modelled solutions assumed equilibrium conditions, and water quality predictions were provided for each month of the modelled year.

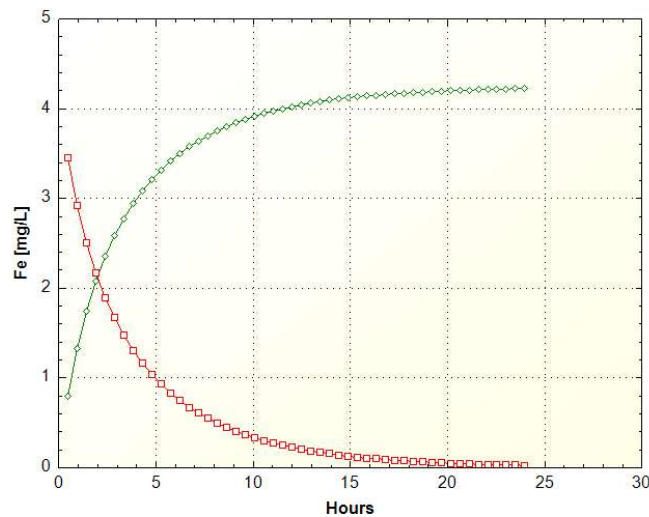


Figure 4: Fe²⁺ oxidation over time for the effluent solution with a pH of 6.5 under atmospheric oxygen conditions. Red and green lines indicate Fe²⁺ and Fe³⁺ concentrations, respectively.

3.2 Water quality predictions

The predicted water quality is highly dependent on the defined parameters for the effluent. The effluent solutions that result from the linear correlations from the EDCM vary significantly when a fixed pH is chosen. For reference, sulphate concentrations from the effluent range from 794 to 1585 mg/L when a pH of 8 and 6.5 is chosen, respectively. Based on the monitoring data obtained since previous operations, the pH of the mining effluent was between 6–8. Troilus has included as an attenuation measurement a liming plan should the pH of the effluent solutions at the sedimentation pond drop below 8. Based on this information, BluMetric has assessed the impacts when an effluent solution with a pH of 8 is discharged into the environment, which are discussed

in Chapter 13. The pH conditions used for the model are in agreement with the pH range from the humidity cells test that was carried out during operation for waste rock and tailings samples (BII, 2000). All the results provided in the chapter are only applicable if the mining effluent is maintained at a pH of 8.

Figures 5 through 13 provide a summary of predicted water quality parameters for all modelled scenarios at Junction 2, 3, 28, and Lake A. Tables A through V provide the water quality parameters for all modelled locations. The figures and tables also report on exceedances of regulatory criteria. Values on the tables are not accurate to all decimal points, but the mathematical value is provided. The box plots in this study show the mean values (square inside the box), the values between the 25th, 50th, and 75th percentiles define the box size, and the ranges are determined by the lower and upper bounds, taking into account an interquartile range coefficient of 1.5.

The model predicts that the discharge of mining effluent to the environment, during year 21 of operations, will increase the hardness and sulphate concentrations of the receiving environment. The resulting hardness and sulphate concentrations are predicted to increase by an order of magnitude at the effluent discharge points, and are particularly dependent on pH conditions.

The main observations from the predictive model are:

- Hardness and sulphate concentrations increase from baseline conditions by an order of magnitude at Bibou Creek and Lake A.
- Effluent solutions defined with a pH of 8 are compliant with MDMER and D019 criteria for all parameters.
 - Predicted pH conditions at the receiver environments range from 7 to 8.2.
- All water parameters are compliant with regulatory criteria or comparable to baseline values at Junction 28.
- As shown in Figures 5 through 13, sulphate, hardness, nickel, and zinc concentrations are virtually independent of solubility limitations, while aluminum, copper, and iron concentrations are strongly dependent on solubility limits.
- The model predicts a virtually complete oxidation of Fe^{2+} to Fe^{3+} under atmospheric conditions. Fe^{3+} is controlled by the solubility of iron oxyhydroxides. During winter months, Fe^{2+} remains mobile in solution.
- The model results from historical and climate change conditions mainly differ in the following ways:

- During the winter months, the ratio between contact and non-contact water is higher for the climate change scenario when compared to historical conditions, while the opposite is observed for non-winter months.
- The climate change scenario results in greater rainfall compared to historical conditions, which increases the overall ratio of non-contact versus contact water, resulting in lower annual average concentrations for dissolved species for climate change scenarios compared to historical conditions.

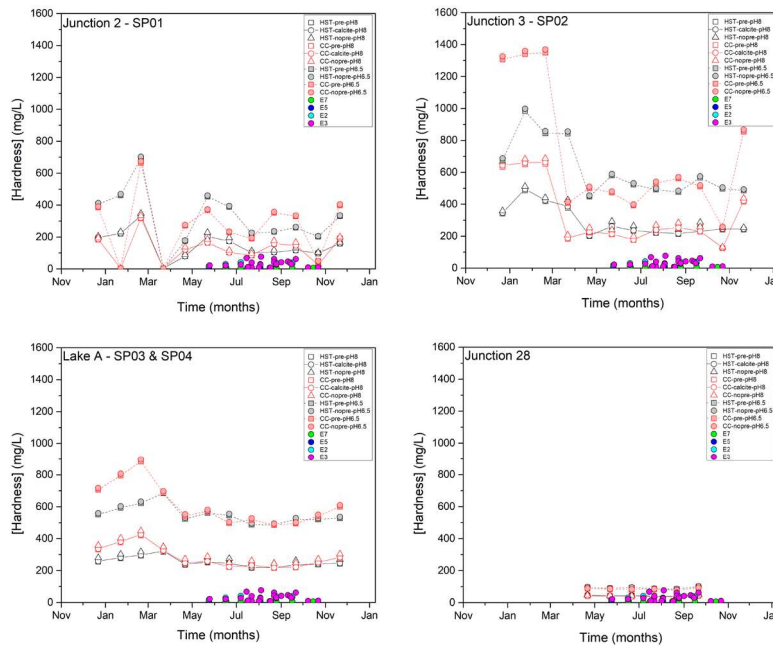


Figure 5 : Predicted versus baseline water hardness for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively.

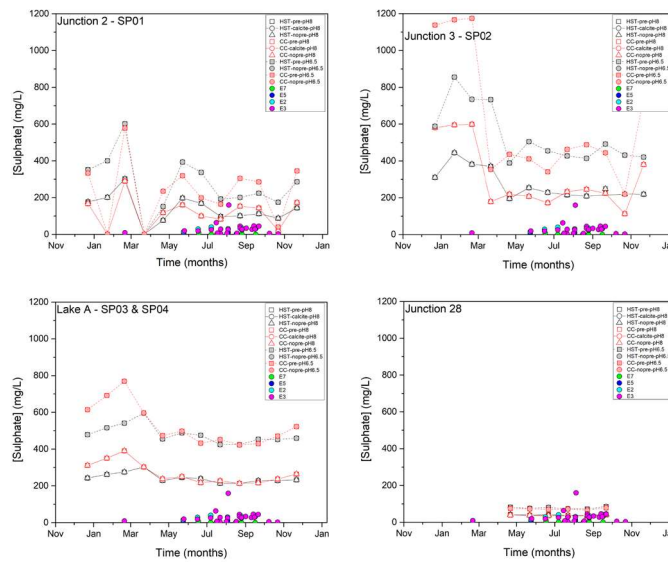


Figure 6 : Predicted versus baseline dissolved sulphate concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively.

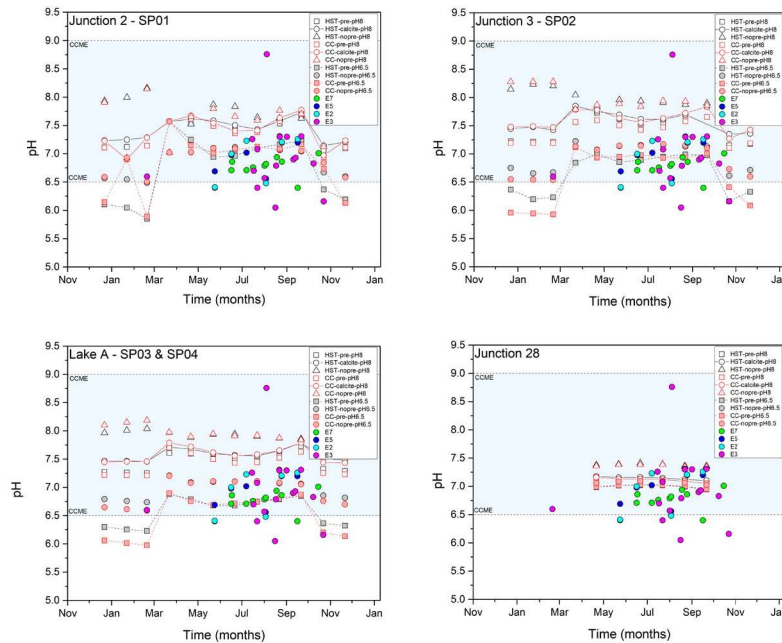


Figure 7 : Predicted versus baseline pH conditions for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively.

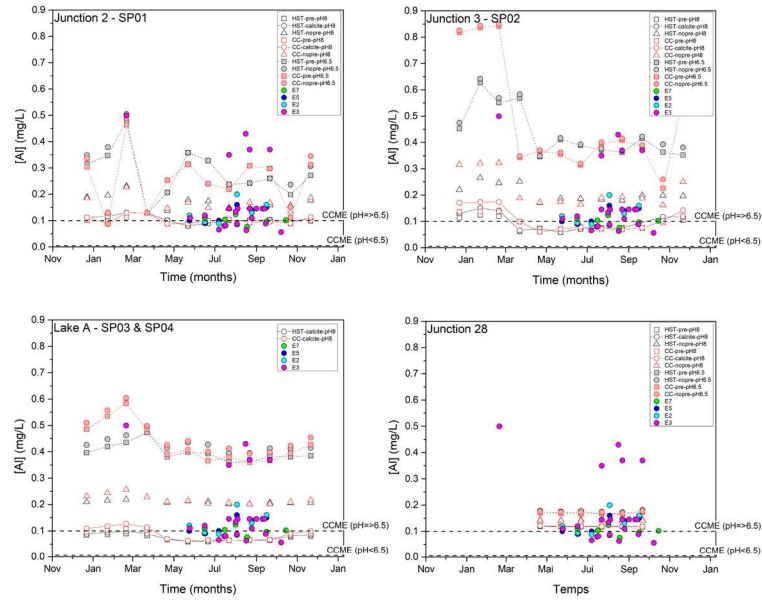


Figure 8 : Predicted versus baseline dissolved aluminium concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines.

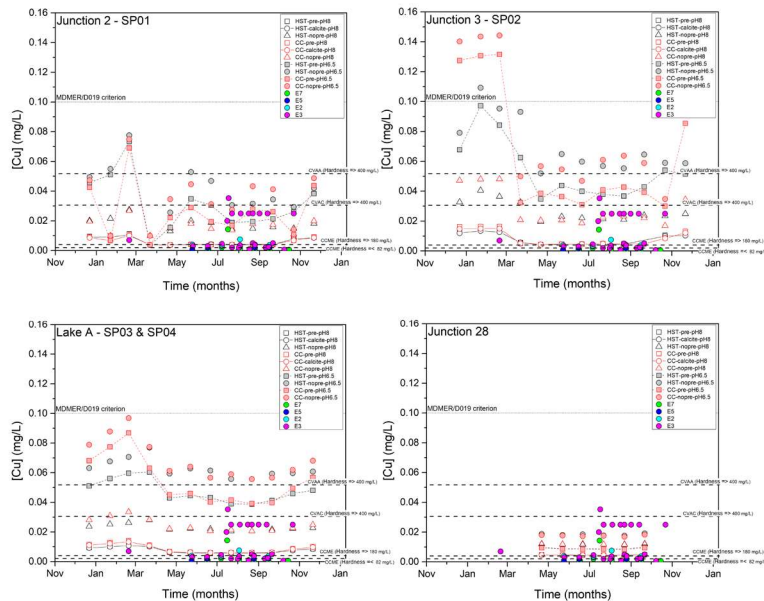


Figure 9 : Predicted versus baseline dissolved copper concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines.

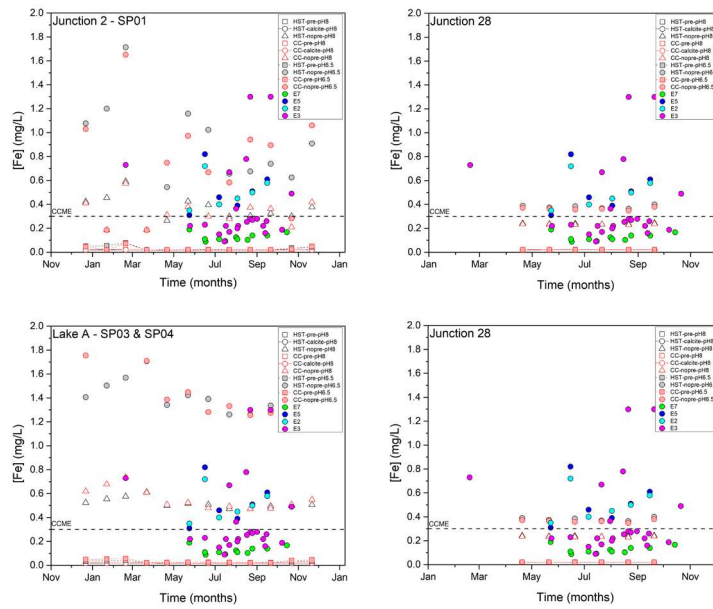


Figure 10 : Predicted versus baseline dissolved iron concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines.

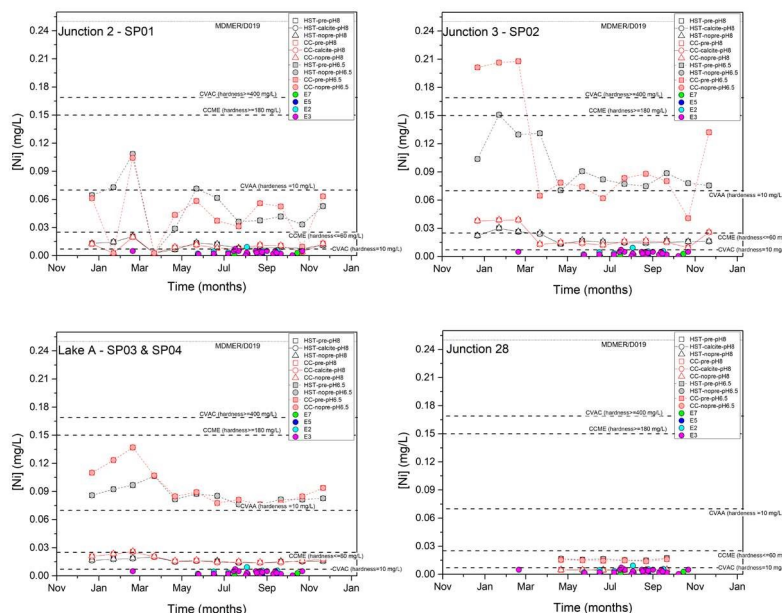


Figure 11 : Predicted versus baseline dissolved nickel concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines.

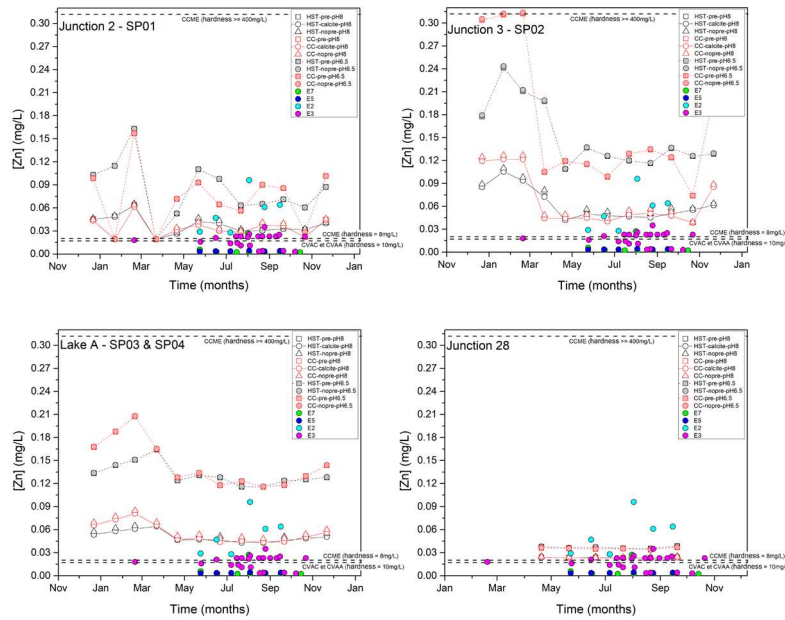


Figure 12 : Predicted versus baseline dissolved nickel concentrations for all modelled scenarios. Continuous and dashed lines represent scenarios HST/CC for an effluent with a pH of 8 and 6.5, respectively. Federal and provincial guidelines are indicated by dashed horizontal lines.

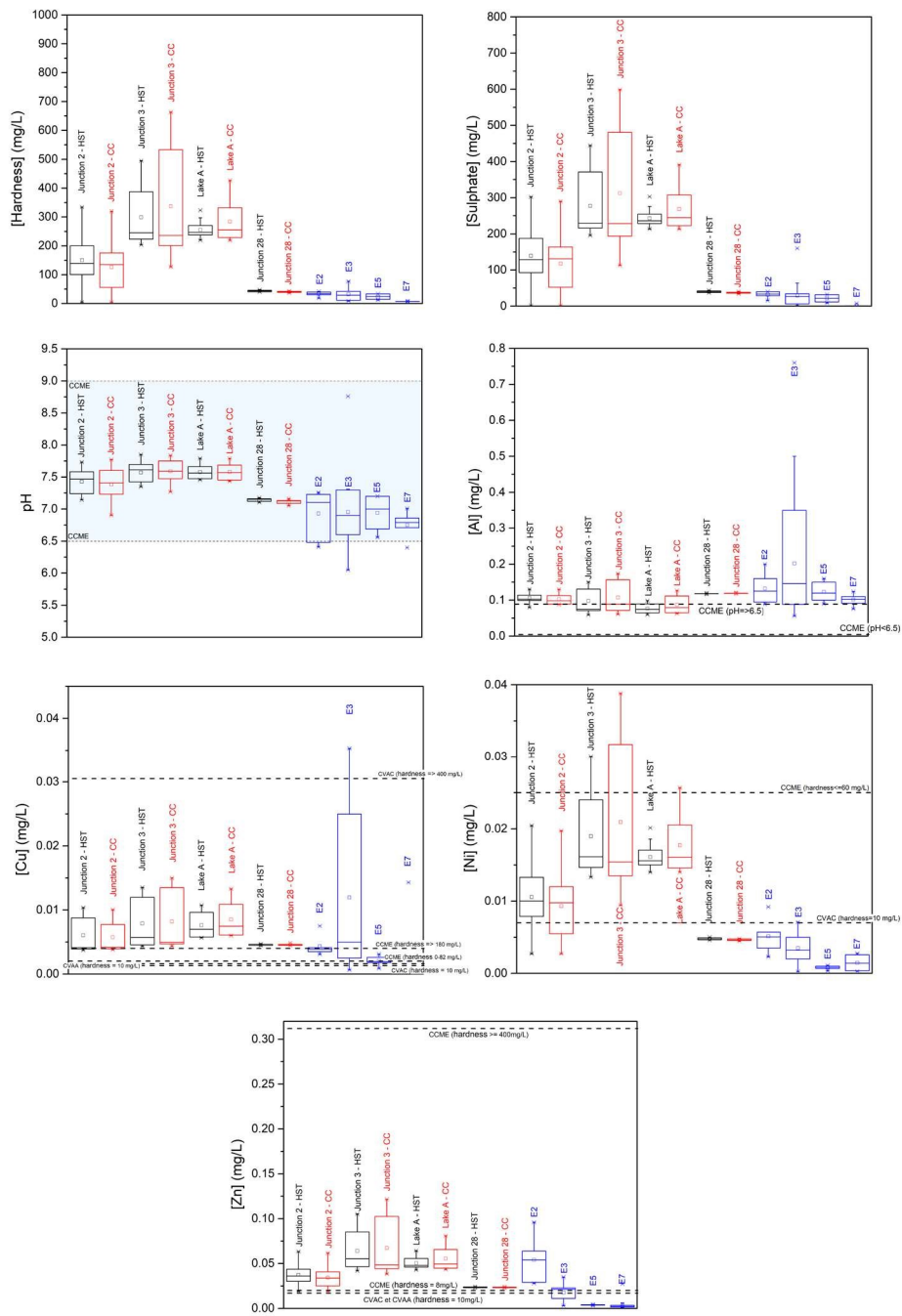


Figure 13 : Box plot showing predicted vs baseline water quality parameters for HST/CC_calcite_pH8 scenarios. Federal and provincial guidelines are indicated by dashed horizontal lines.



4. Model Limitations and Assumptions

Geochemical modeling of groundwater using PHREEQC incorporates an unavoidable amount of uncertainty as it is a simplified representation of often complex reaction assemblages. This section describes and discusses the uncertainties in relation to the conceptual model and prediction simulations. Below is a list of model limitations and assumptions:

1. Kinetics for mineral formation should be considered and calibrated with experimental/observable data. Kinetics for mineral precipitation or dissolution are complicated processes that are controlled by multiple factors, such as temperature, water chemistry (pH, redox potential, concentrations of dissolved gases and solutes), the availability of sorbent surfaces or reactive surfaces, and catalysis by biochemical processes. Cravota III (2021) provides a detailed description of the processes that control the kinetic boundaries for mineral precipitation and dissolution in ARD effluents. The main processes are:
 - a. Atmosphere exchange (O_2 intake and outgassing of CO_2)
 - b. Iron oxidation and reduction
 - c. Manganese oxidation
 - d. Organic carbon oxidation
 - e. Adsorption by hydrous metal oxides

Given the complexity of the processes that control the kinetic boundaries for mineral precipitation and dissolution, geochemical models must be calibrated with field data, to provide realistic predictions.

For the simulations developed in this study, a simplistic kinetic boundary for ferrous oxidation was used, based on the work from Palandri and Kharaka (2004), thus generating uncertainty in the model's predictions. Moreover, no kinetic boundaries were defined for other minerals of interest, such as gypsum. Each mineral phase of interest (i.e. minerals expected to precipitate) should be assessed for its kinetic boundaries, and expressions should reflect real conditions.

2. Processes that drive mineral dissolution and precipitation are not linear, and extrapolation over prolonged periods results in uncertainties. The water quality model should be calibrated with data from the monitoring program when the mine is operational.
3. All contact water is assumed to have the same parameter concentrations as the estimated effluent, which was determined through the EDCM.
4. The inputs for the effluent water quality for the predictive water quality model were defined by a pH of 8. The water quality predictions and resulting impacts presented in Chapter 13 are only applicable if the pH is maintained at 8 throughout the life cycle of the mine operations.

5. The EDCM does not distinguish between the several types of materials (e.g., waste rock, ore, tailings, or pit walls).
6. Below detection limit (bdl) values were assumed to be: $bdl/\sqrt{2}$.
7. Mixing ratios were estimated from the hydrological model.
8. All groundwater discharging to Lake A was considered effluent.
9. Dissolved organic carbon (DOC) was defined as non-reactant; therefore, it only gets diluted.
10. The geochemical model presented here only predicts reactions governed by thermodynamic equilibrium. Kinetic or catalytic reactions (that may be caused by interaction with organic matter and biological activity) were not included; therefore, the model does not provide an accurate prediction for trace element concentrations. No biologically-induced reactions were considered.
11. No evaporation at sedimentation ponds, creeks or lakes was considered.
12. Mineral precipitation was allowed for phases that are likely to precipitate, discarding mineral phases that are kinetically prohibited.
13. Surface complexation was allowed for trace metals onto aluminium and iron precipitates.
14. It is assumed that trace elements are not catalyzing reactions
15. The flow of water at Bibou Creek was allowed during the winter months, mainly resulting from the discharge of water from the sedimentation ponds. This condition applies to Lake A, given that the surface water flow is partially controlled by the discharge of mining effluent. Surface water downstream of Lake A was only allowed to flow from May to October. Water in the winter months (November to April) was assumed to accumulate until the spring melt.
16. Solutions (baseline, predicted, and effluent) were equilibrated with oxygen and CO₂ atmospheric conditions, excepting during winter months.
17. Water quality from X22 and J pits are assumed to be the same as the water quality reported for the 87 pit.
18. Water quality from the dewatering of the pits is assumed to have a mixing ratio of 75%:25% between pit water and contact water, respectively. This mixing ratio was used to account for the contact water contribution that may result from pit wall exposure.
19. Effluent from overburden piles has a water quality similar to that measured in Lake Amont.
20. Solutions originating at SO5, D10b, and D06b were assumed to have similar water quality as those reported for Lake Amont, given that they will only be influenced by overburden materials.
21. Baseline water chemistry was averaged. The average of the major cation and anion composition was used for the model. The 95th percentile for trace metals composition was used for the model.
22. Baseline and EDCM solutions with a balance between cations and anion concentrations greater than $\pm 10\%$ range were corrected by varying calcium concentrations.

23. There are no mineral-water-gas interactions between the effluents with overburden and bedrock materials during the flow path from the effluent until the receiver environment (Lake A). All sources of dissolved species that result from mineral dissolution, cation exchange, or surface complexation (except those minerals that precipitate from the solution) are derived from EDCM.
24. The residual nitrogen content from using explosives is assumed to be 4.5%, consistent with the ranges provided by Mahmood et al. (2017). This factor is variable, and should be calibrated with local data.
25. To preserve a conservative approach, ANFO explosives were assumed in lieu of emulsion explosives.
26. Explosives with a powder factor of 0.31kg/t were assumed for waste rock and ore extraction, according to the feasibility study, resulting in a nitrogen loading of 4.6 g/t when accounting for the tonnage of rock to be extracted. Nitrogen loadings were converted into dissolved concentrations by scaling to the local hydrology of the site.
27. Nitrogen speciation can not be established from existing data. Data available to BluMetric contains limited data from previous operations, and therefore, the nitrogen speciation and concentrations during previous operations could not be evaluated. The geochemical model predicts that nitrite and total ammonia concentrations are negligible, in accordance with the nitrogen speciation at the defined pH and pE conditions. However, the geochemical model presented here only predicts reactions governed by thermodynamic equilibrium, and kinetic or catalytic reactions (that may be caused by interaction with organic matter) were not included; therefore, the model does not offer an accurate prediction of nitrogen speciation, particularly for total ammonia.
28. The nitrogen speciation estimation provided in this document does not apply to reductive conditions that might occur during winter months or leachate that originates from saturated materials (e.g. tailings within the impoundment).
29. The efficiency of the liming plan (as an attenuation measurement, should the pH of the solutions at the sedimentation ponds drop below 8), the amount of lime, and the type of application were not assessed.
30. Existing water chemistry from the open pits has the following distribution of nitrogen species: nitrate (97.32%), nitrite (0.67%), and total ammonia (2.01%). These values were used to calculate nitrogen speciation, as these values are greater and more conservative than what the geochemical model predicts. Nitrogen speciation does not account for un-oxidizing conditions, which may occur during winter months.
31. Selected effluent solutions with a pH of 8 were equilibrated with calcite and dolomite. Results from the model should be calibrated with monitoring data where liming has been applied, or with testing from effluent solutions equilibrated with calcite and dolomite.

5. Closing Statement


The conclusions presented in this report represent our professional opinion and are based upon the work described in this report and any limiting conditions in the terms of reference, scope of work, or conditions noted herein.

The findings presented in this report are based on the water chemistry collected from the baseline studies from 2019 to 2022, and the water quality effluent from the EDCM. Unless otherwise stated, the findings are applicable for year 21 of operations and cannot be extended to previous or future site conditions, or portions of the site that were not investigated directly.


BluMetric Environmental Inc. makes no warranty as to the accuracy or completeness of the information provided by others, or of conclusions and recommendations predicated on the accuracy of that information.

Respectfully submitted,
BluMetric Environmental Inc.

<original signé par>


Christian Gardois, M.Sc., ing. (QC)
Geological Engineer

<original signé par>


Kwoň Rausis, M.Eng., Ph.D., P.Geo.
Geochemist



6. References

AGP Mining Consultants Inc. (2024). NI 43-101 Feasibility Study: Troilus Gold-Copper Project Québec Canada.

Balistrieri, L. S., Seal, R. R., Piatak, N. M., & Paul, B. (2007). Assessing the concentration, speciation, and toxicity of dissolved metals during mixing of acid-mine drainage and ambient river water downstream of the Elizabeth Copper Mine, Vermont, USA. *Applied Geochemistry*, 22(5), 930–952. <https://doi.org/10.1016/j.apgeochem.2007.02.005>

Beak International Incorporate (BII; 2020). Waste Rock Investigation Interim Report, Troilus Mine, Quebec.

Croghan, C AND P P. Egeghy. Methods of Dealing with Values Below the Limit of Detection Using SAS. Presented at Southern SAS User Group, St. Petersburg, FL, September 22-24, 2003.

Cravotta, C. A. (2021). Interactive PHREEQ-N-AMDTreat water-quality modeling tools to evaluate performance and design of treatment systems for acid mine drainage. *Applied Geochemistry*, 126. <https://doi.org/10.1016/j.apgeochem.2020.104845>

Dzombak, D. and Morel, F., 1990. Surface complexation modeling: Hydrous ferric oxide.

Elghali, A., Benzaazoua, M., Bouzahzah, H., Abdelmoula, M., Dynes, J. J., & Jamieson, H. E. (2021). Role of secondary minerals in the acid generating potential of weathered mine tailings: Crystal-chemistry characterization and closed mine site management involvement. *Science of the Total Environment*, 784. <https://doi.org/10.1016/j.scitotenv.2021.147105>

Favas, P. J. C., Sarkar, S. K., Rakshit, D., Venkatachalam, P., & Prasad, M. N. V. (2016). Acid Mine Drainages From Abandoned Mines: Hydrochemistry, Environmental Impact, Resource Recovery, and Prevention of Pollution. In *Environmental Materials and Waste: Resource Recovery and Pollution Prevention* (pp. 413–462). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-803837-6.00017-2>

Hendry, M. J., Wassenaar, L. I., Barbour, S. L., Schabert, M. S., Birkham, T. K., Fedec, T., & Schmeling, E. E. (2018). Assessing the fate of explosives derived nitrate in mine waste rock dumps using the stable isotopes of oxygen and nitrogen. *Science of the Total Environment*, 640–641, 127–137. <https://doi.org/10.1016/j.scitotenv.2018.05.275>

Igarashi, T., Herrera, P. S., Uchiyama, H., Miyamae, H., Iyatomi, N., Hashimoto, K., & Tabelin, C. B. (2020). The two-step neutralization ferrite-formation process for sustainable acid mine drainage

treatment: Removal of copper, zinc and arsenic, and the influence of coexisting ions on ferritization. *Science of the Total Environment*, 715.
<https://doi.org/10.1016/j.scitotenv.2020.136877>

Jönsson, J., Jönsson, J., & Lövgren, L. (2006). Precipitation of secondary Fe(III) minerals from acid mine drainage. *Applied Geochemistry*, 21(3), 437-445.
<https://doi.org/10.1016/j.apgeochem.2005.12.008>

Karamalidis, A., & Dzombak, D. (2010). *Surface Complexation Modeling: Gibbsite*, John Wiley & Sons, New York, New York, pp. 312, ISBN: 0470587687.

Mahmood FN, Barbour SL, Kennedy C, Hendry MJ. Nitrate release from waste rock dumps in the Elk Valley, British Columbia, Canada. *Sci Total Environ*. 2017 Dec 15;605-606:915-928. doi: 10.1016/j.scitotenv.2017.05.253. Epub 2017 Jul 6. PMID: 28693108.

Lorax Environmental Services. (2024). Crawford Nickel Project Water Quality Model Report. In 2024.

MELCCFP. (2021). Guide d'intervention Protection des sols et réhabilitation des terrains contaminés. <http://www.environnement.gouv.qc.ca/sol/terrains/guide-intervention/guide-intervention-protection->

MELCCFP. (2025). Directive 019 sur l'industrie minière.
www.environnement.gouv.qc.ca/formulaires/renseignements.asp

Millero, F. J. (1985). The effect of ionic interactions on the oxidation of metals in natural waters. *Geochimica et Cosmochimica Acta*, 49, 547-553.

Minesite Drainage Assessment Group (MDAG), 2024a. DRAFT Troilus Gold Project – Prediction of ARD Potential in the J4, 87, and Southwest Ore Zones – Phase 1: Based on Generic ARD Criteria. January 13, 2024.

Minesite Drainage Assessment Group (MDAG). 2024b. Troilus Gold Project - Prediction of ARD Potential in the J4, 87, and Southwest Ore Zones - Phase 2: Kinetic Testing and Site-Specific ARD Criteria. Draft report for Troilus Gold Corp., dated 16 May 2024.

Minesite Drainage Assessment Group (MDAG). 2024c. Troilus Gold Project - Predicted Maximum Aqueous Concentrations and Geochemical Source Terms. Draft report for Troilus Gold Corp., dated 7 May 2024.

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP), 2024. Critères de qualité de l'eau de surface. Fichier de calcul des critères de qualité de l'eau de surface pour les métaux. Tableau CQES.

Morgan, B., & Lahav, O. (2007). The effect of pH on the kinetics of spontaneous Fe(II) oxidation by O₂ in aqueous solution - basic principles and a simple heuristic description. *Chemosphere*, 68(11), 2080–2084. <https://doi.org/10.1016/j.chemosphere.2007.02.015>

Mosley, L. M., Daly, R., Palmer, D., Yeates, P., Dallimore, C., Biswas, T., & Simpson, S. L. (2015). Predictive modelling of pH and dissolved metal concentrations and speciation following mixing of acid drainage with river water. *Applied Geochemistry*, 59, 1–10. <https://doi.org/10.1016/j.apgeochem.2015.03.006>

Parkhurst, D. L. (1995). *Advective-Transport, and Inverse Geochemical Calculations*.

Palandri, J., & Kharaka, Y. (2004). *A Compilation of Rate Parameters of Water-Mineral Interaction Kinetics for Application to Geochemical Modeling*.

Ryskie, S., Rosa, E., Neculita, C. M., & Couture, P. (2024). Modeling the geochemical evolution of mine waters during mixing. *Journal of Hazardous Materials*, 476. <https://doi.org/10.1016/j.jhazmat.2024.134929>

Sasaki, A., & Igarashi, T. (n.d.). Groundwater flow and chemistry around the tailings dam of a closed mine and countermeasures for the leachate.

SRK Consulting. (2021). *Geochemical Source Term Methods and Inputs for the 2020 Update of the Elk Valley Regional Water Quality Model*.

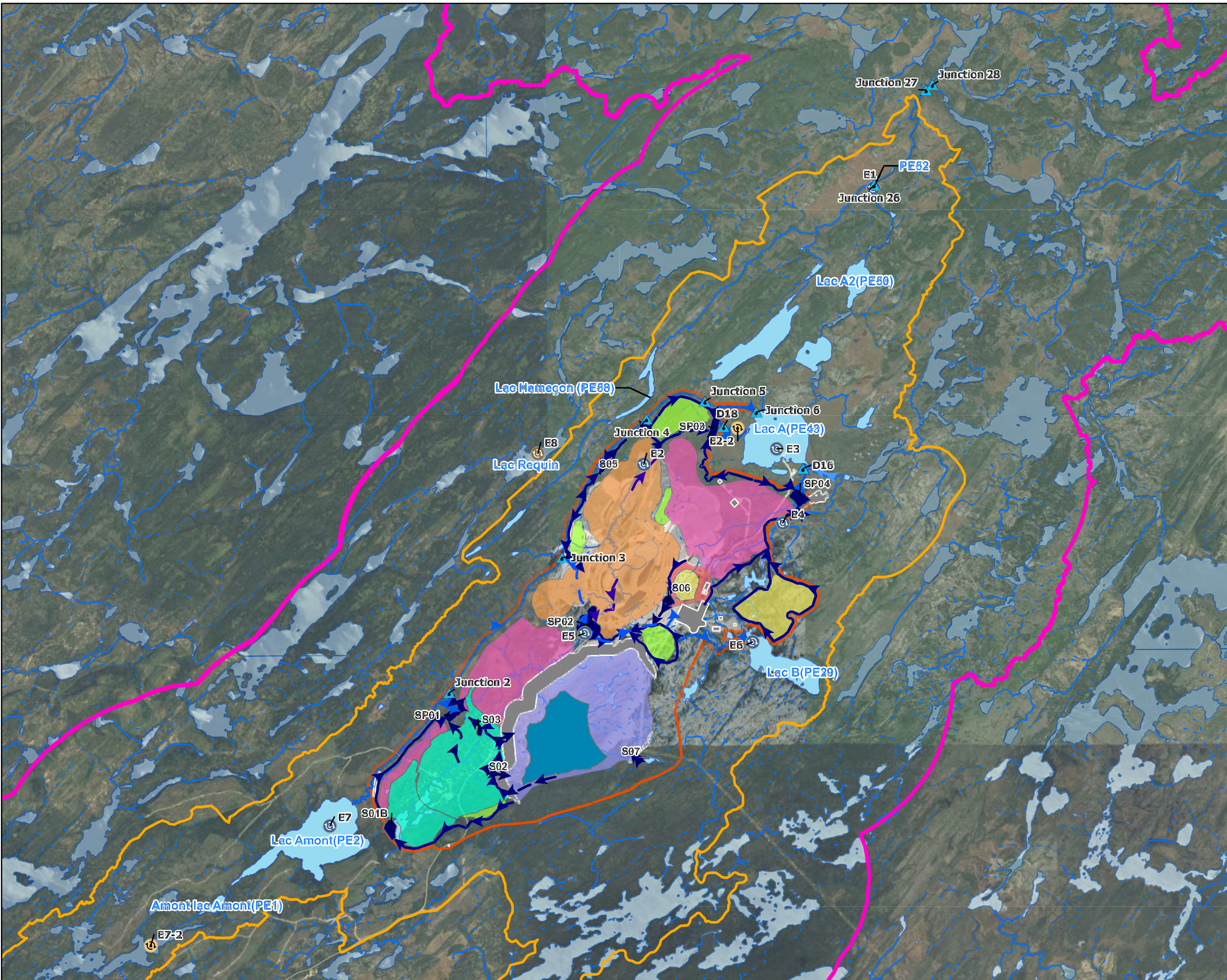
Tabelin, C., Sasaki, A., Igarashi, T., Tomiyama, S., Villacorte-Tabelin, M., Ito, M., & Hiroyoshi, N. (2019). Prediction of acid mine drainage formation and zinc migration in the tailings dam of a closed mine, and possible countermeasures. *MATEC Web of Conferences*, 268, 06003. <https://doi.org/10.1051/matecconf/201926806003>

Ugwu, I. M., & Sherman, D. M. (2019). The solubility of goethite with structurally incorporated nickel and cobalt: Implication for laterites. *Chemical Geology*, 518, 1–8. <https://doi.org/10.1016/j.chemgeo.2019.04.021>

Vandenberg, J. A., Lauzon, N., Prakash, S., & Salzsauler, K. (2011). Use of water quality models for design and evaluation of pit lakes.

Figures





LÉGENDE / LEGEND

- Zone de développement du projet / Project Development Area
- Zone d'étude locale (Hydrologie) / Local Study Area (Hydrology)
- Zone d'étude régionale (Hydrologie) / Regional Study Area (Hydrology)
- Jonctions / Junctions
- Qualité de l'eau 2019 / Water Quality Sample 2019
- Qualité de l'eau 2022 & 2023 / Water Quality Sample 2022 & 2023
- Qualité de l'eau 2023 / Water Quality Sample 2023

Cours d'eau naturel / Natural Watercourses

- Permanent / Permanent
- Intermittent / Intermittent
- Plan d'eau / Lake

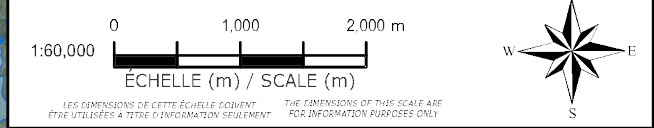
Infrastructure minière projetée - Y21 / Projected Mine Infrastructure - Y21

- Fosse / Pit
- Aire d'entreposage du minerai / Mineral Storage Area
- Halde à mort-terrain / Overburden Storage Area
- Halde à stérile / Waste Rock Storage Area
- Halde à stérile - Super / Waste Rock Storage Area - Super
- Plateforme de la zone de stockage du minerai / Mineral Stacking Platform Area
- Parc à résidus miniers / Tailings Storage Facility
- Pipeline d'eau propre / Clean Water Pipeline
- Fossé d'eau de contact / Contact Water Ditch
- Pipeline d'eau de contact / Contact Water Pipeline
- Direction écoulement / Flow Direction
- Canal de dérivation / Diversion channel
- Assèchement des fosses / Pit Dewatering
- Bassins de sédimentation / Sedimentation Basin
- Bassin de résidus miniers / Tailings Pond
- Autre infrastructure / Other Infrastructure

0				
RÉV.	DESCRIPTION	AA/MM/YY	BY	VERIF.

RÉFÉRENCES/REFERENCES
 Proposed Infrastructure: 16/040485_PublicationDonnes_Infrastructures_Poly, Stantec, 25 January 2024
 Base Map: Bing, 06 June 2023

NOTES
 CES INFORMATIONS NE PEUVENT ÊTRE REPRODUITES SANS L'AUTORISATION ÉCRITE DE BLUMETRIC ENVIRONMENTAL INC. NE PAS AGRANDIR ET RÉDUIRE LA TABLE DE CE DESSIN. CE DESSIN A PEUT-ÊTRE ÊTRE RÉDUIT. TOUTES LES ÉCHELLES ET ANNOTATIONS INCLUSES SONT BASÉES SUR UN FORMAT DE DESSIN DE 11"x17".
 THIS INFORMATION MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF BLUMETRIC ENVIRONMENTAL INC. DO NOT ENLARGE OR REDUCE THE SIZE OF THIS DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED IN SIZE. ALL SCALES AND ANNOTATIONS SHOWN ARE BASED ON AN 11"x17" DRAWING FORMAT.



CLIENT
Troilus Gold Corp.

PROJET/PROJECT
Étude d'impact sur l'environnement et le milieu social pour le projet de mine Troilus / Environmental and Social Impact Assessment for the Troilus Mine Project

TITRE/TITLE
Année 21 infrastructures projetées / Year 21 Proposed Infrastructure

NO. PROJET / PROJECT NO.
 240433-03 / 167040485

DATE
 05/ 14/ 2025

CONÇU / CHECKED
 K. Rausis

RÉVISÉ / VERIFIED
 C. Gardois

DESSINÉ / DRAWN
 M. Baker

Figure No.
 A

ED./REV.
 0

Tables



Table A: General Chemistry Baseline Conditions

Regulation		Hardness mg/L	pH n/a	Alk mg/L	DOC mg/L	F mg/L	Si mg/L	Sulphate mg/L	Cl mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L
MDMER												0.5 ^a
CCME (long-term)			6.5-9							2.935483871	0.059956522	0.019 ^a
CCME (long-term)												
CCME (long-term)												
Location	Time	Baseline										
Llac Amont (E7)	6/27/2022	6.68430172	6.86	5.8018461	8.1497745	1.117E-06	1.491562	7.601612	1.197E-06	0.014142136	0.014142136	0.014142136
	8/11/2022	7.16996924	6.79	7.1021951	8.8580394	1.117E-06	1.435322	0.8001702	1.41E-05	0.014142136	0.014142136	0.021037425
	10/25/2022	7.06864311	7.01	7.0022453	16.957899	1.117E-06	1.89041	1.4358088	1.197E-06	0.014142136	0.014142136	0.014142136
	7/26/2023	8.56757592	6.76	8.2025944	7.6011894	1.117E-06	1.400293	1.7003581	4.231E-06	0.014142136	0.014142136	0.014142136
	8/28/2023	6.7143544	6.94	9.2028937	7.1023995	1.117E-06	1.240285	1.0001767	1.197E-06	0.014142136	0.014142136	0.014142136
	6/3/2019	6.73412894	6.4	3.4010527	8.8779096	7.369E-07	1.491562	1.0001767	4.795E-06	0.014142136	0.014142136	0.089998719
	6/26/2019	6.69295274	6.71	4.301332	8.7781995	1.117E-06	1.491562	1.4357128	4.513E-06	0.014141458	0.014142136	0.014142136
	7/17/2019	6.77531515	6.71	4.5013969	9.1771596	0.0150004	1.491562	0.81017	0.2199885	0.014141458	0.014142136	0.014142136
	8/13/2019	6.15239345	6.82	3.2009828	8.3791197	0.0199996	1.491562	0.8301697	0.1699898	0.014141458	0.014142136	0.014142136
	9/4/2019	7.27478831	6.86	5.1015965	9.0774495	0.0160003	1.491562	0.9501967	0.2199885	0.014141458	0.014142136	0.014142136
9/26/2019	7.31596451	6.4	2.3007084	8.4789495	0.0140003	1.491562	0.8001606	0.1599894	0.014141458	0.014142136	0.014142136	
Llac A (E3)	8/11/2022	10.4537264	6.57	5.6017962	10.474109	0.0212136	1.590343	6.101347	0.042423	0.014141458	0.01707423	0.109999679
	10/18/2022	9.85057197	6.83	6.8021954	10.474109	0.0212136	2.120477	5.1010742	0.042423	0.014141458	0.01707423	0.014142136
	7/27/2023	12.7553454	6.7	7.3023951	10.474109	0.0212136	1.580369	7.6017081	0.3599948	0.014141458	0.01707423	0.014142136
	8/27/2023	9.34793558	6.79	7.6024449	10.474109	0.0212136	1.76375	6.6014353	0.042423	0.014141458	0.01707423	0.126632131
E4	6/3/2019	5.35684891	6.26	2.1006536	8.5786596	0.0370013	1.491562	2.2004464	0.2599868	0.014141458	0.014142136	2.299970378
	6/26/2019	7.6427948	6.55	3.4010577	8.3792394	0.0440003	1.491562	2.9206082	0.4199762	0.014141458	0.014142136	0.01999956
	7/17/2019	8.30691271	6.3	5.7017961	9.1772793	0.0530017	1.491562	3.5307814	0.7599771	0.090012513	0.014142136	0.014142136
	8/13/2019	5.60653545	6.3	1.6004989	11.97	0.0340014	1.491562	1.7203385	0.299985	0.090012513	0.014142136	0.0249998
	9/4/2019	7.14332164	6.75	4.6014368	8.1796995	0.0540011	1.491562	2.2004464	0.6099527	0.090012513	0.014142136	1.099996794
	9/25/2019	6.8936351	6.67	3.9012123	8.3791197	0.0440003	1.491562	2.5404988	0.5299775	0.090012513	0.014142136	0.036998975
Pit Dewatering												
Pit J4	Values used	422.980504	7.39387	60.931871	1.9365066	0.2600121	11.63976	382.05944	4.7230035	1.982840888	0.013670876	0.040867338
Pit 87	Values used	247.736666	7.4489	61.648587	1.9361475	0.2599362	11.63796	213.23399	4.7222945	1.981439983	0.013661218	0.040838465

Notes: ^a Regulatory criteria is for un-ionized ammonia

Table B: Dissolved Metals. Baseline Conditions

Regulation ^f	Al mg/L	As mg/L	B mg/L	Ba mg/L	Be mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	Cu mg/L	Fe mg/L	Li mg/L	Mg mg/L	Mn mg/L	Hg mg/L	Mo mg/L	Ni mg/L	P mg/L	Pb mg/L	K mg/L	Na mg/L	Sr mg/L	Se mg/L	Sb mg/L	Tl mg/L	Tl mg/L	U mg/L	Zn mg/L	Sn mg/L	
MDMER		0.1								0.1							0.25		0.08										0.4	
Directive 019 (2025)		0.1								0.1	3						0.25		0.08										0.4	
CVAC (hardness 10mg/L)		0.15		0.038	0.000138	0.00005			0.1	0.0013	0.65	0.44		0.26	0.00091	3.2	0.007		0.00017			21	0.005	0.24	0.0072		0.014		0.017	
CVAA (hardness 10mg/L)		0.34		0.11	0.00124	0.0002			0.37	0.0016	3.4	0.91		0.6	0.0016	29	0.07		0.004			40	0.062	1.1	0.047		0.32		0.017	
CVAC (hardness 40mg/L)				0.165	0.001425046	0.00014				0.0043				0.86					0.00099										0.055	
CVAA (hardness 40mg/L)				0.47	0.012825099	0.0008				0.0059				1.9					0.025										0.055	
CVAC (hardness 400mg/L)				1.911	0.068822	0.0076				0.0305				6.52					0.01858										0.388	
CVAA (hardness 400mg/L)				5.45	0.61939	0.0087				0.0517				14.1					0.477										0.388	
CCME (long-term)	0.005 ^g	0.005	1.5			0.00004 ^d				0.002 ^e	0.3			0.23 ^f	0.000026	0.073	0.025 ^h		0.001 ^m			0.001		0.0008		0.015		0.02 ⁿ		
CCME (long-term)	0.1 ^a					0.00037 ^a				0.004 ^b				1.2 ^c			0.15 ⁱ		0.007 ^k									0.312 ^p		
CCME (long-term)						0.00007 ^a																						0.037 ^q		
Location	Time																													
Lac Amont (E7)	6/27/2022	0.091103	0.000470013	0.070706	0.00311	4.20013E-06	2.90017E-05	2.380072	0.000183827	6.74929E-05	0.00078	0.088498	0.000354	0.180005	0.00416	2.60005E-06	9.00117E-05	0.000280026	0.00671263	0.000150005	0.353011	0.456002	0.00551	0.000140004	2.10024E-05	0.0003536	0.002121	1.80005E-05	0.003	3.53554E-06
	8/11/2022	0.124002	0.000279008	0.070706	0.00345	6.00013E-06	1.40012E-05	2.530044	0.000237633	2.42401E-05	0.00074	0.124998	0.000354	0.207006	0.00674	2.50015E-06	0.000130012	2.12018E-05	0.00671263	0.000220005	0.376008	0.543018	0.00661	0.00036001	6.50064E-05	0.0003536	0.002121	2.20005E-05	0.0027296	3.53554E-06
	10/25/2022	0.102004	0.000440015	0.070706	0.00303	4.20013E-06	7.00036E-06	2.430089	0.000255566	1.85367E-05	0.00056	0.166999	0.000354	0.243009	0.00576	2.40006E-06	0.000180021	0.002760233	0.00420004	0.000190007	0.380012	0.556008	0.00667	3.54009E-05	5.10053E-05	0.0003536	0.002121	3.00012E-05	0.0023	3.53566E-06
	7/26/2023	0.104003	0.000150001	0.070706	0.00391	4.20013E-06	9.00043E-06	2.900084	0.000165894	3.23207E-05	0.00143	0.093099	0.000354	0.322017	0.00538	1.60005E-06	0.000110016	0.000440036	0.00590019	0.000130003	0.347009	0.645024	0.009331	6.00017E-05	4.00042E-05	0.0003536	0.002121	3.80013E-05	0.0024	3.53554E-06
	8/28/2023	0.076002	0.000340009	0.070706	0.00387	4.20013E-06	1.30007E-05	2.270058	0.002086661	3.89731E-05	0.00056	0.104	0.000354	0.254012	0.00505	1.80003E-06	0.000630084	0.002380193	0.00671263	0.00025E-05	0.398998	0.59601	0.00804	3.54009E-05	1.60017E-05	0.0003536	0.002121	2.50002E-05	0.0015	3.53554E-06
	6/3/2019	0.120003	0.000230002	0.070706	0.0036	4.20004E-06	2.40015E-05	2.400031	0.000188309	7.12939E-05	0.002161	0.189996	0.000354	0.180003	0.028001	2.20007E-06	8.50107E-05	0.001176274	0.00560006	0.000180003	0.490019	0.470003	0.0064	3.54009E-05	4.30044E-05	0.0003536	0.002121	1.90004E-05	0.005799	3.53554E-06
	6/26/2019	0.110001	0.000170005	0.070706	0.0031	4.20004E-06	1.30007E-05	2.400031	0.000112088	1.94871E-05	0.00064	0.109998	0.000354	0.170004	0.0064	2.20007E-06	5.20068E-05	0.001176274	0.00740025	8.8002E-05	0.490019	0.470003	0.0053	3.54009E-05	2.10024E-05	0.0003536	0.002121	1.80005E-05	0.0034	3.53554E-06
	7/17/2019	0.100002	0.000210005	0.070706	0.0035	4.20004E-06	9.90041E-06	2.400031	0.000121057	2.09128E-05	0.002	0.109998	0.000354	0.190004	0.0045	2.20007E-06	6.60078E-05	0.001176274	0.01270017	9.20009E-05	0.509998	0.520006	0.0055	3.54009E-05	3.60032E-05	0.0003536	0.002121	1.90004E-05	0.0033	3.53554E-06
	8/13/2019	0.085003	0.000240004	0.070705	0.003	4.20004E-06	8.50041E-06	2.200042	9.86366E-05	2.37645E-05	0.001	0.109998	0.000354	0.160002	0.0058	2.20007E-06	6.10079E-05	0.001176274	0.00609997	8.70012E-05	0.400015	0.369997	0.0059	3.54009E-05	1.70013E-05	0.0003536	0.002121	1.80002E-05	0.0013	3.53554E-06
	9/4/2019	0.110004	0.000280004	0.070706	0.0035	4.20004E-06	2.50009E-05	2.60006	0.000112088	2.09128E-05	0.00061	0.139998	0.000354	0.190004	0.0067	2.20007E-06	5.70068E-05	0.001176274	0.00760003	0.000200004	0.459991	0.510005	0.0069	3.54009E-05	0.000160017	0.0003536	0.002121	2.20005E-05	0.0017	3.53554E-06
9/26/2019	0.097001	0.000260008	0.070705	0.0041	4.20004E-06	7.8003E-06	2.60006	0.000112088	1.71105E-05	0.00042	0.139998	0.000354	0.200003	0.0058	2.20007E-06	6.20077E-05	0.001176274	0.00420004	8.8002E-05	0.430003	0.480003	0.0067	3.54009E-05	1.70013E-05	0.0003536	0.002121	2.00004E-05	0.001	3.53554E-06	
Lac A (E3)	8/11/2022	0.134004	4.62012E-05	0.070706	0.0054	7.00021E-06	3.2002E-05	3.53011	0.000322823	7.22462E-05	0.0019	0.364997	0.0006	0.398019	0.0118	3.00002E-06	0.000160025	0.000260024	0.00515001	9.90022E-05	0.554023	0.916027	0.0137	3.53567E-05	5.20061E-05	0.00035356	0.002121	0.000101003	0.021897	3.53566E-06
	10/18/2022	0.056602	0.000290007	0.070706	0.00312	4.24276E-06	1.30007E-05	3.300103	0.000197278	1.75861E-05	0.00065	0.187997	0.000354	0.391019	0.00485	1.20003E-06	0.000150018	0.000460039	0.00520018	0.000140005	0.514025	0.828023	0.0123	3.53567E-05	2.70027E-05	0.00035356	0.002121	9.50021E-05	0.0031	3.53566E-06
	7/27/2023	0.081603	8.00013E-05	0.070707	0.00544	6.00022E-06	1.00006E-05	4.150077	0.000188314	4.13512E-05	0.035301	0.220001	0.0006	0.581011	0.0108	2.00006E-06	0.000170023	0.007080772	0.00590019	0.000130006	0.880025	1.420055	0.0191	3.53567E-05	4.00042E-05	0.00035356	0.002121	0.000117003	0.014299	3.53566E-06
	8/27/2023	0.063501	0.00027001	0.070706	0.00538	4.24276E-06	1.20002E-05	2.98008	0.00232251	6.22634E-05	0.00094	0.254	0.0006	0.46301	0.00968	1.40004E-06	0.000760106	0.003210294	0.00515001	0.000123004	0.686019	1.190042	0.0167	3.53567E-05	3.10037E-05	0.00035356	0.002121	8.90038E-05	0.0034	3.53566E-06
E4	6/3/2019	0.190004	0.000170005	0.070706	0.0046	7.07123E-06	5.70029E-05	1.700029	0.000242115	5.22835E-05	0.0053	0.219996	0.000354	0.270004	0.013001	2.18001E-06	0.000120014	0.000560047	0.00620002	0.000460005	0.490019	0.650013	0.01	7.07118E-06	2.60031E-05	0.00035356	0.002121	8.2001E-05	0.008599	3.53566E-06
	6/26/2019	0.160003	0.000180007	0.070706	0.0038	5.00014E-06	4.24284E-06	2.500066	0.00026248	7.60472E-05	0.0036	0.229998	0.000354	0.340003	0.0101	2.18001E-06	0.000130012	0.000670044	0.00650015	0.000130003	0.549996	0.940029	0.013	5.00014E-06	2.90032E-05	0.00035356	0.002121	9.70015E-05	0.0032	3.53566E-06
	7/17/2019	0.120003	0.000140006	0.070706	0.0048	3.53566E-06	7.00036E-05	2.700055	0.00014796	9.50603E-05	0.0047	0.249996	0.000354	0.380009	0.016	2.18001E-06	0.000160025	0.000660066	0.02890069	0.000220005	0.580023	1.100037	0.016	3.53559E-06	2.30029E-05	0.00035356	0.002121	0.000120002	0.005299	3.53566E-06
	8/13/2019	0.230004	0.000220007	0.070706	0.0051	1.30001E-05	2.50009E-05	1.800023	0.000282469	7.60472E-05	0.0082	0.289998	0.000354	0.270004	0.0089	2.18001E-06	7.40091E-05	0.000670044	0.00920014	0.000150002	0.419994	0.550007	0.011	7.07118E-06	5.60059E-05	0.00035356	0.002121	8.10012E-05	0.005299	3.53566E-06
	9/4/2019	0.170005	0.000180007	0.070706	0.0047	7.07123E-06	2.3001E-05	2.300036	0.000215212	7.60472E-05	0.0044	0.299994	0.000354	0.340003	0.011	2.18001E-06	0.000110016	0.000540044	0.00770008	0.000150002	0.540026	0.910027	0.014	7.07126E-06	5.80065E-05	0.00035356	0.002121	0.000130002	0.0039	3.53566E-06
	9/25/2019	0.170003	0.000150001	0.070706	0.0053	7.07123E-06	1.10005E-05	2.200042	0.000215212	5.22835E-05	0.0037	0.23999																		

Table C: General Chemistry Historical Conditions. Effluent solutions at sedimentation ponds in equilibrium with calcite. Mineral precipitation was allowed. Effluent pH of 8.

Regulation		Hardness mg/L	pH n/a	Alk mg/L	DOC mg/L	F mg/L	Si mg/L	Sulphate mg/L	Cl mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L
MDMER												0.5 ^o
CCME (long-term)			6.5-9							2.935483871	0.059956522	0.019 ^o
Station	Time	Effluent										
Effluent (pH 8)	n/a	913.677787	8	126.1225	4.465648	1.0015388	34.733625	795.6938	40.05141	6.575847907	0.04533778	0.1355315
	n/a	811.387772	7.7692	22.55273	4.465648	0.18604	24.858573	795.5977	40.05141	6.575987997	0.045338746	0.135534387
	n/a	876.0056	7.13599	88.37278	4.465648	0.1860476	34.733625	795.5881	40.05141	6.569263653	0.045292384	0.135395795
Year 21 Historical Conditions												
Junction 2	November	99.6492365	7.1447	13.84088	8.603318	0.0243066	5.1088297	88.3435	4.43515	0.76137784	0.005249389	0.015692376
	December	160.676592	7.20993	19.72481	8.339858	0.0368702	7.4469969	143.9267	7.234282	1.218086867	0.00839821	0.025105377
	January	196.962035	7.23524	23.21024	8.152647	0.0443955	8.8319676	176.9809	8.899014	1.48958225	0.01027006	0.030701032
	February	223.576164	7.24987	25.76404	8.009007	0.0499259	9.8474126	201.2265	10.11991	1.688650845	0.011642556	0.034803935
	March	334.130777	7.28908	36.37164	7.408592	0.0729273	14.064814	301.9454	15.1921	0.839072029	0.005785058	0.017293692
	April	4.56814635	7.57181	5.012157	9.198825	0.0059108	1.491923	1.670099	0.069996	0.327447527	0.002257617	0.006748857
	May	80.314209	7.61211	6.009854	7.593768	0.0207767	3.5157228	76.59824	3.845262	0.660666782	0.004555027	0.013616671
	June	203.295827	7.58734	8.654946	6.808057	0.0483965	7.0678574	197.6338	9.940535	1.654188583	0.011404953	0.03409365
	July	174.779261	7.50428	8.231623	7.349939	0.04211	6.2975613	169.4594	8.521117	1.424440169	0.009820932	0.029358421
	August	101.474316	7.4321	6.648342	7.805517	0.0256497	4.1780452	97.31839	4.888201	0.832109531	0.005737055	0.017150192
September	105.545295	7.57839	6.71646	7.743393	0.026537	4.290345	101.3337	5.09062	0.864960753	0.00596355	0.017827272	
October	117.411772	7.73346	7.122716	7.954304	0.0292955	4.6752528	112.9185	5.673418	0.961202924	0.006627101	0.019810871	
Junction 3	November	245.533032	7.3497	29.80332	7.584551	0.0600654	10.650155	219.9678	10.88492	1.84793374	0.012740747	0.038086835
	December	245.094613	7.36168	31.11428	7.448213	0.0687248	10.692215	219.2377	10.59281	1.850595459	0.012759098	0.038141694
	January	347.113934	7.44839	44.21657	6.479481	0.1048351	14.614596	310.6004	14.75145	2.615209389	0.018030798	0.053900768
	February	495.012067	7.47691	59.41986	5.669471	0.1358956	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	March	425.472163	7.42605	51.07052	6.141448	0.1181929	17.598442	382.3092	18.45137	2.513643779	0.017330545	0.05180745
	April	387.528775	7.85021	21.51444	6.799199	0.0951687	12.40345	371.051	18.47477	1.026022797	0.007074007	0.021146841
	May	203.766341	7.75232	10.91545	6.34829	0.0485105	6.9212487	195.8279	9.822486	1.638638538	0.011297742	0.033773156
	June	261.98928	7.69357	10.99393	5.735426	0.0631336	8.6204667	254.4053	12.73506	2.119989484	0.01461646	0.043694039
	July	236.147714	7.61657	10.21536	6.416878	0.0572783	7.9715433	229.2952	11.47871	1.915457359	0.013206295	0.03947853
	August	223.090873	7.61294	10.57822	6.619889	0.0548693	7.5984123	215.8852	10.78637	1.806466953	0.01245485	0.037232183
September	216.788152	7.69726	10.95625	6.589964	0.0530891	7.3875122	209.1226	10.45137	1.750570845	0.01206947	0.036080137	
October	258.626939	7.83949	13.87126	6.758382	0.0630861	8.6204667	248.4688	12.40856	2.076001068	0.014313178	0.042787416	
Junction 4	November	245.141735	7.34904	29.75007	7.572342	0.0597234	10.633331	219.622	10.8672	1.844991839	0.012720464	0.038026201
	December	245.040572	7.36099	31.10187	7.446657	0.0684626	10.689811	219.1897	10.59069	1.850175188	0.012756201	0.038133032
	January	347.102926	7.4478	44.21017	6.479361	0.1045881	14.614596	310.5908	14.75145	2.615209389	0.018030798	0.053900768
	February	495.012067	7.47644	59.41436	5.669471	0.1356486	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	March	425.472163	7.42556	51.06501	6.141448	0.1179459	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	April	387.518767	7.84795	21.50894	6.799199	0.0949217	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	May	199.663233	7.74828	10.69088	6.220809	0.0742927	6.7824512	191.8991	9.625384	1.605717271	0.011070763	0.033094633
	June	256.728299	7.69028	10.76816	5.620514	0.0616232	8.4474204	249.3045	12.48017	2.077542063	0.014323802	0.042819177
	July	232.432902	7.61309	10.04914	6.315971	0.0561308	7.8465654	225.6834	11.29827	1.885337902	0.012998633	0.038857753
	August	219.932482	7.60958	10.42311	6.526283	0.0538472	7.4908593	212.8305	10.63358	1.780970482	0.012279063	0.036706689
September	213.517675	7.68798	10.78618	6.490972	0.0520461	7.2763541	205.9815	10.29433	1.724233831	0.011887887	0.035537318	
October	255.952913	7.83627	13.72286	6.688836	0.0621913	8.5315401	245.904	12.28059	2.054707312	0.014166366	0.042348541	
Junction 5	November	244.979612	7.34835	29.7264	7.567793	0.0594422	10.626722	219.4875	10.86082	1.843731025	0.012711771	0.038000215
	December	245.009549	7.36031	31.09351	7.445939	0.0682119	10.68861	219.1705	10.58962	1.850035097	0.012755235	0.038130145
	January	347.092918	7.44722	44.20416	6.479241	0.1043411	14.614596	310.5908	14.7511	2.615209389	0.018030798	0.053900768
	February	495.00206	7.47598	59.40885	5.669471	0.1354016	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	March	425.462155	7.42507	51.05901	6.141448	0.1177008	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	April	387.50876	7.84569	21.50338	6.799199	0.0946766	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	May	198.143082	7.74447	10.60399	6.173528	0.0466867	6.7307777	190.439	9.552357	1.593529398	0.010986733	0.032843434
	June	254.77382	7.68648	10.68092	5.5779	0.0609089	8.3837298	247.4121	12.38517	2.061711837	0.014214659	0.042492908
	July	231.039848	7.60927	9.983474	6.278145	0.0555494	7.7996988	224.3385	11.23091	1.874130662	0.012921364	0.038626766
	August	218.743583	7.60592	10.3616	6.491211	0.0533114	7.450602	211.6874	10.57651	1.771444329	0.012213384	0.03651035
September	212.303756	7.69007	10.71916	6.453985	0.0515047	7.2348951	204.8095	10.23583	1.714427496	0.011820276	0.035335204	
October	254.942147	7.83292	13.6635	6.662622	0.0617011	8.4978923	244.9434	12.23273	2.046582064	0.014110346	0.042181075	
Junction 6	November	244.827497	7.34767	29.70267	7.563125	0.0591591	10.620112	219.353	10.85408	1.842610301	0.012704044	0.037977116
	December	244.977525	7.35962	31.0852	7.44522	0.0679592	10.688009	219.1513	10.58856	1.849895007	0.012754269	0.038127257
	January	347.082911	7.44664	44.19815	6.479122	0.1040923	14.613995	310.5812	14.7511	2.615209389	0.018030798	0.053900768
	February	494.992052	7.47551	59.40334	5.669471	0.1351565	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	March	425.452148	7.42459	51.0535	6.141448	0.1174538	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	April	387.50876	7.84344	21.49783	6.799199	0.0944297	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	May	196.623931	7.74065	10.51776	6.126485	0.0460844	6.679705	188.9884	9.479685	1.581341525	0.010902703	0.032592236
	June	252.830349	7.68266	10.59428	5.535527	0.0602002	8.3200392	245.539	12.29122	2.046021702	0.014106482	0.042169526
	July	229.647795	7.60545	9.918258	6.24056	0.050497	7.7528321	222.9937	11.16356	1.862923423	0.012844095	0.038395779
	August	217.56469	7.60226	10.30044	6.456379	0.0527795	7.4103447	210.5539	10.51979	1.761918175	0.012147705	0.036314011
September	211.079829	7.68665	10.65249	6.417237	0.0509651	7.1934361	203.6376	10.17734	1.704621162	0.011752665	0.035133091	
October	253.94239	7.82958	13.60439	6.636407	0.0612129	8.4648452	243.9828	12.18452	2.038596905	0.014055291	0.042016497	
OutletSP04	November	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	December	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	January	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411</	

Table E: General Chemistry, Climate Change Conditions, Effluent sources at sedimentation ponds in equilibrium with calcite. Mineral precipitation was allowed. Effluent pH of 8

Regulation	Hardness mg/L	pH	Alk mg/L	DOC mg/L	Si mg/L	Sb mg/L	Sulfate mg/L	Cl mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L	O ₂
CCME (long-term) CCME (long-term) CCME (long-term)												
Station Time Effluent (pH 8)												
Year 21 Historical Conditions												
November	25.94356	6.97274	4.81326	8.95848	0102279	28.9941	125.542	181.5499	0.00349535		0.00379513	
December	192.0578	7.2389	2.86559	1.58513	0.04362	6.888363	173.6924	8.72885	1.288790541	0.008885681	0.02564561	
January	186.9813	7.22945	2.23942	8.20068	0.04254	8.493008	167.5988	8.8247	1.245872328	0.008887713	0.025021872	
February	1.5861564	6.90502	4.960545	9.19876	0.005911	1.491861	1.670033	0.07	0.003227268	0.022358505	0.6688405	
March	319.8096	7.26447	5.15114	7.480771	0.070163	13.5749	389.83223	12.5824	0.031608909	0.002410206	0.066231235	
April	4.5681464	6.75243	5.013108	9.198825	0.005911	1.491923	1.670033	0.07	0.003227268	0.003172229	0.004117051	
May	12.03854	6.76471	6.718726	6.939488	0.003010	4.677556	118.24025	5.94284	0.08343869	0.006006948	0.01820811	
June	164.5973	7.5429	7.952495	7.02095	0.00995	6.002361	160.24729	8.05779	1.188411736	0.001917024	0.02649494	
July	102.1055	7.40317	6.660994	7.880072	0.02929	4.248405	100.28664	5.0745	0.756470799	0.005216945	0.01595362	
August	86.748378	7.41491	6.328923	7.872549	0.022342	3.757387	83.117836	4.17313	0.633368314	0.00436878	0.01303393	
September	157.95354	7.65997	7.409992	7.946993	0.03868	8.95276	155.19743	7.1286	1.140044252	0.007860226	0.022374883	
October	148.04004	7.2729	7.62528	7.016463	0.03227	5.565179	143.98089	8.79297	1.069780908	0.00733764	0.022948844	
November	127.6654	7.27072	7.189172	8.187839	0.034171	6.157562	113.1991	5.55253	0.868180744	0.009581208	0.01746173	
December	421.9837	7.42674	49.31932	6.475531	0.105994	17.44703	380.95187	18.7034	2.097935179	0.014937353	0.057914163	
January	643.62178	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
February	659.8919	7.49003	75.2326	5.00457	0.161794	26.49991	595.64885	29.346	4.373352512	0.005124225	0.019013681	
March	663.0704	7.47061	74.9548	5.026323	0.161669	26.6359	599.04937	29.54	4.207046442	0.014438058	0.042520516	
April	188.11768	7.87821	12.82436	8.058805	0.01704	6.73798	179.42087	8.9429	1.27143464	0.008767461	0.026202925	
May	226.80882	7.7798	17.27171	5.49839	0.053974	9.292314	219.10465	11.0037	1.61203024	0.011161619	0.0321027	
June	213.79581	7.63495	9.889029	6.25648	0.00367	7.299187	207.8845	10.2794	1.534411208	0.005199137	0.016249279	
July	107.86683	7.5593	8.981673	6.64347	0.04048	8.285544	172.54297	8.6068	1.27996731	0.008282675	0.026277248	
August	240.6013	7.63198	11.27742	6.565066	0.007916	8.13317	233.67556	11.4747	1.722272564	0.013646985	0.03496875	
September	253.79094	7.2304	18.7204	6.602531	0.05198	8.48848	246.34587	12.316	1.83303306	0.01282624	0.03496875	
October	231.87161	7.83813	11.97907	6.00453	0.065659	7.8639	224.98837	11.2075	1.65207497	0.011393364	0.034059002	
November	127.19493	7.26887	17.89833	8.172013	0.033857	8.146243	112.9565	5.9408	0.800001549	0.009592939	0.01729506	
December	421.89648	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
January	643.62178	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
February	659.8919	7.49003	75.2326	5.00457	0.161794	26.49991	595.64885	29.346	4.373352512	0.005124225	0.019013681	
March	663.0704	7.47061	74.9548	5.026323	0.161669	26.6359	599.04937	29.54	4.207046442	0.014438058	0.042520516	
April	188.11768	7.87821	12.82436	8.058805	0.01704	6.73798	179.42087	8.9429	1.27143464	0.008767461	0.026202925	
May	226.80882	7.7798	17.27171	5.49839	0.053974	9.292314	219.10465	11.0037	1.61203024	0.011161619	0.0321027	
June	213.79581	7.63495	9.889029	6.25648	0.00367	7.299187	207.8845	10.2794	1.534411208	0.005199137	0.016249279	
July	107.86683	7.5593	8.981673	6.64347	0.04048	8.285544	172.54297	8.6068	1.27996731	0.008282675	0.026277248	
August	240.6013	7.63198	11.27742	6.565066	0.007916	8.13317	233.67556	11.4747	1.722272564	0.013646985	0.03496875	
September	253.79094	7.2304	18.7204	6.602531	0.05198	8.48848	246.34587	12.316	1.83303306	0.01282624	0.03496875	
October	231.87161	7.83813	11.97907	6.00453	0.065659	7.8639	224.98837	11.2075	1.65207497	0.011393364	0.034059002	
November	127.19493	7.26887	17.89833	8.172013	0.033857	8.146243	112.9565	5.9408	0.800001549	0.009592939	0.01729506	
December	421.89648	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
January	643.62178	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
February	659.8919	7.49003	75.2326	5.00457	0.161794	26.49991	595.64885	29.346	4.373352512	0.005124225	0.019013681	
March	663.0704	7.47061	74.9548	5.026323	0.161669	26.6359	599.04937	29.54	4.207046442	0.014438058	0.042520516	
April	188.11768	7.87821	12.82436	8.058805	0.01704	6.73798	179.42087	8.9429	1.27143464	0.008767461	0.026202925	
May	226.80882	7.7798	17.27171	5.49839	0.053974	9.292314	219.10465	11.0037	1.61203024	0.011161619	0.0321027	
June	213.79581	7.63495	9.889029	6.25648	0.00367	7.299187	207.8845	10.2794	1.534411208	0.005199137	0.016249279	
July	107.86683	7.5593	8.981673	6.64347	0.04048	8.285544	172.54297	8.6068	1.27996731	0.008282675	0.026277248	
August	240.6013	7.63198	11.27742	6.565066	0.007916	8.13317	233.67556	11.4747	1.722272564	0.013646985	0.03496875	
September	253.79094	7.2304	18.7204	6.602531	0.05198	8.48848	246.34587	12.316	1.83303306	0.01282624	0.03496875	
October	231.87161	7.83813	11.97907	6.00453	0.065659	7.8639	224.98837	11.2075	1.65207497	0.011393364	0.034059002	
November	127.19493	7.26887	17.89833	8.172013	0.033857	8.146243	112.9565	5.9408	0.800001549	0.009592939	0.01729506	
December	421.89648	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
January	643.62178	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
February	659.8919	7.49003	75.2326	5.00457	0.161794	26.49991	595.64885	29.346	4.373352512	0.005124225	0.019013681	
March	663.0704	7.47061	74.9548	5.026323	0.161669	26.6359	599.04937	29.54	4.207046442	0.014438058	0.042520516	
April	188.11768	7.87821	12.82436	8.058805	0.01704	6.73798	179.42087	8.9429	1.27143464	0.008767461	0.026202925	
May	226.80882	7.7798	17.27171	5.49839	0.053974	9.292314	219.10465	11.0037	1.61203024	0.011161619	0.0321027	
June	213.79581	7.63495	9.889029	6.25648	0.00367	7.299187	207.8845	10.2794	1.534411208	0.005199137	0.016249279	
July	107.86683	7.5593	8.981673	6.64347	0.04048	8.285544	172.54297	8.6068	1.27996731	0.008282675	0.026277248	
August	240.6013	7.63198	11.27742	6.565066	0.007916	8.13317	233.67556	11.4747	1.722272564	0.013646985	0.03496875	
September	253.79094	7.2304	18.7204	6.602531	0.05198	8.48848	246.34587	12.316	1.83303306	0.01282624	0.03496875	
October	231.87161	7.83813	11.97907	6.00453	0.065659	7.8639	224.98837	11.2075	1.65207497	0.011393364	0.034059002	
November	127.19493	7.26887	17.89833	8.172013	0.033857	8.146243	112.9565	5.9408	0.800001549	0.009592939	0.01729506	
December	421.89648	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
January	643.62178	7.4749	7.33777	5.00975	0.18329	28.98094	881.9976	28.461	4.266277242	0.029428029	0.08797132	
February	659.8919	7.49003	75.2326	5.00457	0.161794	26.49991	595.64885	29.346	4.373352512	0.005124225	0.019013681	
March	663.0704	7.47061	74.9548	5.026323	0.161669	26.6359	599.04937	29.54	4.207046442	0.014438058	0.042520516	
April	188.11768	7.87821	12.82436	8.058805	0.01704	6.73798	179.42087	8.9429	1.27143464	0.008767461	0.026202925	
May	226.80882	7.7798	17.27171	5.49839	0.053974	9.292314	219.10465	11.0037	1.61203024	0.011161619	0.0321027	
June	213.79581	7.63495	9.889029	6.25648	0.00367							

Table G. General Chemistry, Historical Concentrations, Mineral Production was Allowed, Effluent pH of 8.2

Regulation	Mercurous		pH	DO _C	Sulfide		pH	Nitrate-N	Biometh-N	Total Ammonia-N		
	mg/L	mg/L			mg/L	mg/L					mg/L	mg/L
HIDER CCEM (Reg-Comm) CCEM (Reg-Comm) CCEM (Reg-Comm)												
Station	Time	Mercurous	pH	DO _C	Sulfide	pH	Nitrate-N	Biometh-N	Total Ammonia-N			
Effluent (pH)	January	93.677888	8	136.122495	44654679	1.00158819	5472926499	79567979	60.05141	6.579437907	0.0433378	0.135351
	February	93.6781872	6.97083	79.985505	44645497	1.04801574	5473326499	79557852	60.0514	6.57926335	0.0433378	0.135351
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
	January											
	February											
	March											

Table M: General Chemistry, Climate Change Conditions. No precipitation. All 2008-2019

Regulator Metric	Hardness mg/L	pH	Al mg/L	DOC mg/L	F mg/L	Substanc mg/L	Cl mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L		
											CCME (long-term) CCOI (long-term)	2019 0.59
Effluent (pH)	min	910.015565	8	124.12	4.465448	1.001538	34.762521	69.9738	40.05141	5.776251453	0.03982558	0.11025348
	max	910.015549	8.93288	125.7674	4.465448	1.001538	34.762521	69.9738	40.05141	5.776251453	0.03982558	0.11025348
Junection 2	November	28484000	17190	811350	875648	0.03917	2279914	21.2378	135511	0.16748003	0.0011997	0.03262528
	December	29013100	8	124.12	4.465448	1.001538	34.762521	69.9738	40.05141	5.776251453	0.03982558	0.11025348
	January	195171268	97398	30.4426	820068	0.13198	4870088	16.6247	842648	1.34537203	0.0088877	0.02567187
	February	4.5468454	78705	220982	670848	0.13142	413124	18.2489	94218	0.0302702	0.0010257	0.01402105
	March	32013329	81467	490051	740071	0.037951	1255762	289800	145026	0.31604039	0.0021151	0.06521133
	April	4.34683269	70237	512717	919825	0.0091	149723	146997	589996	0.19795029	0.0031723	0.00411701
	May	116426059	76913	119097	670848	0.13142	413124	18.2489	94218	0.0302702	0.0010257	0.01402105
	June	185.97749	79773	28.7881	725178	0.204368	779951	160.2665	805785	1.18848745	0.008142	0.04492783
	July	97.263694	75913	220982	670848	0.13142	413124	18.2489	94218	0.0302702	0.0010257	0.01402105
	August	97.263694	75913	220982	670848	0.13142	413124	18.2489	94218	0.0302702	0.0010257	0.01402105
	September	177.48645	74683	27.8503	749679	0.191725	772198	153.427	711275	1.44004852	0.0078023	0.04289863
	October	166.58884	72708	24.2014	749163	0.189225	733452	140.601	712775	1.6097708	0.0073754	0.04043678
Junection 3	November	131.94329	72388	22.7028	818789	0.145414	11.6756	211.374	5.52534	0.06185704	0.0049211	0.01726137
	December	677.44493	8.2132	60.0296	67.714	0.486706	17.6432	38.6707	18.6972	0.2072517	0.0012324	0.01726137
	January	666.60434	82768	96.5192	510914	0.702175	2580901	581.1822	28.6170	4.26827228	0.004280	0.00977132
	February	682.81905	82819	98.7466	510257	0.705059	26.99901	59.7053	39.9847	5.7332132	0.0013623	0.01726137
	March	687.07291	82825	99.13704	502633	0.747406	26.63902	59.1158	29.5440	2.09701462	0.0014806	0.04225616
	April	207.59779	77609	32.0617	806385	0.28778	174481	194269	127.14484	0.00220255	0.00253137	0.00977132
	May	232.12628	78907	31.8641	6.99009	0.278066	10.2813	91.495	110.008	1.612014	0.0011116	0.00977132
	June	299.56392	78962	30.0845	6.2548	0.263798	89.9674	97.0123	16.7974	1.54411208	0.0010794	0.01216297
	July	199.25503	78819	30.6647	6.2548	0.263798	84.80014	125.642	6.9003	1.27979714	0.0008207	0.00982728
	August	169.13048	79043	30.2718	6.50606	0.264311	110.0713	232.6918	11.67475	1.72722564	0.0011736	0.03244889
	September	200.71874	79043	30.2718	6.50606	0.264311	115.9016	283.6139	18.30538	1.81305788	0.0011736	0.03244889
	October	258.20003	78412	38.7243	6.49013	0.264311	10.6445	22.1127	11.2022	1.67207487	0.0011034	0.04909500
Junection 5	November	131.66493	72393	22.6538	817363	0.142998	13.4342	21.966	1.56681	0.0600119	0.0039706	0.01727506
	December	677.44493	8.2132	60.0296	67.714	0.486706	17.6432	38.6707	18.6972	0.2072517	0.0012324	0.01726137
	January	666.60434	82768	96.5192	510915	0.702175	2580901	581.1822	28.6170	4.26827228	0.004280	0.00977132
	February	682.81905	82819	98.7466	510257	0.705059	26.99901	59.7053	39.9847	5.7332132	0.0013623	0.01726137
	March	687.07291	82825	99.13704	502633	0.747406	26.63902	59.1158	29.5440	2.09701462	0.0014806	0.04225616
	April	207.59779	77609	32.0617	806385	0.28778	174481	194269	127.14484	0.00220255	0.00253137	0.00977132
	May	232.12628	78907	31.8641	6.99009	0.278066	10.2813	91.495	110.008	1.612014	0.0011116	0.00977132
	June	299.56392	78962	30.0845	6.2548	0.263798	89.9674	97.0123	16.7974	1.54411208	0.0010794	0.01216297
	July	199.25503	78819	30.6647	6.2548	0.263798	84.80014	125.642	6.9003	1.27979714	0.0008207	0.00982728
	August	169.13048	79043	30.2718	6.50606	0.264311	110.0713	232.6918	11.67475	1.72722564	0.0011736	0.03244889
	September	200.71874	79043	30.2718	6.50606	0.264311	115.9016	283.6139	18.30538	1.81305788	0.0011736	0.03244889
	October	258.20003	78412	38.7243	6.49013	0.264311	10.6445	22.1127	11.2022	1.67207487	0.0011034	0.04909500
Junection 6	November	131.71728	72389	22.6708	817363	0.142998	13.4342	21.966	1.56681	0.0600119	0.0039706	0.01727506
	December	437.31774	8.2131	63.01895	6.74351	0.4806216	17.4422	38.0552	18.67729	0.20792172	0.0012324	0.01726137
	January	666.60434	82768	96.5192	510915	0.702175	2580901	581.1822	28.6170	4.26827228	0.004280	0.00977132
	February	682.81905	82819	98.7466	510257	0.705059	26.99901	59.7053	39.9847	5.7332132	0.0013623	0.01726137
	March	687.07291	82825	99.13704	502633	0.747406	26.63902	59.1158	29.5440	2.09701462	0.0014806	0.04225616
	April	207.59779	77609	32.0617	806385	0.28778	174481	194269	127.14484	0.00220255	0.00253137	0.00977132
	May	232.12628	78907	31.8641	6.99009	0.278066	10.2813	91.495	110.008	1.612014	0.0011116	0.00977132
	June	299.56392	78962	30.0845	6.2548	0.263798	89.9674	97.0123	16.7974	1.54411208	0.0010794	0.01216297
	July	199.25503	78819	30.6647	6.2548	0.263798	84.80014	125.642	6.9003	1.27979714	0.0008207	0.00982728
	August	169.13048	79043	30.2718	6.50606	0.264311	110.0713	232.6918	11.67475	1.72722564	0.0011736	0.03244889
	September	200.71874	79043	30.2718	6.50606	0.264311	115.9016	283.6139	18.30538	1.81305788	0.0011736	0.03244889
	October	258.20003	78412	38.7243	6.49013	0.264311	10.6445	22.1127	11.2022	1.67207487	0.0011034	0.04909500
Junection 7	November	131.71728	72389	22.6708	817363	0.142998	13.4342	21.966	1.56681	0.0600119	0.0039706	0.01727506
	December	437.31774	8.2131	63.01895	6.74351	0.4806216	17.4422	38.0552	18.67729	0.20792172	0.0012324	0.01726137
	January	666.60434	82768	96.5192	510915	0.702175	2580901	581.1822	28.6170	4.26827228	0.004280	0.00977132
	February	682.81905	82819	98.7466	510257	0.705059	26.99901	59.7053	39.9847	5.7332132	0.0013623	0.01726137
	March	687.07291	82825	99.13704	502633	0.747406	26.63902	59.1158	29.5440	2.09701462	0.0014806	0.04225616
	April	207.59779	77609	32.0617	806385	0.28778	174481	194269	127.14484	0.00220255	0.00253137	0.00977132
	May	232.12628	78907	31.8641	6.99009	0.278066	10.2813	91.495	110.008	1.612014	0.0011116	0.00977132
	June	299.56392	78962	30.0845	6.2548	0.263798	89.9674	97.0123	16.7974	1.54411208	0.0010794	0.01216297
	July	199.25503	78819	30.6647	6.2548	0.263798	84.80014	125.642	6.9003	1.27979714	0.0008207	0.00982728
	August	169.13048	79043	30.2718	6.50606	0.264311	110.0713	232.6918	11.67475	1.72722564	0.0011736	0.03244889
	September	200.71874	79043	30.2718	6.50606	0.264311	115.9016	283.6139	18.30538	1.81305788	0.0011736	0.03244889
	October	258.20003	78412	38.7243	6.49013	0.264311	10.6445	22.1127	11.2022	1.67207487	0.0011034	0.04909500
Junection 8	November	131.71728	72389	22.6708	817363	0.142998	13.4342	21.966	1.56681	0.0600119	0.0039706	0.01727506
	December	437.31774	8.2131	63.01895	6.74351	0.4806216	17.4422	38.0552	18.67729	0.20792172	0.0012324	0.01726137
	January	666.60434	82768	96.5192	510915	0.702175	2580901	581.1822	28.6170	4.26827228	0.004280	0.00977132
	February	682.81905	82819	98.7466	510257	0.705059	26.99901	59.7053	39.9847	5.7332132	0.0013623	0.01726137
	March	687.07291	82825	99.13704	502633	0.747406	26.63902	59.1158	29.5440	2.09701462	0.0014806	0.04225616
	April	207.59779	77609	32.0617	806385	0.28778	174481	194269	127.14484	0.00220255	0.00253137	0.00977132
	May	232.12628	78907	31.8641	6.99009	0.278066	10.2813	91.495	110.008	1.612014	0.0011116	0.00977132
	June	299.56392	78962	30.0845	6.2548	0.263798	89.9674	97.0123	16.7974	1.54411208	0.0010794	0.01216297
	July	199.25503	78819	30.6647	6.2548	0.263798	84.80014	125.642	6.9003	1.27979714	0.0008207	0.00982728
	August	169.13048	79043	30.2718	6.50606	0.264311	110.0713	232.6918	11.67475	1.72722564	0.0011736	0.03244889
	September	200.71874	7									

Table G. General Chemistry. Historical Conditions. Mineral precipitation was allowed. Effluent pH of 6.5

Precipitant	Hardness mg/L	pH	Alk n/a	DOC mg/L	Si mg/L	Sulfate n/g/L	Cl n/g/L	Nitrate as N n/g/L	Nitrite as N n/g/L	Total Ammonia N n/g/L	Total Ammonia N n/g/L
CCME (English)		6.5*									
CCME (French)											
CCME (Russian)											
Station	Time										
EhPact (pH of 6.5)	n/a										
	n/a										
	n/a										
November	20126691	6.5	37.690155	8192862	1.0025447	52.642485	1589.21604	40.99395	6.27587907	0.04303778	0.1235131
	30077741	6.132557	5.121207	9.136703	0.00647918	10.6252158	28.11471	7.24726	1.42329927	0.00071787	0.025243956
	40640084	6.132557	5.121207	9.136703	0.00647918	10.6252158	28.11471	7.24726	1.42329927	0.00071787	0.025243956
	40722881	6.0469	4.805705	9.136856	0.00316674	14.3444213	40.078663	10.31919	1.04179444	0.00196062	0.0303525
	49328132	6.5321	7.942831	9.099345	0.0052705	20.83542	92.06566	5.32074	0.00019656	0.00049604	0.0711015
	54881482	7.718	10.21315	9.180235	0.0007916	19.919227	14.999914	6.8277708	0.00023708	0.00023708	0.0674631
	17625048	7.2478	8.4290747	8.054532	0.0015621	6.4374728	15.33742	35.99663	0.6123128	0.00459277	0.01329275
	45388058	6.1429	4.612120	7.990102	0.0003718	10.4709200	39.71115	9.958405	1.55884668	0.00115644	0.02155484
	38973749	6.9475	4.9770272	8.296614	0.0005081	10.170118	11.44794	8.826245	1.45840704	0.00069051	0.03926775
	29373825	7.0355	4.6511927	8.031024	0.0017964	7.5381125	19.03388	4.89809	0.68296047	0.00374265	0.07116465
	22399685	7.6864	6.4500504	8.902117	0.001711	7.0825225	20.51681	5.99538	0.68187281	0.00084967	0.01184807
	29519834	7.2106	4.8126185	8.318388	0.000466	6.8489240	24.23322	5.76709	0.94212327	0.00643251	0.01829927
49778272	6.1324	6.8762260	6.772088	0.0007152	12.42733	43.85882	1.0895275	1.9006794	0.00212348	0.08274478	
48545883	6.5293	7.937155	9.98123	0.0007911	15.200008	42.39609	16.00095	1.9454266	0.0213499	0.0283804	
56784256	6.6862	1.8307161	8.0084874	0.0006028	10.8847316	16.76164	2.5164458	0.00736667	0.03568557	0.01766489	
803129	6.132621	3.8380764	7.970161	0.0002991	20.480348	85.47938	21.649315	1.30221613	0.00176407	0.00176407	
84494235	6.2321	12.538743	8.1179343	0.0026128	25.5501572	73.84466	18.640995	2.16052138	0.00176465	0.00186535	
48112998	6.897	5.7681008	8.4292514	0.0062079	24.802635	73.302828	18.492015	1.6297742	0.00079575	0.01164765	
48636096	6.981	4.8584610	7.430033	0.0003778	14.197649	38.96202	9.83242	0.00193738	0.00108887	0.03849957	
50638487	6.5851	4.4584800	7.40105	0.0001989	17.256359	50.64500	15.7478	2.21008281	0.00430748	0.04373749	
50374278	6.8766	7.30656	7.90665	0.0008789	11.8098768	45.85808	11.00688	1.9741866	0.00317881	0.01317881	
49215887	6.9844	4.9842142	7.885946	0.0065149	14.925232	47.42006	19.79305	1.8868481	0.00246048	0.01274919	
41917120	6.9921	4.6715489	7.799217	0.0003974	14.492321	41.62386	18.62004	1.7220139	0.00320836	0.03611475	
50060891	6.9781	6.9574656	6.1307498	0.0001942	17.003837	49.929365	12.00973	0.0001942	0.0001942	0.01362805	
49479465	6.1162	6.8681125	8.7939702	0.0007342	14.4020179	43.14651	10.84781	1.9783581	0.00211965	0.0111965	
48443354	6.7386	1.9560793	8.7937078	0.0003913	19.24608	42.72998	10.26798	1.9464467	0.00371763	0.01380176	
48182342	6.3406	3.0274114	8.06646	0.0006704	20.877113	38.8448	14.76279	2.2147461	0.00746462	0.0117662	
803129	6.132621	3.8380764	7.970161	0.0002991	20.480348	85.47938	21.649315	1.30221613	0.00176407	0.00176407	
84494235	6.2321	12.538743	8.1179343	0.0026128	25.5501572	73.84466	18.640995	2.16052138	0.00176465	0.00186535	
48112998	6.897	5.7681008	8.4292514	0.0062079	24.802635	73.302828	18.492015	1.6297742	0.00079575	0.01164765	
48636096	6.981	4.8584610	7.430033	0.0003778	14.197649	38.96202	9.83242	0.00193738	0.00108887	0.03849957	
50638487	6.5851	4.4584800	7.40105	0.0001989	17.256359	50.64500	15.7478	2.21008281	0.00430748	0.04373749	
50374278	6.8766	7.30656	7.90665	0.0008789	11.8098768	45.85808	11.00688	1.9741866	0.00317881	0.01317881	
49215887	6.9844	4.9842142	7.885946	0.0065149	14.925232	47.42006	19.79305	1.8868481	0.00246048	0.01274919	
41917120	6.9921	4.6715489	7.799217	0.0003974	14.492321	41.62386	18.62004	1.7220139	0.00320836	0.03611475	
50060891	6.9781	6.9574656	6.1307498	0.0001942	17.003837	49.929365	12.00973	0.0001942	0.0001942	0.01362805	
49479465	6.1162	6.8681125	8.7939702	0.0007342	14.4020179	43.14651	10.84781	1.9783581	0.00211965	0.0111965	
48443354	6.7386	1.9560793	8.7937078	0.0003913	19.24608	42.72998	10.26798	1.9464467	0.00371763	0.01380176	
48182342	6.3406	3.0274114	8.06646	0.0006704	20.877113	38.8448	14.76279	2.2147461	0.00746462	0.0117662	
803129	6.132621	3.8380764	7.970161	0.0002991	20.480348	85.47938	21.649315	1.30221613	0.00176407	0.00176407	
84494235	6.2321	12.538743	8.1179343	0.0026128	25.5501572	73.84466	18.640995	2.16052138	0.00176465	0.00186535	
48112998	6.897	5.7681008	8.4292514	0.0062079	24.802635	73.302828	18.492015	1.6297742	0.00079575	0.01164765	
48636096	6.981	4.8584610	7.430033	0.0003778	14.197649	38.96202	9.83242	0.00193738	0.00108887	0.03849957	
50638487	6.5851	4.4584800	7.40105	0.0001989	17.256359	50.64500	15.7478	2.21008281	0.00430748	0.04373749	
50374278	6.8766	7.30656	7.90665	0.0008789	11.8098768	45.85808	11.00688	1.9741866	0.00317881	0.01317881	
49215887	6.9844	4.9842142	7.885946	0.0065149	14.925232	47.42006	19.79305	1.8868481	0.00246048	0.01274919	
41917120	6.9921	4.6715489	7.799217	0.0003974	14.492321	41.62386	18.62004	1.7220139	0.00320836	0.03611475	
50060891	6.9781	6.9574656	6.1307498	0.0001942	17.003837	49.929365	12.00973	0.0001942	0.0001942	0.01362805	
49479465	6.1162	6.8681125	8.7939702	0.0007342	14.4020179	43.14651	10.84781	1.9783581	0.00211965	0.0111965	
48443354	6.7386	1.9560793	8.7937078	0.0003913	19.24608	42.72998	10.26798	1.9464467	0.00371763	0.01380176	
48182342	6.3406	3.0274114	8.06646	0.0006704	20.877113	38.8448	14.76279	2.2147461	0.00746462	0.0117662	
803129	6.132621	3.8380764	7.970161	0.0002991	20.480348	85.47938	21.649315	1.30221613	0.00176407	0.00176407	
84494235	6.2321	12.538743	8.1179343	0.0026128	25.5501572	73.84466	18.640995	2.16052138	0.00176465	0.00186535	
48112998	6.897	5.7681008	8.4292514	0.0062079	24.802635	73.302828	18.492015	1.6297742	0.00079575	0.01164765	
48636096	6.981	4.8584610	7.430033	0.0003778	14.197649	38.96202	9.83242	0.00193738	0.00108887	0.03849957	
50638487	6.5851	4.4584800	7.40105	0.0001989	17.256359	50.64500	15.7478	2.21008281	0.00430748	0.04373749	
50374278	6.8766	7.30656	7.90665	0.0008789	11.8098768	45.85808	11.00688	1.9741866	0.00317881	0.01317881	
49215887	6.9844	4.9842142	7.885946	0.0065149	14.925232	47.42006	19.79305	1.8868481	0.00246048	0.01274919	
41917120	6.9921	4.6715489	7.799217	0.0003974	14.492321	41.62386	18.62004	1.7220139	0.00320836	0.03611475	
50060891	6.9781	6.9574656	6.1307498	0.0001942	17.003837	49.929365	12.00973	0.0001942	0.0001942	0.01362805	
49479465	6.1162	6.8681125	8.7939702	0.0007342	14.4020179	43.14651	10.84781	1.9783581	0.00211965	0.0111965	
48443354	6.7386	1.9560793	8.7937078	0.0003913	19.24608	42.72998	10.26798	1.9464467	0.00371763	0.01380176	
48182342	6.3406	3.0274114	8.06646	0.0006704	20.877113	38.8448	14.76279	2.2147461	0.00746462	0.0117662	
803129	6.132621	3.8380764	7.970161	0.0002991	20.480348	85.47938	21.649315	1.30221613	0.00176407	0.00176407	
84494235	6.2321	12.538743	8.1179343	0.0026128	25.5501572	73.84466	18.640995	2.16052138	0.00176465	0.00186535	
48112998	6.897	5.7681008	8.4292514	0.0062079	24.802635	73.302828	18.492015	1.6297742	0.00079575	0.01164765	
48636096	6.981	4.8584610	7.430033	0.0003778	14.197649	38.96202	9.83242	0.00193738	0.00108887	0.03849957	
50638487	6.5851	4.4584800	7.40105	0.0001989	17.256359	50.64500	15.7478	2.21008281	0.00430748	0.04373749	
50374278	6.8766	7.30656	7.90665	0.0008789	11.8098768	45.85808	11.00688	1.974			

Table P: Dissolved Metals, Historical Conditions, Mineral precipitation was allowed. Effluent pH of 6.5

Facility	Al		As		Ba		Be		Bi		Br		Ca		Cd		Co		Cr		Cu		Fe		Hg		Mn		Mo		Ni		Pb		Se		Si		Tl		U		Zn		Sr					
	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L						
Division 01 (000)	0.11	0.01	0.008	0.00118	0.0005																																													
CMAA (Historical-000)	0.34	0.11	0.00154	0.0002																																														
CMAA (Historical-001)			0.0002	0.0000100000000000																																														
CMAA (Historical-002)			1.12	0.0001010000000000000000	0.00015411																																													
CMAA (Historical-003)			5.45	0.000193	0.0001																																													
CMAA (Historical-004)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-005)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-006)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-007)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-008)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-009)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-010)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-011)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-012)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-013)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-014)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-015)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-016)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-017)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-018)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-019)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-020)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-021)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-022)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-023)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-024)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-025)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-026)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-027)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-028)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-029)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-030)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-031)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-032)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-033)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-034)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-035)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-036)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-037)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-038)			0.0001	0.0000000000000000000000																																														
CMAA (Historical-039)			0.0001	0.000000																																														

Table S: General Chemistry, Climate change conditions, Mineral precipitation was allowed, EIT of 6.5

Respiration Process	Hardness		DOC mg/L	T mg/L	SI mg/L	OF mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L			
	mg/L	mg/L										
CMF (B-Item)	6.5						2.93548371	0.00995622	0.06			
CMF (A-Item)	6.5											
CMF (B-Item)	6.5											
Station	Time	EIT										
Effluent	n/a	1815191833	6.5	17.69010245	8.912842	1.02454573	52.92466977	1589.214564	-0.09395	1.174311543	0.00992579	0.11903458
	n/a	1825499219	6.0238	1.65517455	8.912743	0.01340429	52.82400631	1589.215058	-0.09395	1.174311543	0.00992579	0.11903458
	n/a	1825379918	6.0238	1.65517455	8.912743	0.01340429	52.82400631	1589.215058	-0.09395	1.174311543	0.00992579	0.11903458
	n/a	487555766	6.3791	4.9336924	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	39818189	6.1371	3.5406192	9.124188	0.00307912	12.162772	3.4540972	8.71774	1.2094453	0.0082802	0.02024334
	n/a	385072231	6.0562	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	546413434	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	645503737	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	546413434	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	546413434	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	546413434	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
	n/a	546413434	6.0502	1.8306785	8.912842	1.02454573	52.92466977	1589.214564	1.0644	1.16464274	0.00994855	0.09992424
Jan-2	Jan	283179912	7.0489	4.6022181	8.232451	0.011276	17.079611	180.048	9.1012638	0.0042186	0.01351887	0.02451977
	Feb	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Mar	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Apr	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	May	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Jun	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Jul	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Aug	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Sep	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Oct	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Nov	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
	Dec	365144564	7.0134	4.6092405	8.4143564	0.00720169	11.54444105	16.70003	0.0096263	0.11999139	0.00417392	0.04119377
Jan-3	Jan	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Feb	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
	Mar	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Apr	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
	May	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Jun	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
	Jul	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Aug	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
	Sep	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Oct	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
	Nov	522101512	6.9201	4.4084078	1.0000156	0.00035266	11.514052	10.00866	1.37025164	0.0118894	0.0118894	0.0118894
	Dec	952933108	6.9823	4.9058605	1.7888102	0.00292878	14.763147	34.117632	1.8802597	0.00823274	0.02426252	0.02426252
Jan-4	Jan	234147200	6.1071	8.1210585	9.574280	0.0021876	6.34585102	21.74804	5.5879	0.97972009	0.0086826	0.01440331
	Feb	854989605	6.0571	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Mar	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Apr	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	May	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jun	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jul	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Aug	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Sep	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Oct	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Nov	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Dec	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
Jan-5	Jan	505798520	7.0149	4.9229035	7.8826	0.00291143	15.626289	99.99278	11.01024	0.0467721	0.0118827	0.0117774
	Feb	854989605	6.0571	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Mar	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Apr	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	May	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jun	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jul	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Aug	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Sep	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Oct	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Nov	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Dec	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
Jan-6	Jan	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Feb	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Mar	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Apr	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	May	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jun	130734604	6.0566	1.932022	8.200719	0.00029801	25.4252044	119.0760	18.77949	2.0951210	0.0086826	0.01440331
	Jul	130734604	6.0566	1.932022	8.200719							

Table U: General Chemistry, Climate Change Conditions, No Precipitation, Effluent pH of 6.5-9

Regulation Identifier		Hardness mg/L	pH n/A	DOC mg/L	F mg/L	Oil mg/L	Sulfate mg/L	Cl mg/L	Nitrate as N mg/L	Nitrite as N mg/L	Total Ammonia as N mg/L	
CME (long-term)		2.935483871 0.05995652										
CME (short-term)		6.5-9										
Station		Effluent										
Station	Time	Effluent										
Effluent	n/a	1851.8188	6.5	37.6901	8.91286	1.002546	52.22468	1589.22	40.094	5.762354401	0.00928528	0.11055348
	n/a	1851.8188	7.22544	32.9017	8.91274	1.002546	52.22468	1589.22	40.094	5.762354401	0.00928528	0.11055348
	n/a	1851.8188	6.35468	34.6556	8.91286	1.002546	52.22468	1589.22	40.094	5.762354401	0.00928528	0.11055348
June 2	November	50077471	6.81705	5.99581	9.06011	0.002016	1.232028	40.8123	1.05241	0.19301706	0.00095866	0.002058522
	December	406.4162	6.38618	11.8642	9.12142	0.217149	25.72329	36.48	8.7732	1.266547749	0.00818782	0.026467749
	January	300.62411	6.35027	11.4703	9.1274	0.214207	12.17813	20.3472	16.8497	1.164446744	0.00712164	0.01933448
	February	4.5480443	6.92864	5.24444	9.19875	0.00591	1.491863	1.66981	0.07	0.001829022	1.261025	3.7679E-03
	March	675.0087	6.50683	15.9664	8.93905	0.267657	20.05573	57.9787	14.9732	0.116457407	0.000281834	0.00654651
	April	4.6806543	7.02337	5.17252	9.19883	0.00591	1.491923	1.66991	0.07	0.001999319	0.00137829	0.004120227
	May	275.6467	7.00005	8.02216	7.94041	0.13159	8.764071	23.04	5.9485	0.048012424	0.00606948	0.012522726
	June	232.45716	7.09973	10.3569	8.16104	0.204516	11.5444	318.98	8.06364	1.896444762	0.00020294	0.004798139
	July	234.9325	7.29088	8.02421	8.23333	0.129313	7.206291	199.027	5.0421	0.7572869	0.00522186	0.016100087
	August	1794.477	7.08206	7.6531	8.32048	0.24985	6.611208	144.685	41.7707	0.36303553	0.00437099	0.013564545
	September	357.56189	7.08658	8.2005	8.34692	0.194604	11.14466	305.24	7.2066	1.14149167	0.00786776	0.022519653
	October	304.7126	7.05212	9.04088	8.48733	0.153229	20.5329	285.538	7.22506	1.07802377	0.00738209	0.020737071
June 3	November	218.5272	7.05212	9.04088	8.48733	0.153229	20.5329	285.538	7.22506	1.07802377	0.00738209	0.020737071
	December	807.8467	6.59948	20.3058	8.51941	0.48123	25.63187	743.524	18.7129	2.492393796	0.01568479	0.035503013
	January	1326.8939	6.44882	19.3011	8.22997	0.12292	9.64427	1138.02	28.445	4.143131723	0.00376604	0.046798139
	February	1365.5799	6.54405	20.9615	8.22183	0.751178	39.3783	1166.94	29.3756	4.214447242	0.00740065	0.084903006
	March	1369.6248	6.53796	20.8539	8.252	0.755472	39.6237	1176.72	29.3781	2.097973999	0.01447138	0.042260499
	April	415.14833	7.13005	12.6222	9.04705	0.29007	10.9783	554.519	8.9715	1.278243053	0.00875747	0.025333747
	May	509.5932	7.07234	12.161	8.90884	0.278227	10.5595	426.228	11.0147	1.61399284	0.01112775	0.032242875
	June	481.01518	7.14566	12.4298	7.99792	0.246039	14.48181	411.539	10.887	1.533952024	0.01589976	0.03155474
	July	399.23005	7.14578	11.1566	7.58862	0.239755	12.22451	341.796	8.61754	1.281095927	0.00883217	0.024020556
	August	545.7423	7.07793	13.1467	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	September	570.6028	7.14481	14.0216	7.9195	0.241486	17.0421	488.417	12.288	1.814872382	0.01250422	0.03645222
	October	512.93027	7.10375	19.3171	9.22426	0.286204	15.1541	444.226	11.2187	1.645188505	0.01462495	0.034097305
June 4	November	238.00469	6.5885	15.1189	8.7078	0.144515	8.44652	219.027	5.8168	0.9863362	0.00376604	0.010491893
	December	867.66953	6.59949	20.3011	8.51773	0.481135	25.6247	743.37	18.7128	2.492393796	0.01568479	0.035503013
	January	1326.8939	6.44882	19.3011	8.22997	0.12292	9.64427	1138.02	28.445	4.143131723	0.00376604	0.046798139
	February	1365.5799	6.54405	20.9615	8.22183	0.751178	39.3783	1166.94	29.3756	4.214447242	0.00740065	0.084903006
	March	1369.6248	6.53796	20.8539	8.252	0.755472	39.6237	1176.72	29.3781	2.097973999	0.01447138	0.042260499
	April	415.14833	7.13005	12.6222	9.04705	0.29007	10.9783	554.519	8.9715	1.278243053	0.00875747	0.025333747
	May	494.87936	7.06401	11.8585	8.736	0.271354	14.78884	423.306	10.7392	1.579445467	0.01046841	0.032340474
	June	392.6779	7.10777	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	July	392.60794	7.13999	12.6177	7.6227	0.216126	12.0332	335.338	8.4748	1.259791898	0.00868575	0.025333747
	August	533.82097	7.16827	13.4673	7.9603	0.239889	15.9646	456.873	11.5319	1.70118899	0.01127882	0.032502678
	September	501.82147	7.07173	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	October	513.82847	7.11028	19.2211	8.84035	0.281613	15.9948	479.628	11.1001	1.634677021	0.01284202	0.033739274
June 5	November	238.00469	6.5885	15.1189	8.7078	0.144515	8.44652	219.027	5.8168	0.9863362	0.00376604	0.010491893
	December	867.66953	6.59949	20.3011	8.51773	0.481135	25.6247	743.37	18.7128	2.492393796	0.01568479	0.035503013
	January	1326.8939	6.44882	19.3011	8.22997	0.12292	9.64427	1138.02	28.445	4.143131723	0.00376604	0.046798139
	February	1365.5799	6.54405	20.9615	8.22183	0.751178	39.3783	1166.94	29.3756	4.214447242	0.00740065	0.084903006
	March	1369.6248	6.53796	20.8539	8.252	0.755472	39.6237	1176.72	29.3781	2.097973999	0.01447138	0.042260499
	April	415.14833	7.13005	12.6222	9.04705	0.29007	10.9783	554.519	8.9715	1.278243053	0.00875747	0.025333747
	May	494.87936	7.06401	11.8585	8.736	0.271354	14.78884	423.306	10.7392	1.579445467	0.01046841	0.032340474
	June	392.6779	7.10777	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	July	392.60794	7.13999	12.6177	7.6227	0.216126	12.0332	335.338	8.4748	1.259791898	0.00868575	0.025333747
	August	533.82097	7.16827	13.4673	7.9603	0.239889	15.9646	456.873	11.5319	1.70118899	0.01127882	0.032502678
	September	501.82147	7.07173	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	October	513.82847	7.11028	19.2211	8.84035	0.281613	15.9948	479.628	11.1001	1.634677021	0.01284202	0.033739274
June 6	November	238.00469	6.5885	15.1189	8.7078	0.144515	8.44652	219.027	5.8168	0.9863362	0.00376604	0.010491893
	December	867.66953	6.59949	20.3011	8.51773	0.481135	25.6247	743.37	18.7128	2.492393796	0.01568479	0.035503013
	January	1326.8939	6.44882	19.3011	8.22997	0.12292	9.64427	1138.02	28.445	4.143131723	0.00376604	0.046798139
	February	1365.5799	6.54405	20.9615	8.22183	0.751178	39.3783	1166.94	29.3756	4.214447242	0.00740065	0.084903006
	March	1369.6248	6.53796	20.8539	8.252	0.755472	39.6237	1176.72	29.3781	2.097973999	0.01447138	0.042260499
	April	415.14833	7.13005	12.6222	9.04705	0.29007	10.9783	554.519	8.9715	1.278243053	0.00875747	0.025333747
	May	494.87936	7.06401	11.8585	8.736	0.271354	14.78884	423.306	10.7392	1.579445467	0.01046841	0.032340474
	June	392.6779	7.10777	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	July	392.60794	7.13999	12.6177	7.6227	0.216126	12.0332	335.338	8.4748	1.259791898	0.00868575	0.025333747
	August	533.82097	7.16827	13.4673	7.9603	0.239889	15.9646	456.873	11.5319	1.70118899	0.01127882	0.032502678
	September	501.82147	7.07173	12.6177	7.84993	0.226803	10.11207	350.847	11.6664	1.72955540	0.011889107	0.035115143
	October	513.82847	7.11028	19.2211	8.84035	0.281613	15.9948	479.628	11.1001	1.634677021	0.01284202	0.033739274
June 7	November	238.00469	6.5885	15.1189	8.7078	0.144515	8.44652	219.027	5.8168	0.9863362	0.00376604	0.010491893
	December	867.66953	6.59949	20.3011	8.51773	0.481135	25.6247	743.37	18.7128	2.492393796	0.01568479	0.035503013
	January	1326.8939	6.44882	19.3011	8.22997	0.12292	9.64427	1138.02	28.445	4.143131723	0.00376604	0.046798139
	February	1365.5799	6.54405	20.9615	8.22183	0.751178	39.3783	1166.94	29.3756	4.214447242	0.00740065	0.084903006
	March	1369.6248	6.53796	20.8539	8.252	0.755472	39.6237	1176.72	29.3781	2.097973999	0.01447138	0.042260499
	April	415.14833	7.13005	12.6222	9.04705	0.29007	10.9783	554.519	8.9715	1.278243053	0.00875747	0.025333747
	May	494.87936	7.06401	11.8585	8.736	0.271354	14.78884	423.306	10.7392	1.579445467	0.01046841	0.032340474
	June	392.6779	7.10777	12.6177	7.							

Table V: Dissolved Metals, Climate Change Conditions, No precipitation, Effluent pH of 5.5

Reguland ^a	As		Ba		Be		Bi		Br		Ca		Cd		Co		Cr		Cu		Fe		Hg		Mn		Mo		Ni		P		Pb		S		Tl		Zn		
	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L	µg/L	mg/L			
Review (R) (D) (S)	0.1																																								
CMAA (Review) (S) (M)	0.1		0.00	0.00124	0.0000				0.1	0.016	0.4	0.4	0.2	0.0001	12	0.05	0.0001																								
CMAA (Review) (S) (M)	0.36		0.11	0.0016	0.0000				0.37	0.016	0.4	0.4	0.8	0.0006	29	0.07	0.0006																								
CMAA (Review) (S) (M)	0.1		0.00	0.00124	0.0000				0.1	0.016	0.4	0.4	0.2	0.0001	12	0.05	0.0001																								
CMAA (Review) (S) (M)	1.12		0.00043208	0.00194011					0.0136		2.9715			1.75652		0.42016																									
CMAA (Review) (S) (M)	1.12		0.00043208	0.00194011					0.0136		2.9715			1.75652		0.42016																									
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								
CMAA (Review) (S) (M)	0.0002	0.005	1.5						0.002	0.3				0.02	0.0002	0.002	0.002																								



1682 Woodward Dr.
Ottawa, ON K2C 3R8
Canada

T 877.487.8436
Ottawa@blumetric.ca

The Tower, 4 Catarauqui St.
Kingston, ON K7K 1Z7
Canada

T 877.487.8436
Kingston@blumetric.ca

3B-209 Frederick St.
Kitchener, ON N2H 2M7
Canada

T 877.487.8436
Kitchener@blumetric.ca

825 Milner Ave.
Toronto, ON M1B 3C3
Canada

T 877.487.8436
Toronto@blumetric.ca

6-410 Falconbridge Rd.
Sudbury, ON P3A 4S4
Canada

T 877.487.8436
Sudbury@blumetric.ca

260-15 Taschereau St.
Gatineau, QC J8Y 2V6
Canada

T 877.487.8436
Gatineau@blumetric.ca

200-1500 Du College St.
Saint-Laurent, QC H4L 5G6
Canada

T 877.487.8436
Montreal@blumetric.ca

27 Parker St.
Dartmouth, NS B2Y 4T5
Canada

T 877.487.8436
Dartmouth@blumetric.ca

4916 49th St.
Yellowknife, NT X1A 1P3
Canada

T 877.487.8436
Yellowknife@blumetric.ca

200-4445 SW 35th Terrace
Gainesville, FL 32608
USA

T 877.487.8436
Gainesville@blumetric.ca