Environmental and Social Impact Assessment for the Troilus Mine Project

SURFACE WATER QUALITY

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Acronyms and Abbreviations

ARD	Acid Rock Drainage
BOD	Biochemical Oxygen Demand
CAAT	Acute toxicity criterion: provincial surface water quality criterion for the short- and long-term protection of all aquatic organisms
CCME	Canadian Council of Ministers of the Environment
CEIA	Canadian Impact Assessment Agency
CEPA	Canadian Environmental Protection Act
CEQG	Canadian Environmental Quality Guidelines
COD	Chemical Oxygen Demand
CV	Valued Component
CVAC	Chronic toxicity criterion for aquatic life: provincial surface water quality criterion that corresponds to the highest concentration of a substance that will not produce harmful impacts on aquatic organisms.
DOC	Dissolved organic carbon
EDCM	Empirical Drainage Chemistry Model
ESIA	Environmental and Social Impact Assessment
GCC	Grand Council of the Crees
JBNQA	James Bay and Northern Quebec Agreement
LQE	Environmental Quality Act
MDDEP	Ministry of Sustainable Development, Environment and Parks
MDMER	Metal and Diamond Mining Effluent Regulations
MELCCFP	Ministry of the Environment, the Fight against Climate Change, Wildlife and Parks
NHS	Noxious and potentially hazardous substance
OER	Environmental discharge objectives
ORP	Oxidation-reduction potential
PAHS	Polycyclic aromatic hydrocarbons
SS	Suspended solids
TDS	Total dissolved solids
TSF	Tailings Storage Facility
VOC	Volatile organic carbon
µg/l	Microgram per liter

12. Surface Water Quality

12.1 Scope of Assessment

12.1.1 Regulatory and Policy Setting

Surface water quality at the Troilus mining project falls within a regional, provincial and federal regulatory context. The Troilus mining project is located in the Eeyou Istchee James Bay territory, in the James Bay region of Northern Quebec. It is therefore governed by the James Bay and Northern Quebec Agreement (JBNQA), signed in 1975 between the governments of Canada and Quebec, the Grand Council of the Crees (GCC) and the Northern Quebec Inuit Association.

Among other things, the JBNQA divides the territory into Category I, II and III lands. Category I lands are reserved for the exclusive use of the Crees, while Category II lands, contiguous to Category I lands, are part of the Québec public domain, where the Crees have exclusive hunting, fishing and trapping rights.

The Troilus mining project is located on Category III lands, which represent all lands in the territory covered by the Agreement that are not included in Category I or II lands. On these Category III lands, mining rights belong to the provincial government. However, surface water management falls under the jurisdiction of the federal government, so project design and implementation must also comply with applicable federal regulations.

12.1.1.1 Federal Regulatory Context

The Canadian Environmental Protection Act (CEPA) ensures that the potential impacts of industrial projects on water quality are rigorously assessed and managed before, during and after mine development:

- Article 64: Defines toxic substances and their management;
- Articles 56-60: Concerns pollution prevention planning.

The following regulations apply:

- Environmental Emergencies Regulation.

The purpose of the Fisheries Act is to protect fish habitats and regulate any activity likely to harm the population of aquatic species. It ensures that the potential impacts of industrial projects on fish habitats and aquatic ecosystems are strictly assessed and managed. The Metal and Diamond Mining Effluent Regulations (MDMER) authorize the deposit of effluent from metal and diamond mines in water frequented by fish under Section 36 of the Fisheries Act. It helps protect surface waters by setting limits on the quality of effluent that can be discharged, and by requiring effluent analysis, monitoring and reporting.

The Navigation Protection Act, the Species at Risk Act and the Migratory Birds Convention Act also apply.

The Canadian Council of Ministers of the Environment (CCME) establishes Canadian Environmental Quality Guidelines (CEQGs). The purpose of these guidelines is to ensure a standard for the quality of aquatic and terrestrial ecosystems. The Canadian Water Quality Guidelines for the Protection of Aquatic Life apply to the Valued Component (VC). These guidelines are designed to ensure the long-term protection of all forms of aquatic life and all aspects of aquatic life cycles, against factors such as chemical inputs or changes in physical components. They provide the scientific benchmarks needed to maintain a consistent level of protection for aquatic life across Canada.

12.1.1.2 Provincial Regulatory Context

The Environmental Quality Act (LQE) requires mining projects to obtain authorizations in compliance with regulations. The main regulations and policies applicable to the Troilus project's surface water protection component are as follows:

- Regulation respecting the regulation of activities based on their impact on the environment;
- Regulation respecting the withdrawal of water and its protection;
- Regulation respecting the quality of drinking water;
- Regulation respecting hazardous materials;
- Regulation respecting the protection and rehabilitation of lands;
- Wetland and Water Conservation Policy.

Directive 019 of the mining industry (MDDEP, 2012) provides a frame of reference for monitoring and assessing surface water quality, specifying the parameters to be monitored, sampling frequencies and recommended analytical methods. Directive 019 establishes water quality standards based on the designated uses of water bodies, and the geological province (e.g. Superior Province). Please note that a new version of Directive 019 was published on February 13, 2025. It does not apply to this project because the assessment process was already underway, but will apply to all projects. However, Directive 019 (2025) will apply to authorization applications, article 22-LQE.

The surface water quality criteria of the Ministry of Environment, the Fight Against Climate Change, Wildlife and Parks (MELCCFP) serve as reference tools for assessing the chemical integrity of ecosystems.

The following laws and regulations may apply at various stages of the Troilus mining project:

- Sustainable Forest Development Act;
- Regulation respecting the sustainable management of forests in the domain of the State;
- Act respecting lands in the domain of the State;
- Petroleum Products Act and Regulations.

12.1.2 Influence of Consultation and Engagement

Consultation with the stakeholders concerned allows us to incorporate their expectations and concerns into the project, and to deepen our knowledge of the environment by integrating the traditional knowledge of indigenous communities and groups.

As part of the Troilus mining project, consultations were held with land users, indigenous communities, surrounding communities, the City of Chibougamau, the Eeyou Istchee Baie-James regional government and non-profit organizations. These consultations helped identify stakeholder concerns, guide the identification and assessment of potential project impacts, and establish communication between the proponent and stakeholders during project design and implementation.

Table 12.1 shows the concerns raised during consultations with stakeholders. These elements, detailed in the consultation section of the Environmental and Social Impact Assessment (ESIA), illustrate how this feedback influenced and modified the project design to better respond to the environmental and social issues identified during the impact assessment.

Land users

The Cree Nation of Mistissini, along with other indigenous land users consulted, expressed the following concerns related to the VC of surface water quality: runoff collection, tailings management, risks of hydrocarbon spills, mine site development, and impact of the Bibou Creek (CE2) diversion on spawning grounds and fish. In addition, concerns were expressed about future development, site operations and post-closure reclamation. These concerns were raised in the context of land use for traditional activities throughout the life cycle of the project.

Surrounding communities

The surrounding communities in the region, including the general public and citizens of the towns of Chibougamau and Chapais, have raised concerns about the environmental management of the site to ensure adequate protection of aquatic wildlife, as well as preservation of the quality of watercourses and water bodies.

Government(s), municipality(ies) and non-profit organizations

Representatives of the Eeyou Istchee Baie-James regional government, the City of Chibougamau, and Eau Secours raised concerns about the management of residual materials, as well as hazardous materials and the adverse impacts these may have on surface water quality.

The main concerns relate to the persistence of contamination present on the site as a result of historical operations at the former mine site. It was noted that, despite remediation efforts, the potential impact of a new mining project on an already problematic situation was cause for concern. Specifically, the lack of any noticeable improvement in metal concentrations in water near the site was raised. The consultations also called for an assessment of the remediation objectives and the measures to be put in place to ensure that they are stringent enough to protect the environment and aquatic environments over the long term.

Table 12.1 Summary of key information, Indigenous knowledge, and concerns for the project related to surface water quality

Topic	Key Information, Indigenous Knowledge and Concerns	Influence on the Assessment	Where Information is Addressed in the ESIA
Preservation of surface water quality	Concerns about water quality exceedances due to former project and restoration objectives. Questions about environmental monitoring of surface water quality	Analysis of existing conditions in the reference environment, including analysis of historical data, as well as water quality monitoring during the reclamation phase of the former mine site.	Chapter 13 Wachiih, 2024
Water treatment and management	Concern about the collection and treatment of water that has been in contact with mine tailings.	Included in mitigation of potential impacts	Chapter 3 Chapter 25 AGP, 2024 WSP, 2024
Environmental emergencies	Concern for the risk of spills of petroleum products and hazardous and noxious materials	Included in potential impact mitigation measures	Chapter 3 Chapter 25 AGP, 2024
Pit dewatering	Concern about impact of pit dewatering on water quality of other surrounding water bodies	Assessed as potential impact on surface water quality	Chapter 3 Chapter 10 Chapter 13 WSP, 2024
Infrastructure maintenance	Questioning infrastructure maintenance, including culvert inspection to prevent rusting in the water. Ensuring proper water retention in the tailings facility	Included in mitigation of potential impacts	Chapter 3 Chapter 25 AGP, 2024

12.1.3 Potential Impacts, Pathways and Measurable Parameters

The construction, operation and closure phases of the Troilus mining project include several activities that contribute to the interaction of the Troilus mining project with surface water. These activities have the potential to alter surface water quality. The interaction between project activities and the VC may result in the generation of potential impacts on surface water quality during all three phases of the project life cycle. Changes in surface water quality may have an impact on aquatic habitats, aquatic fauna and flora, social and recreational activities such as hunting and fishing, and human consumption of surface water. In addition, changes in surface water quality may have an impact on land use by indigenous communities.

The identification of potential impacts on surface water quality has taken into account the concerns raised by stakeholders, detailed in Section 12.1.2. More specifically, the interaction of project activities with surface waters may lead to changes in their physico-chemical parameters. Potential impacts include surface water eutrophication, acidification and stratification, bioaccumulation of contaminants in organisms whose habitat is the VC's physical environment, and a relative increase in acute and chronic surface water toxicity.

The measurable parameters of the potential modification of surface water quality parameters represent the change in concentration values of physico-chemical parameters of the surface water environment, in relation to its reference conditions. Reference conditions are detailed in Section 12.2.2. This change is directly or indirectly attributable to the activities of the Troilus mining project within the spatio-temporal boundaries presented in Section 12.1.4. The development of an environmental monitoring program for surface water quality throughout the life cycle of the Troilus mining project will make it possible to assess the measurable parameters of this potential impact on VC. TheTable 12.2 presents the pathways and measurable parameters used in assessing potential impacts on surface water quality.

Table 12.2 Potential impacts, impact pathways and measurable parameters for surface water quality

Potential impact	Impact Pathway	Measurable Parameters and Units of Measurement
Modification of surface water quality	Change in physical and chemical parameters of surface water due to discharge of contact water into the receiving environment. Exposure of sulfide minerals, both metalliferous and non-metalliferous, to oxidizing conditions. Exposure of pit wall materials, waste rock management, and tailings management. Modification of surface water quality due to mine site operations, traffic, use of heavy machinery, waste management, and accidental spills.	Change in concentration of physical and chemical parameters in surface water directly related to project activities (mg/l or µg/l), such as : • Metal content • Suspended solids (SS), total dissolved solids (TDS), • Petroleum hydrocarbons C10-C50, • Polycyclic aromatic hydrocarbons (PAHs), • Inorganic compounds, • Volatile organic compounds (VOC), • Biochemical oxygen demand (BOD), • Chemical Oxygen Demand (COD), • Physico-chemical parameters (pH, temperature, electrical conductivity, oxidation-reduction potential, dissolved oxygen, turbidity, hardness, alkalinity)

12.1.4 Spatial and Temporal Boundaries

12.1.4.1 Spatial Boundaries

The VC assessment of surface water quality includes an in-depth analysis of the physico-chemical quality of all potentially affected water bodies within the study area. The study area corresponds to the spatial framework, to which are associated to the sources of potential impacts on surface water quality of the receiving environment, as well as the assessment of project impacts. It comprises the Project Development Area (PDA), the Local Study Area (LSA) and the Regional Study Area (RSA). The spatial-temporal assessment boundary for the surface water quality VC was determined in conjunction with the hydrological regime VC. The two VCs therefore have the same LSA and RSA, as detailed in Section 12.1.4 and Maps 12.1 and 12.2.

12.1.4.2 Temporal Boundaries

The temporal boundary determines the timing at which an impact is assessed in relation to the main phases of the project. The temporal boundary of the assessment includes all phases of the Project, from the start of construction to the end of closure. According to the current project schedule, project phases include:

- Construction (Year -3 to Year -1)
- Operations :
  - Operations phase 1 (Year 1 to Year 21): milling with ore extraction
  - Operations phase 2 (Year 22): milling with no ore extraction
- Decommissioning and Closure :
  - Active closure (Year 22 to Year 24)
  - Passive closure (Year 24+)

Construction, operations and decommissioning/closure of the project site result in activities that modify the physico-chemical components of the receiving environment in relation to the baseline established prior to the project construction phase. Refer to Chapter 3 of the ESIA for a detailed description of the activities planned during each phase, as well as to Section 12.3.

Thus, the temporal boundary for assessing surface water quality includes spot monitoring of seasonal variations in levels of measurable physico-chemical parameters, pre-identified for quantification of potential impacts on VC during each of the main project phases.

12.1.5 Residual Impacts Characterization

Residual impacts are defined as those remaining after the application of a mitigation measure (André et al., 2021). Residual impacts on surface water quality are assessed on the basis of several characteristics. Each characteristic presents a quantitative or qualitative measure to describe the degree of significance of residual impacts on surface water quality. TheTable 12.3 details these characteristics, making it possible to describe the residual impacts on VC.

Table 12.3 Characterization of residual impacts on surface water quality

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual impact	**Positive -** a residual impact that causes measurable parameters to evolve in a favorable direction for the VC relative to the baseline. **Adverse** - a residual impact that causes measurable parameters to evolve in an unfavorable direction for the VC in relation to the baseline. **Neutral -** no net change in measurable parameters for the VC compared with the baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	If expressed qualitatively, the categories are as follows: **No measurable change -** no measurable change in impact can be observed. **Low -** A measurable change can be detected whose measurable impact lies within the natural range of variation with respect to reference-state conditions. **Moderate** - A measurable change that exceeds the range of natural variation from baseline conditions and surface water quality does not meet the limits of established criteria for monitoring surface water quality (CCME, MELCCFP [CVAC, CVAA]) . [1] **High -** A measurable change that exceeds the natural ranges of variation from baseline conditions and does not meet the limits of the criteria established for monitoring surface water quality in Directive 019 (MDDEP, 2012). The impact of this change reduces surface water quality.
Geographic Extent	The geographical area in which a residual impact occurs	**PDA –** residual Impacts are restricted to the PDA **LSA –** residual Impacts extend into the LSA **RSA –** residual Impacts extend into the RSA
Timing	Considers when the residual impact is expected to occur, where relevant to the VC.	**No sensitivity -** The impact does not occur during a critical life stage (e.g., outside fish spawning or elk calving periods, or periods of cultural activity), or the timing chosen does not affect the VC. **Moderate sensitivity -** The impact may occur during an insensitive period of a critical life stage of aquatic species or periods of cultural activity. **High sensitivity** - Impact occurs during a critical life stage (e.g. fish spawning period) or during culturally significant activities (e.g. plant harvesting, hunting, fishing or holiday periods).

[1] CCME Canadian Council of Ministers of the Environment / ACAT: Acute Toxicity Criterion / CACL: Chronic Toxicity Criterion for Aquatic Life

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual impact can no longer be measured or otherwise perceived	**Short term -** the residual impact is limited to the phase of the project during which the activity presenting the pathway for the impact takes place. **Medium-term** - the residual impact extends beyond the duration of the operating phase, and is expected to persist beyond project closure. **Long term -** the residual impact extends beyond the life cycle of the project (>25 years).
Frequency	Identifies how often the residual impact occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event -** occurs at irregular intervals **Multiple regular event -** occurs at regular intervals **Continuous** - occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible** - the residual impact is likely to be reversed after completion of the activity and reclamation. **Irreversible** - the residual impact is unlikely to be reversed.

12.1.6 Significance Definition

The significance of residual impacts is determined using the Canadian Impact Assessment Agency (CIAA) ranking system with the following thresholds:

- **Negligible or low**: Impacts on surface water quality are likely to be negligible or low if they are of negligible or minor magnitude, of short duration, infrequent, of small spatial extent, reversible or easily avoidable, and to generate a minor modification of surface water physico-chemical parameters in sanitary or ecological contexts. Mitigation measures will allow reference conditions to remain largely unchanged;
- **Moderate** : Impacts on surface water quality are likely to be of moderate magnitude if they are of moderate magnitude, moderate duration, occasional, possibly/partially reversible, and to generate a moderate level of modification of surface water physico-chemical parameters, in environmental and sanitary contexts. Mitigation measures may not fully eliminate, reduce, control or compensate for impacts, but they should prevent residual impacts on surface water quality, relative to the existing reference state;
- **High**: Impacts on surface water quality are likely to be of high magnitude if they are large, permanent/long-term, frequent, irreversible and extend over a large area or into an area of exclusive/preferred indigenous use or ecological/environmental sensitivity. High levels of environmental and health impact are expected. There is a high degree of uncertainty as to the effectiveness of mitigation measures, or mitigation measures are unable to fully address impacts, such that surface water quality is degraded.

12.2 Existing Conditions

This section provides a summary of the historical and existing conditions of the existing reference environment for this Valued Component (VC). The description of surface water quality includes an analysis of the physico-chemical quality of all water bodies likely to be affected by the project in the RSA and LSA. This includes analysis of physico-chemical parameters (i.e. pH, water temperature, conductivity and redox potential (ORP)), as well as chemical constituents (i.e. major/minor ions, dissolved metals).

Existing CV conditions are influenced by historical activities at the former mine site. Existing CV conditions represent an environmental baseline against which to assess the potential, residual and cumulative impacts of the project on the CV. A description of water quality prior to 1996, i.e. prior to the operation of the former mine site, is presented. Issues related to surface water quality during the operation and closure of the former mine site are also discussed. Resolution of these issues is described in Section 12.2.2. Post-closure environmental monitoring of the former mine site has been carried out from site closure in 2010 to the present. Finally, the existing baseline (2019 to 2023) for surface water quality is presented in Section 12.2.3.

12.2.1 Methods

12.2.1.1 Literature Review

The analysis of the VC reference framework is based on a review of the data and information available on surface water quality monitoring. This review identifies three distinct periods:

1. The historical period of baseline environmental conditions prior to operation of the former mine site, i.e. before 1996;
2. The historical period of operation, closure and post-closure monitoring of the former mine site, from 1996 to the present;
3. The period characterizing existing VC conditions, from 2019 to 2023.

The following documents and environmental studies were used as the main references for developing the VC description for each of these three periods.

The following studies characterize the environmental monitoring data on surface water quality during the pre-mining phase of the former mine site, i.e. pre -1996. These data, together with the initial environmental baseline, are presented for information only.

- Entraco. 1993. Troilus Project - Environmental and Social Impact Assessment. 232 p.;
- Inmet Mining Corporation. 1995. Memorandum Troilus Project. Monitoring program of November 1995. Water and sediment quality. Sampling results. ENV-IN-044. Toronto, ON;
- Inmet Mining Corporation. 1996. Environmental monitoring and inspection program submitted to the Ministry of the Environment and Wildlife, Regional Directorate of Abitibi-Témiscamingue and Northern Québec. Troilus Project.

Environmental monitoring data on surface water quality from 1996 to 2018 were obtained from Troilus Gold. These data, the annual environmental monitoring reports, and the following reports detail the issues observed, and their resolution.

- Genivar Limited Partnership (Genivar). 2009. Troilus Mine Second Cycle EEM and Biomonitoring Interpretation Report. Reference No. T-111915;
- Genivar Limited Partnership (Genivar). 2013. Annual characterization of water quality, sediments and benthic invertebrate communities. Troilus Mine - 2012. Multiple pages and appendices.

Surface water quality data collected at the Troilus mine site between 2019 and 2023 were incorporated into the report and used to characterize the existing state of surface water quality.

- Wachiih Resources (Wachiih). 2020. Troilus Mine Project - Baseline status of water quality, sediments and benthic invertebrate communities. Report prepared for Troilus Gold. 36 p. + appendices (Appendix G.1.4 of the ESIA);
- Troilus Gold Corp - Environment Department. 2021. 2020 Post-Closure Environmental Monitoring and Inspection Program. Submitted to Ministry of the Environment and the Fight against Climate Change (MELCC), Regional Directorate of Abitibi-Témiscamingue and Northern Québec. Québec (Appendix G.1.5 of the ESIA);
- WSP. 2024. Troilus Project Operational Site-Wide Water Management Plan. Feasibility Study. 61 pages + tables, figures and appendices. N/Ref: 059-2252552002-RevA (Appendix C.14 of the ESIA);
- Wachiih Resources (Wachiih). 2024. Surface Water and Sediment Quality - Baseline Study - Troilus Mining Project. Project report 141022002 (22-0243). 68 pages + appendices. (Appendix G.1.6 of the ESIA).

12.2.1.2 Sampling Programs and Methods

Sampling methods

In the period prior to 1996, the sampling protocol in place, as well as the choice of parameters analyzed and quality criteria, followed Directive 019 (MDDEP, 2012) effective in 1996 (Inmet Mining Corporation 1996). The sampling methods applied during the 2011 to 2023 surface water quality monitoring programs followed the recommendations contained in the following documents and guides (Wachiih 2024; Troilus Gold Corp. 2021; Genivar 2013; Genivar 2009):

- Guide to physicochemical characterization of the initial state of the aquatic environment prior to the implementation of an industrial project (MDDELCC, 2017);
- Sampling procedures for monitoring river water quality (MDDELCC, 2016);
- Surface water sampling protocol for trace metal analysis (MDDELCC, 2014);
- Manual of sampling protocols for water quality analysis in Canada (CCME, 2011);
- Sampling guide for environmental analysis (MDDEP, 2008).

In shallow streams, samples were taken using an instantaneous method, where the sampler stands in the center of the stream, facing the current, and takes samples in the middle of the water column. Samples were taken at the bow of the boat, at least 10 minutes after engine shutdown to avoid hydrocarbon contamination, using a bottle designed for trace metal sampling. After sampling, the sample bottles were stored at 4°C until arrival at the laboratory. Samples were analyzed by laboratories accredited by the Quebec Centre of Expertise in Environmental Analysis (CEAEQ). The analytical methods and detection limits of the instruments used are documented in the certificates of analysis attached to the respective reports (Wachiih, 2024).

Parameters measured in situ were sampled using a multiparameter probe, calibrated at the start of each program for all parameters, and at the start of each sampling day for dissolved oxygen readings. Water depth was measured using a depth gauge or echo sounder (Wachiih, 2024).

Certificates of analysis are appended to the respective consultant reports (Genivar 2013, WSP 2017, Wachiih 2019, Wachiih, 2024).

Sampling Programs

Environmental monitoring of surface water quality from 2011 to 2015 was carried out annually by Genivar and WSP. In addition, water samples were collected from the mine's tailings facility effluent to meet the discharge requirements of the Metal and Diamond Mining Effluent Regulations (MDMER). Samples characterizing surface water quality were collected at the following stations (Map 12.1):

- E3: located in Lake A (PE43), exposed to mining effluent;
- E6: control station located in Lake B (PE29);
- E7: control station located in Lake Amont (PE2).

As of January 2016, the annual frequency of surface water sampling programs has been reduced to once every three years. This change is communicated in the certificate of authorization issued by the Ministry of Environment, the Fight Against Climate Change, Wildlife and Parks (MDDELCC) dated August 12, 2016.

Environmental monitoring of surface water quality in the existing environment (2019 to 2023) was carried out by Wachiih Resources. A specific environmental monitoring program was implemented in 2018, in accordance with the recommendations of the Guide to physicochemical characterization of the initial state of the aquatic environment prior to the implementation of an industrial project (MDDELCC, 2017). Stations E1, E2, E3, E4, E5, E6 and E7 were sampled in 2019. In 2022 and 2023, two to three seasonal sampling programs took place annually at stations E0-1, E0-2, E0-3, E2-2, E7-2. Only stations E2-2 and E7-2 were sampled in spring, summer and autumn. Station E8 was sampled three times in 2023. All stations, their locations and sampling dates are presented in Table 12.4.

Map 12.2 illustrates the location of sampling stations established between 2019 and 2023.

LÉGENDE/LEGEND

- Zone de développement du projet / Project Development Area
- Zone d'étude locale / Local Study Area
- Zone d'étude régionale / Regional Study Area
- Halde de minerai existant / Existing Ore Stockpile
- Halde à mort-terrain existant / Existing Overburden Pile
- Halde à stériles existant / Existing Waste Rock Pile
- Fosses existants / Existing Open Pits
- Littoral / Body of Water

Stations d'échantillonnage / Sampling Points

- Qualité de l'eau 2013, 2014, 2015 et 2018 / Water Quality 2013, 2014, 2015 and 2018

Cours d'eau naturel / Natural Watercourses

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

RÉV.	DESCRIPTION	AA/MM/JJ	PAR	VÉRIF.
2				

RÉFÉRENCES/REFERENCES

Infrastructures proposées: 167040485_PublicationDonnes_Infrastructures_Poly, Stantec, 25 Janvier 2024
Carte de base: Bing, 06 Juin 2023

NOTES

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ÉCHELLE (m) / SCALE (m)

LES DIMENSIONS DE CETTE ÉCHELLE DOIVENT ÊTRE UTILISÉES À TITRE D'INFORMATION SEULEMENT

N, O, E, S

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

Suivi de la qualité des eaux de surface 1996 à 2018 / Surface Water Quality Sampling Locations 1996 to 2018

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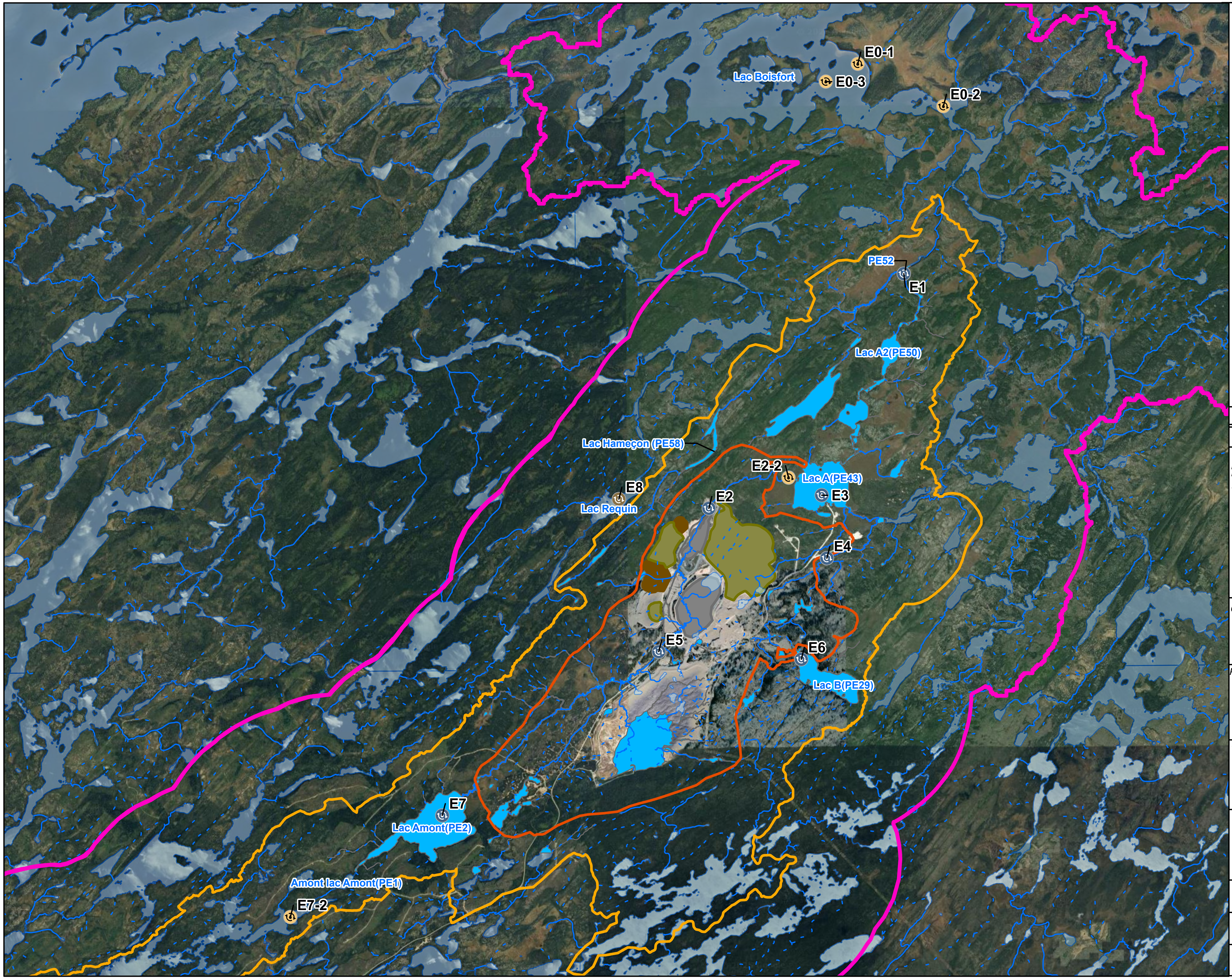

LÉGENDE / LEGEND

- Zone de développement du projet / Project Development Area
- Zone d'étude locale / Local Study Area
- Zone d'étude régionale / Regional Study Area
- Halde à mort-terrain existant /Existing Overburden Pile
- Halde à stériles existant /Existing Waste Rock Pile
- Fosses existants / Existing Open Pits
- Littoral / Body of Water

Stations d'échantillonnage / Sampling Points

- Qualité de l'eau 2019 / Water Quality 2019
- Qualité de l'eau 2022 & 2023 / Water Quality 2022 & 2023
- Qualité de l'eau 2023 / Water Quality 2023

Cours d'eau naturel / Natural Watercourses

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

RÉV.	DESCRIPTION	AA/MM/YY	BY	VERIF.
2				

RÉFÉRENCES/REFERENCES

Proposed Infrastructure: 167040485_PublicationDonnes_Infrastructures_Poly, Stantec, 25 January 2024
Base Map: Bing, 06 June 2023

NOTES

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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

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Table 12.4 Description of existing environmental sampling stations (Wachiih, 2024)

Station	Water Body Name	Description	Sampling Date
E1	PE52	Station located downstream of Lake A (PE43), more precisely, at water body PE52 at the confluence of stream CE51 - SH1 downstream of Lake A2 (PE50) and stream CE58 - SH4 downstream of Lake Hameçon (PE58).	2019-06-05 2019-06-26 2019-07-17 2019-08-13 2019-09-04 2019-09-25
E2	Bibou Creek (CE2)	Station located in Bibou Creek (CE2) upstream of Lake A (PE43) and exposed to mining effluent.	2019-06-06 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-26
E3	Lake A (PE43)	Station located in the receiving environment for all mine site effluent;	2019-06-04 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-25
E4	Bibou Creek (SH156)	Station located in the tributary stream of Lake A, at segment SH156 linking Lake B (PE29) to Lake A (PE43).	2019-06-03 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-26
E5	Bibou Creek (SH33)	Station located in Bibou Creek, segment SH33, downstream of and near the former tailings facility discharge point.	2019-06-03 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-26
E6	Lake B (PE29)	Control station located in the PDA at Lake B (PE29) downstream of the mine site	2019-06-03 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-26
E7	Lake Amont (PE2)	Control station located in the LSA and upstream of the mine site	2019-06-03 2019-06-26 2019-07-16 2019-08-13 2019-09-04 2019-09-26
E0-1	Lake Boisfort	Station located in the RSA and downstream of stations initially exposed to mining effluents	2022-08-11, 2022-10-18, 2023-07-27, 2023-08-27
E0-2	Lake Boisfort	Station located in the RSA and downstream of stations initially exposed to mining effluents	2022-08-11, 2022-10-18, 2023-07-27, 2023-08-27
E0-3	Lake Boisfort	Station located in the RSA and downstream of stations initially exposed to mining effluents	2022-08-11, 2022-10-18, 2023-07-27, 2023-08-28, 2023-10-17
E2-2	Bibou Creek (SH64) at mouth of Lake A (PE43)	Station in LSA exposed to mining effluents	2022-06-27, 2022-08-11, 2022-10-25, 2023-07-27, 2023-08-28
E7-2	Water body upstream of Lake Amont (PE-1)	Added as a control station, since station E7 was likely to be directly impacted by the construction of a diversion dam. Station located in the LSA	2022-06-27, 2022-08-11, 2022-10-26, 2023-08-28
E8	Lake Requin	Control station, located in the RSA outside the LSA.	2023-07-26 2023-08-27 2023-10-16

The physico-chemical parameters and chemical constituents analyzed are summarized in**Erreur ! Source du renvoi introuvable.**. Surface water quality criteria applied to surface water quality monitoring included (Wachiih 2024):

- Surface water quality criteria, MELCCFP 2019, 2021, 2022 and 2023;
- Canadian Environmental Quality Guidelines, CCME 2017.

Table 12.5 Parameters analyzed for surface water quality monitoring

Physico-chemical parameters	Chemical constituents
Temperature Biochemical oxygen demand (BOD5) Total alkalinity pH Specific conductivity Conductivity (at 25°C) Total hardness Turbidity Dissolved oxygen Suspended solids (SS) Total dissolved solids (TDS) Dissolved organic carbon (DOC) Chemical oxygen demand (COD) Radioactivity Chlorophyll A	Thermotolerant/faecal coliforms Total cyanides Total methylmercury Bromides (Br-) Chlorides (Cl-) Sulfates (SO42-) Fluorides (F-) Ammoniacal nitrogen Total Kjeldahl nitrogen Nitrates Nitrites Nitrites-Nitrates Total trace phosphorus Total extractable metals : Aluminum (Al), Antimony (Sb), Silver (Ag), Arsenic (As), Barium (Ba), Beryllium (Be), Bismuth (Bi), Boron (B), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Cobalt (Co), Copper (Cu), Tin (Sn), Iron, (Fe), Lithium (Li), Magnesium (Mg), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Lead (Pb), Potassium (K), Selenium (Se), Sodium (Na), Strontium (Sr), Tellurium (Te), Thallium (Tl), Titanium (Ti), Tungsten (W), Uranium ®, Vanadium (V), Zinc (Zn) Petroleum hydrocarbons (C10-C50) Volatile organic compounds (BTEX) Polycyclic aromatic hydrocarbons (PAH) Radium 226*

*Parameter analyzed in 2022-2023

12.2.2 Surface Water Quality: Reference Framework for the Historical Environment

12.2.2.1 Surface Water Quality before 1996

A surface water sampling program was carried out on the study site in 1991 to determine the physico-chemical characteristics of the environment. Samples were taken at the outlet of Lake B (PE29) and at the outlet of Lake A (PE43). The results of this sampling program complied with the guidelines recognized for the protection of aquatic life in 1991 (Environment Canada, 1979; US. Environmental Protection Agency, 44019-76-023; Environmental Studies Board, 1973, EPA. R3.73.033) (Inmet Mining Corporation, 1996).

Two other pre-project sampling programs were carried out by Inmet Mining Corporation in November 1995 and August 1996, prior to discharge of mine effluent into the receiving environment. Samples were taken at Lake Amont, downstream of the site at Lake A (PE43), and at Lake Boisfort, 10 km downstream. The purpose of these programs was to assess the influence of mine discharges on the receiving environment, and to establish a baseline for water quality prior to operation of the former mine site. Results from the 1995-1996 sampling program indicated a naturally acidic aquatic environment, rich in aluminum, iron, nickel, sulfides and phosphates. No seasonal trends could be observed due to the low number of samples collected.

12.2.2.2 Surface Water Quality from 1996 to 2018

Environmental monitoring of surface water quality was carried out from 1996 to 2018, during the operation and closure of the former mine site. Sampling stations E3, E6 and E7 respectively characterize surface water quality in the receiving environment at Lake A (PE43), the control environment downstream of the mine site at Lake B (PE29) and in the LSA upstream of the site, at Lake Amont (PE2). Station E6 (Lake B) showed high copper levels ranging from 4.2 µg/l in 2011 to 2.8 µg/l in 2018. These levels exceeded CCME criteria and MELCC criteria for the protection of aquatic life, both chronic (CVAC) and acute (CVAA). CCME criteria were also exceeded for suspended solids (SS) at stations E6 and E7. Station E6 showed levels ranging from 8.2 mg/l in 2013 to 9.3 mg/l in 2018. Similar levels were observed at station E7: 8.39 mg/l in 2013 and 9.3 mg/l in 2015. Exposed stations E3 and E6 also showed exceedances of CCME criteria for dissolved oxygen concentrations, compared to station E7. Exceedances of MELCC CVAC criteria were also observed for aluminum, at all three stations.

A number of surface water quality issues were raised during the operation and closure of the former mine site. Current stakeholder concerns are detailed in Section 12.1. Historical comments and observations by land users concerning surface water are detailed in Section 6.1. Among others, the following issues were raised:

- High iron concentrations in the tailings area of the former mine site;
- High concentrations of suspended solids (SS) in the effluent from the tailing storage facility (TSF) pond (PR-1), both during operation and after closure. Until 2017, active treatment by flocculation and settling was in place to ensure compliance with the maximum TSS concentrations authorized by REMMMD and Directive 019 (MDDEP, 2012), i.e. a monthly average of 15 mg/l.

12.2.3 Surface Water Quality: Reference Framework for the Existing Environment

12.2.3.1 Drinking Water Quality

Surface water present in the study area is not used for drinking water supply purposes. The quality of surface water in water bodies located in the PDA may interact with the cultural activities of Cree communities and land users. More specifically, Cree camps and the hunting and fishing activities that take place there are influenced by the quality of these waters.

12.2.3.2 Surface Water Quality from 2019 to 2023

Pits J and 87 were dewatered and kept dry between 1996 and 2010. Environmental discharge objectives (EDOs) have been drawn up for the effluent from the dewatering of the pits. These EDOs are based on the existing quality of the receiving environment, to ensure that the effluent is not likely to alter the receiving environment (see Appendix G.1.7 of the ESIA). The quality of the water currently present in pits J and 87 is representative of the receiving environment. This water is mainly composed of groundwater seepage, runoff from surrounding pits and precipitation. These three sources, resulting from historical activities, already influence the existing environment. Tables 12.8 and 12.9 in Section 12.4.4 detail all reference conditions for pits J and 87. Existing conditions show :

- Average sulfate and hardness concentrations for pit J4 are 382 and 546 mg/l, respectively. Average sulfate concentration for pit 87 is 213 mg/l;
- Dissolved concentrations of copper, aluminum, cadmium, arsenic and selenium exceed CCME regulatory criteria, with mean values of 0.0139, 0.1095, 0.00117, 0.0056 and 0.00191 mg/l respectively;
- Total dissolved ammonia concentrations exceed CCME criteria, with an average value of 0.041 mg/l;
- Uranium concentrations exceed CCME and CVAC criteria, with an average value of 0.0194 mg/l.

Stations E1, E2, E3, E4, E5, E6 and E7 were sampled during 2019. It should be noted that the receiving environment has been and continues to be influenced by the same sources that feed water into pits J and 87, and this has been the case since the operation phase of the former mine site. Sampling of stations located upstream and downstream of the dewatering discharge point E8, E7-2, E2-2, E0-1, E0-2 and E-03 complements and characterizes the surface water quality of the existing receiving environment, uninfluenced by operations at the former mine site.

The Wachiih (2024) report details the results for all parameters analyzed between 2019 and 2023, at the various sampling stations on the Troilus mine site (see Appendix G1.6). TheTable 12.6 summarizes the statistics associated with physico-chemical parameters at the various sampling stations, presenting exceedances for surface water quality criteria (CCME, MELCCFP) during the surface water quality monitoring programs carried out. Table 12.6 shows the number of samples (%) with exceedances relative to the total number of observations made, with criterion indicated. The specific values of the applicable criteria for each parameter are detailed in Appendices 1, 2 and 3 of the Wachiih report (2024). Surface water quality monitoring stations have been grouped together in accordance with the environmental baseline study (Wachiih, 2024), so as to represent spatio-temporal variability and present statistics for surface water quality criterion exceedances at control stations (E6, E7, E7-2, E8), intermediate stations exposed to mining effluent (E1, E4, and E5), stations directly exposed and downstream of mining effluent (E2, E2-2, and E3) and stations downstream of the site and in the RSA (E0-1, E0-2 and E-03). Control stations are located outside the PDA, generally upstream or in a neighboring, unaffected sub-catchment basins. Stations directly exposed downstream to mining effluent are located within the LSA, in water bodies directly downstream of the mining effluent discharge point. Intermediate stations exposed to mining effluent are located at a moderate distance from the discharge point, under the influence of diluted mining effluent in the watercourse or water body. The stations located downstream of the site and within the RSA are located hydraulically downstream of the project site, within the RSA, and enable surface water quality to be assessed on a catchment scale.

The existing surface water environment throughout the RSA is naturally acidic, being characterized by a relatively low pH. The control stations at Lake Amont (PE2) and Lake B (PE29) had pH values ranging from 6.21 to 7.22. Station E8 at Lake Requin had a pH of 5.45 (August 2023) and 5.62 (October 2023), and station E4 in Bibou Creek, on segment SH156 between Lake B (PE29) and Lake A (PE43), had the lowest pH, at 5.3 in June 2019 (Wachiih, 2024). On average, control stations had an average pH of 6.5, and intermediate stations exposed to mining effluent had an average pH of 6.6. Directly exposed stations had an average pH of 6.98 and downstream stations 6.7. On the other hand, similar to previous observations (before 1996 and from 1996 to 2018), dissolved oxygen concentrations in the existing environment were generally low, characteristic of an oligotrophic environment. Several values below CCME guidelines were observed at all sampling stations (Table 12.6).

Figures 12.1 and 12.2 detail pH and dissolved oxygen measurements observed at sampling stations in the receiving environment, represented by Lake A (PE43), the control environment in the project area, represented by Lake B (PE29), and the control environment in the LSA upstream of the mine site, represented by Lake Amont (PE2). These figures show an overview of pH and dissolved oxygen levels during the mine site's operation, closure and post-closure environmental monitoring periods (1996-2018), as well as the period characterizing the existing environment (2019-2023). In general, observations of pH and dissolved oxygen measurements show similar variations between Lake A (PE43), Lake B (PE29) and Lake Amont (PE2).

In 2019, conductivity measured at station E3 of receiving environment lake A (PE43) ranged from 37-99 µS/cm. In 2022 and 2023, the conductivity measured at stations located in the RSA at Lake Boisfort (E0-1, E0-2 and E0-3) varied between 17 and 30 µS/cm. Conductivity at station E7-2, located in the LSA and upstream of Lake Amont (PE1), ranged from 16 to 21 µS/cm (Wachiih, 2024). Stations E7 (Lake Amont [PE2]), E3 (Lake A (PE43)) and E4 (tributary stream of Lake A (PE43)) have mean sulfate and hardness concentrations of 1.7 and 7.0 mg/l, 6.4 and 10.6 mg/l, and 2.5 and 6.5 mg/l, respectively.

The existing environment is also characterized by high levels of aluminum, copper, iron, cadmium and lead. Aluminum levels exceed CCME and MELCCFP surface water quality criteria at all sampling stations (Table 12.6). These results reflect naturally high aluminum and iron concentrations in this type of northern environment (Wachiih 2024). Figure 12.4 shows little variability in concentrations between the receiving environment at Lake A (PE43) and the environment upstream of the mine site at Lake Amont (PE2). Exceedances of MELCCFP CVAC and CVAA criteria for copper are reported for all data collected at station E4, located in the tributary stream of Lake A (PE43). Exceedances are also frequent at Lake A (PE43) (2 out of 4 samples) and Lake Amont (PE2) (3 out of 11 samples).

Exceedances of aquatic life protection criteria (ALPC) for cadmium were observed at intermediate stations exposed to mining effluent E4 and E5, as well as at stations directly exposed to mining effluent (E2, E2-2 and E3). Environmental monitoring stations in the receiving environment showed higher cadmium levels than control stations. Specifically, cadmium levels averaged 0.2076 µg/l at stations E2, E2-2 and E3, 0.1922 µg/l at stations E1, E4 and E5, 0.0943 µg/l at control stations E6, E7, E7-2 and E8, and 0.046 µg/l at stations E0-1, E0-2 and E-03. Stations E2 and E2-2 also showed high zinc levels (max = 132 µg/l). Stations E8 and E0-3, located within the RSA, also showed high levels of silver, iron, mercury, copper and lead (Wachiih, 2024). These results reflect naturally high metal concentrations in this type of northern environment (Wachiih, 2024). Results for ions and nutrients in the existing environment met federal and provincial criteria (Wachiih, 2024). It should be noted that total ammonia nitrogen concentrations exceeded Directive 019 (MDDEP, 2012) and REMMMD criteria at station E4 located in the tributary stream of Lake A (PE43), i.e. 2 out of 6 samples, with a maximum value of 2.3 mg/l.

No exceedance of criteria was noted for TSS in the existing surface water environment. Measurements taken in 2022 and 2023 at station E7-2 showed turbidity values ranging from 0.5 to 1 NTU, and TSS concentrations were all below 2 mg/l. At station E8, turbidity ranged from 0.7 to 0.9 NTU and SS concentrations from 1 to 2 mg/l (Wachiih, 2024). All stations in the LSA had low total alkalinity values. Values obtained at stations E0-1, E0-2 and E0-2 were below 10 mg/l CaCO3, indicating that these environments are sensitive to acidification (Wachiih, 2024).

Figure 12.5 shows the variability of existing environment observations (2019 to 2023) of concentrations of parameters exceeding existing environment surface water quality criteria at the four types of environmental monitoring stations for surface water quality at the study site. Total iron shows the greatest variability at stations directly exposed to the mine effluent, with concentrations ranging from 2.5 µg/l to 780 µg/l at stations directly exposed and downstream of the mine effluent (E2, E2-2, and E3). This variability is also illustrated in Figure 12.3. In contrast, the control stations (E6, E7, E7-2, E8) and the intermediate stations exposed to the former mine effluent (E1, E4, E5) show lower variability in the concentrations observed (Wachiih, 2024). This variability is illustrated in Figure 12.5. Table 12.6 shows consistently high lead levels at all stations, with exceedances of MELCCFP CVAC criteria at control stations, exposed intermediate stations and stations downstream and in the RSA. Variability was observed in the percentage of exceedances of copper criteria (up to 100% for stations exposed downstream from the mine effluent to the former effluent). Variability in aluminum levels remains relatively low, reflecting the natural aluminum content of the environment.

A detailed analysis of seasonal variability could not be carried out for all stations over the period from 2019 to 2023. However, observations of seasonal variability can be highlighted at stations E3 in Lake A (PE43) and E7-2 in Lake Amont (PE1).

According to Wachiih (2024), the six observations made during 2019 at station E3 of Lake A (PE43) show a relatively stable pH observed in spring (avg. 6.84), summer (avg. 6.98) and autumn (avg. 7.17), with a slight increase in autumn. Dissolved oxygen remains high in spring (avg. 9.05 mg/l) and autumn (avg. 9.23 mg/l). Measured turbidity is stable, showing no marked seasonal variation, while a gradual increase in total dissolved solids (TDS) concentrations is observed, with concentrations ranging from 59 g/L in spring to 73 g/L in autumn. This increase is consistent with conductivity, possibly due to mineral accumulation or summer evaporation. TSS concentrations averaged 1.6 mg/l in spring, 0.67 mg/l in summer and 0.48 mg/l in autumn. A slight decrease is thus observed over the seasons. Ammoniacal nitrogen and total nitrogen concentrations show a summer peak of 0.072 mg/l and 0.304 mg/l, respectively. Increasing chloride concentrations can also be observed, with concentrations of 0.55 mg/l in spring, 0.81 mg/l in summer and 0.84 mg/l in autumn. This growth is consistent with that of dissolved ions. On the other hand, concentrations of dissolved and total metals such as iron and manganese rise progressively from early to late spring (June) through to September. Zinc and aluminum concentrations are relatively stable, with a slight fall in autumn. Copper, nickel and cadmium show slight variations, but remain relatively constant. Barium, arsenic and lead show no seasonal variations; and chromium, selenium and cobalt are present in trace amounts, with no noticeable variation.

Seasonal variations observed by Wachiih (2024) at station E7-2 upstream of Lake Amont in 2022 and 2023 show a slight decrease in pH in summer 2023 (6.76) compared to autumn (6.94). Chemical oxygen demand (COD) also decreases from summer to fall, with concentrations ranging from 38 mg/l in June 2022 to 23 mg/l in October 2022, then from 26 mg/l to 18 mg/l in 2023. Alkalinity rises slightly in summer, to 9.2 mg/l in August 2023. TDS show strong summer variability. Concentrations are higher in July 2023 (52 mg/l) than in June 2022 (32 mg/l) or August 2023 (<10 mg/l). Bromides, fluorides and nitrates/nitrites show no significant seasonal variability. Concentrations of dissolved and total metals such as aluminum, manganese and zinc show a slight overall drop between late spring (June) and autumn. On the other hand, copper and chromium show slight inter-annual variability. For cobalt, an autumn peak of 0.0448 mg/l can be observed in 2023, while copper shows a peak of 0.0143 mg/l in June 2023. Concentrations of arsenic, lead, mercury, cadmium, beryllium, thallium, uranium and other metals are relatively stable over the seasons.

Table 12.6 Surface water quality criteria exceedance statistics for samples (µg/l) taken from 2019 to 2023 (Data source: Wachiih, 2024)

Parameter	Nb	Average	Standard deviation	Min	Max	1st quartile	2th quartile	3th quartile	CCME*	CVAC**	CVAA**
Control stations (E6, E7, E7-2, E8)											
Aluminum (µg/l)	22	148,7	51,072	76	260	101,5	142	197,75	77,27 %	18,18 %	9,09 %
Cadmium (µg/l)	22	0,0828	0,2155	0,003	1	0,005	0,0105	0,017	-	-	-
Copper (µg/l)	22	1,1202	3,106	0,007	10,9	0,011	0,017	0,236	36,36 %	40,91 %	40,91 %
Iron (µg/l)	21	76,95	119,86	0,42	318	0,69	3	222	4,76 %	-	-
Lead (µg/l)	22	0,154	0,06	0,07	0,26	0,091	0,14	0,21	-	31,82 %	-
Zinc (µg/l)	22	3,91	5,246	1	27,3	1,675	2,75	3,45	-	-	-
Dissolved oxygen (µg/l)	11	9384,5	460,9	8210	9890	9240	9500	9690	92,86 %	-	-
pH in situ (n/a)	22	6,52	0,460	5,45	7,22	6,3275	6,555	6,83	36,36 %	36,36 %	-
Intermediate stations exposed to mining effluent (E1, E4, and E5)											
Aluminum (µg/l)	18	142,4	47,072	64	230	105	145	167,5	72,22 %	5,56 %	-
Cadmium (µg/l)	18	0,1922	0,3732	0,003	1	0,008675	0,019	0,1	16,67 %	11,11 %	-
Copper (µg/l)	18	0,0349	0,0176	0,006	0,07	0,0235	0,029	0,051	77,78 %	66,67 %	61,11 %
Iron (µg/l)	18	3,226	1,6822	0,88	8,2	2,025	2,9	3,675	55,56 %	-	-
Lead (µg/l)	18	0,2021	0,1012	0,089	0,46	0,13	0,155	0,265	-	16,67 %	-
Zinc (µg/l)	18	7,75	5,9	2,8	23	3,7	4,85	10,4	-	-	-
Dissolved oxygen (µg/l)	6	6405	4460,2	230	9600	3050	9100	9300	72,22 %	11,11 %	-
pH in situ (n/a)	18	6,67	0,46	5,26	6,55	6,7	7	7,23	38,89 %	38,89 %	-
Stations directly exposed and downstream of mine effluent (E2, E2-2, and E3)											
Aluminum (µg/l)	17	115,829	35,904	66	200	89	110	130	70,59 %	-	-
Cadmium (µg/l)	17	0,20764	0,3206	0,003	1	0,0078	0,1	0,23	88,24 %	41,18 %	-
Copper (µg/l)	17	1,44017	2,5441	0,042	8,86	0,071	0,13	1,09	100 %	58,82 %	41,18 %
Iron (µg/L)	17	195,088	310,76	2,5	780	3,5	4	468	50,59 %	-	-
Lead (µg/l)	17	0,20435	0,0808	0,095	0,35	0,14	0,21	0,26	-	-	-
Zinc (µg/l)	17	41,9152	37,888	0,4	132	16	28	61	17,65 %	41,18 %	41,18 %
Dissolved oxygen (µg/l)	6	9263,33	308,71	9000	9830	9092,5	9130	9340	58,82 %	-	-

Parameter	Nb	Average	Standard deviation	Min	Max	1st quartile	2th quartile	3th quartile	CCME*	CVAC**	CVAA**
pH in situ (n/a)	17	6,98	0,26	6,41	7,35	6,86	7,04	7,2	11,76 %	11,76 %	-
Stations downstream and in the Regional Study Area (E0-1, E0-2 and E-03)											
Aluminum (µg/l)	12	87,1	26,711	56,6	134	63,175	80,55	104,5	43,75 %	-	-
Silver (µg/l)	12	0,0456	0,0682	0,0015	0,2	0,002625	0,012	0,04075	-	16,66 %	16,66 %
Cadmium (µg/l)	12	0,046	0,0710	0,003	0,2	0,003	0,012	0,04075	-	-	-
Copper (µg/l)	12	0,018	0,0091	0,01	0,035	0,012	0,014	0,01925	25,00 %	31,25 %	31,25 %
Iron (µg/l)	12	5,1925	10,024	0,59	35,3	0,7475	0,995	3,0375	12,50 %	-	-
Lead (µg/l)	12	0,1908	0,0800	0,11	0,33	0,1275	0,16	0,25	-	25,00 %	-
Zinc (µg/l)	12	8,8916	9,3309	3,1	32,4	3,55	4,4	8,525	-	8,33 %	8,33 %
Dissolved oxygen (µg/l)	6	9163,3	198,25	8920	9370	9010	9175	9332,5	37,50 %	-	-
pH in situ (n/a)	12	6,74	0,16	6,12	7,02	6,41	6,82	7,01	37,50 %	37,50 %	-

*Canadian Council of Ministers of the Environment Aquatic Life Protection Criteria (long-term exposure)

**MELCC Chronic Aquatic Life Criteria (CALC) and Acute Aquatic Life Criteria (AAVC)

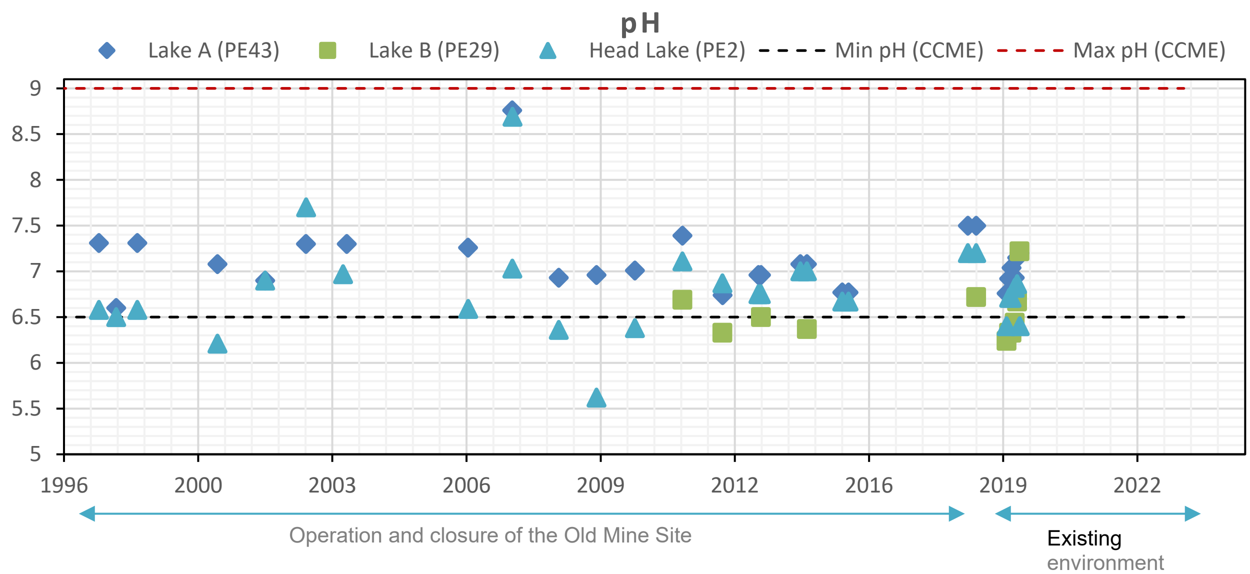


Figure 12.1 **Distribution of pH measurements from environmental monitoring (1996-2023) at sampling stations in Lake A (PE43), Lake B (PE29) and Lake Amont (PE2)**

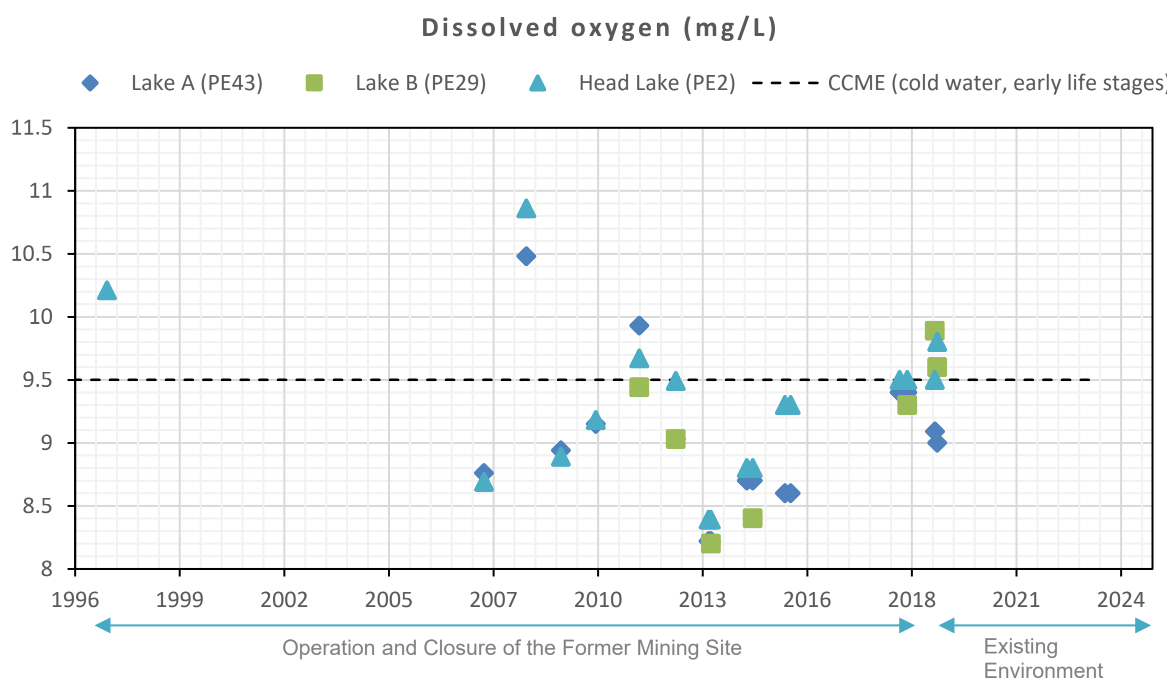


Figure 12.2 **Distribution of dissolved oxygen measurements (mg/l) from environmental monitoring (1996-2023) at sampling stations in Lake A (PE43), Lake B (PE29) and Lake Amont (PE2)**

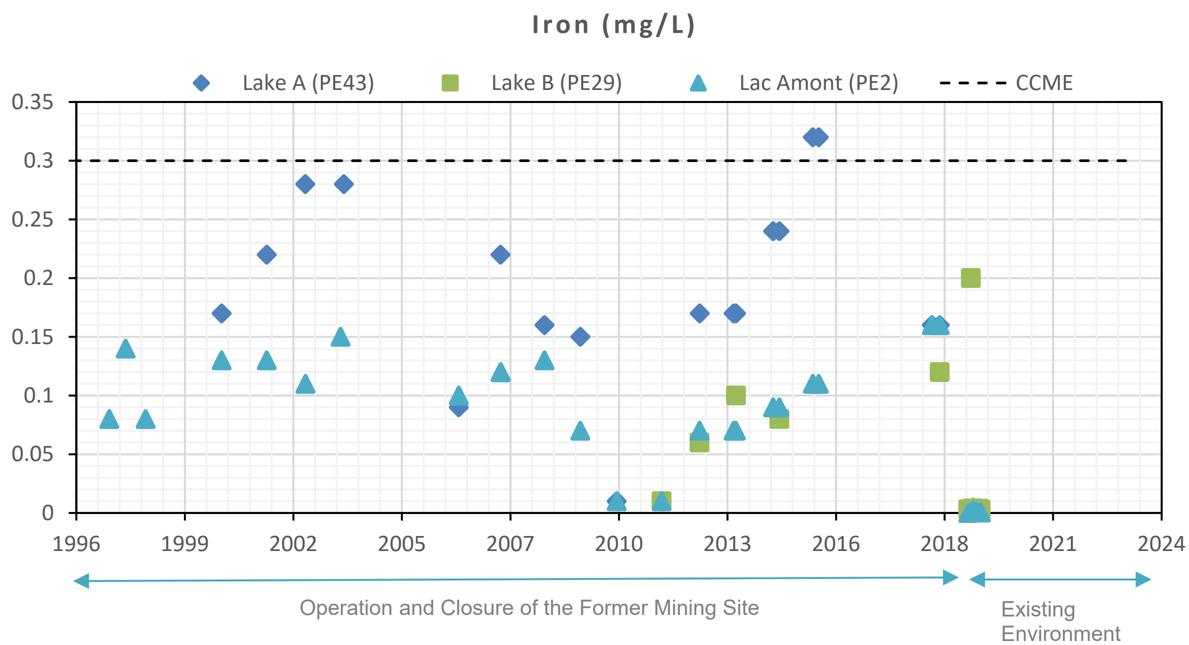


Figure 12.3 **Distribution of iron levels (mg/l) from environmental monitoring (1996-2023) at sampling stations on Lake A (PE43), Lake B (PE29) and Lake Amont (PE2).**

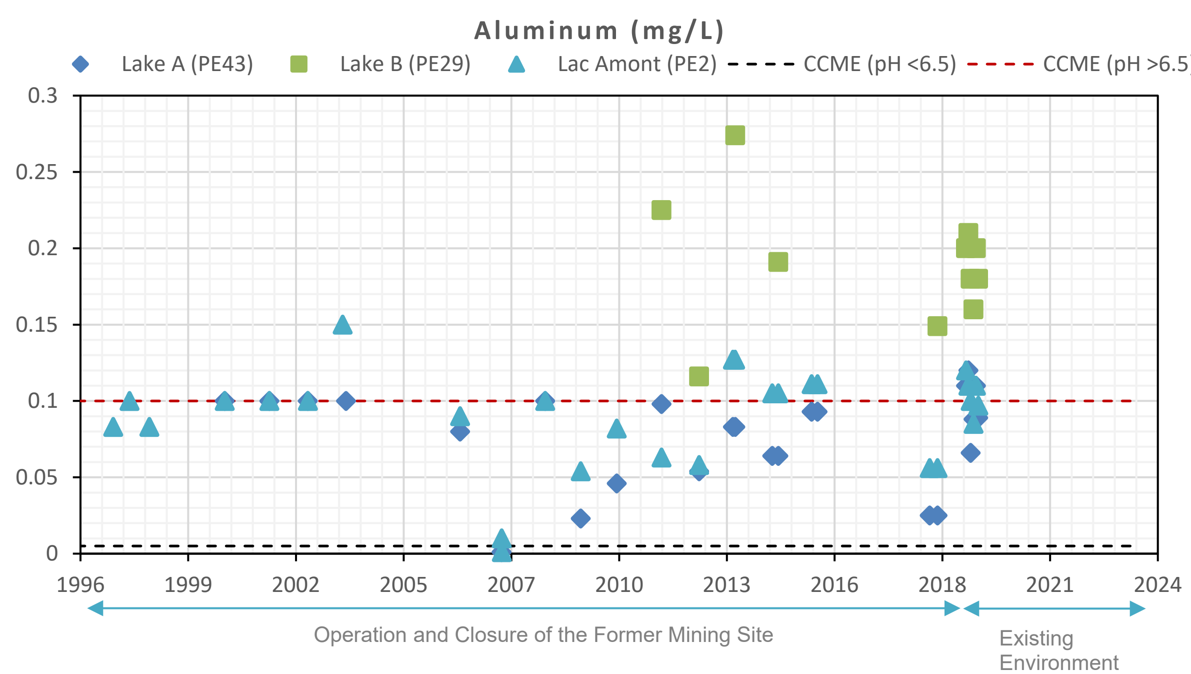


Figure 12.4 **Distribution of aluminum levels (mg/l) from environmental monitoring (1996-2023) at sampling stations in Lake A (PE43), Lake B (PE29) and Lake Amont (PE2)**

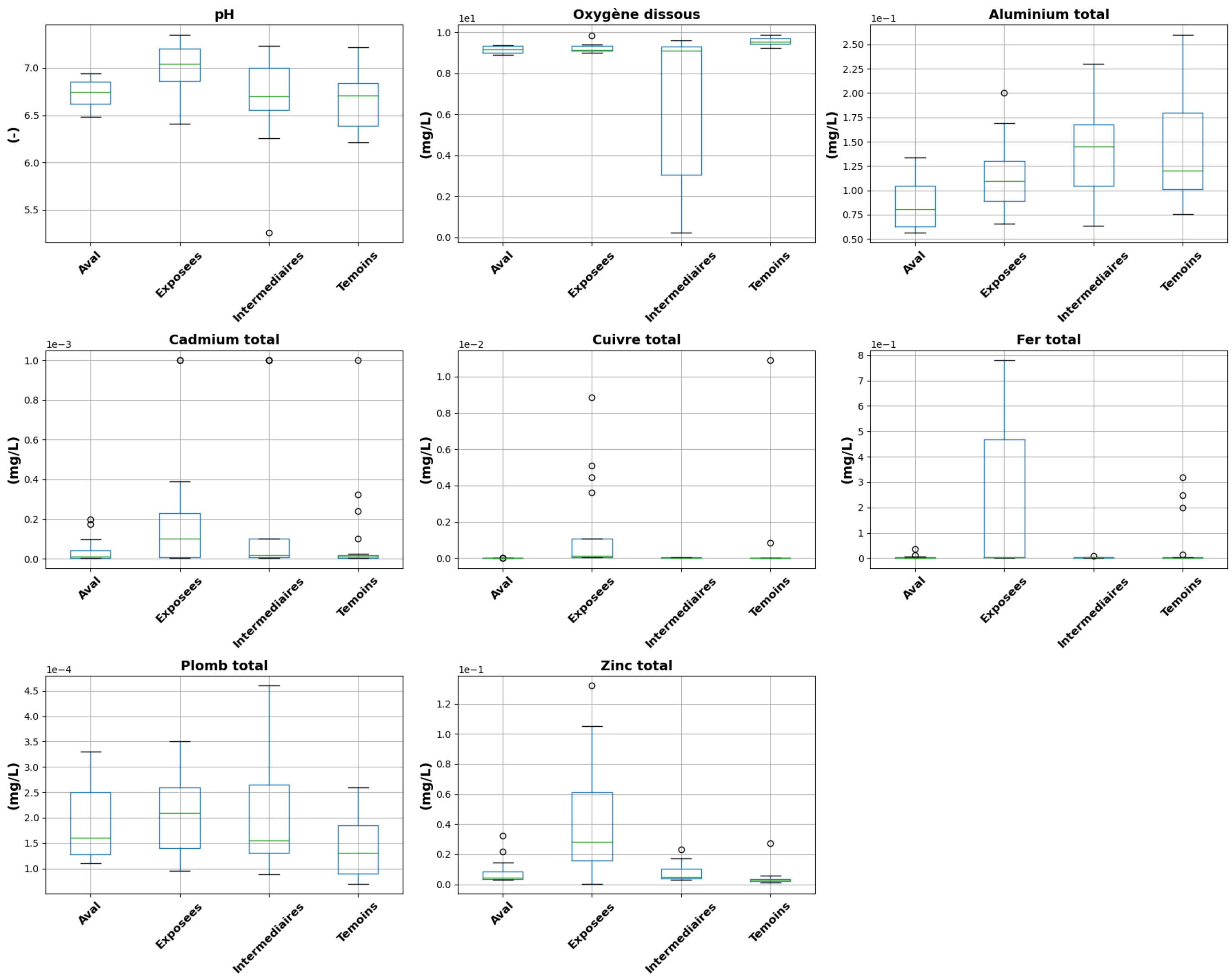


Figure 112.5 Data variability for parameters exceeding surface water quality criteria at study site stations from 2019 to 2023

12.3 Project Interactions with Surface Water Quality

The Table 12.7 identifies, for each potential impact, the activities likely to interact with the VC and result in the identified impact (Section 12.3). These interactions are indicated by a bracket or dash, and are discussed in detail in Section 12.4, in the context of pathways, standard and project-specific mitigation and/or enhancement measures, and residual impacts.

During the three phases of the project, the purchase of goods and services is a socio-economic activity, with no interaction with the physical environment of surface water. As such, there is no interaction between this activity and surface water quality. Similarly, the presence of the workforce during the life cycle of the project does not imply any interaction with the surface water environment.

Table 12.7 Project interaction with surface water quality

Physical Activities	Potential impacts
	Modification of physico-chemical parameters of surface water receiving environment
Construction	
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PDA.	√
Tree cutting, vegetation clearing, soil stripping and earthworks.	√
Handling and use of explosives, including blasting	√
Construction of temporary and permanent buildings, including wastewater treatment system and drinking water collection and distribution system.	√
Construction of mining infrastructures such as stockpiles, pits and the raising of tailings management facility.	√
Construction of roads and preparation of construction surfaces including the crushing of material used for construction. Relocation of a section of the access road and the power line.	√
Construction of water management systems including ditches, diversion channel, sedimentation ponds and the water treatment plant.	√
Dewatering of natural water bodies and pits, lowering water level in tailings management facility and management of contact water.	√
Diversion of Bibou Creek (CE2).	√
Management of waste materials, including hazardous waste.	–
Purchases of goods and services	–
Employment	–
Relocation of power line	–

Physical Activities	Potential impacts Modification of physico-chemical parameters of surface water receiving environment
Operations	
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PA.	√
Handling and use of explosives, including blasting	√
Ore extraction from pits including drilling and hauling of waste rock.	√
Ore, waste rock and tailings storage.	√
Ore processing including conveyor, crushing, loading and hauling on site.	–
Transportation of concentrate to a smelter or a wharf.	–
Management and treatment of water on the mine site and to the environment, including drainage and contact water.	√
Progressive reclamation of disturbed areas.	√
Management of waste materials, including hazardous waste.	–
Purchases of goods and services	–
Employment	–
Decommissioning and Closure	
Labour, equipment and materials transport to the site.	√
Vehicles and equipment operation and maintenance within the PA.	√
Decommissioning, dismantling and disposal of buidings and equipment.	√
Pits flooding, surface and groundwater management.	√
Reclamation of disturbed areas, including earthworks, placement of overburden and revegetation.	√
Management of waste materials, including hazardous waste.	–
Purchases of goods and services	–
Employment	–

The management of residual materials, including hazardous residual materials, has no potential for interaction with the VC. Solid residual materials will be collected and stored in designated areas, according to a management plan to be determined. Residual materials will be transported off-site for final treatment and disposal. The project includes the installation of a water treatment plant to treat domestic wastewater.

12.4 Assessment of Residual Impact on Surface Water Quality

A residual impact is defined as the environmental impact remaining after the implementation of all reasonable and effective mitigation measures. In other words, it is the impact that remains, despite all efforts to avoid, reduce or compensate for adverse impacts.

12.4.1 Modification of Physico-chemical Parameters of Surface Water Receiving Environment

Project activities (**Erreur ! Source du renvoi introuvable.**) undertaken during all phases of the project will be supported by a number of measures to mitigate and prevent the release of contaminants into the receiving environment. However, changes in physico-chemical parameters such as concentrations of total and dissolved metals, anions and nutrients, as well as conductivity, turbidity and concentrations of suspended solids, temperature, pH, alkalinity and oxygenation could occur in the surface waters of the LSA and RSA.

12.4.2 Project Pathways

12.4.2.1 Construction

During the construction phase, earthworks, development and infrastructure expansion activities could lead to increased runoff, higher erosion rates, and the mobilization of sediments and suspended solids into nearby watercourses and bodies of water. These disturbances are likely to alter surface water quality by increasing turbidity and modifying aquatic habitats. In addition, these activities involve the use of heavy machinery and various industrial equipment, as well as high-frequency road transport on the site. These could also cause increased emissions of total suspended solids (TSS), hydrocarbons, oils and greases and other parameters into nearby watercourses and bodies of water. The volumes and frequencies of these emissions are variable. The construction of a water management and treatment system is planned to mitigate these impacts. However, temporary disruptions are expected before these infrastructures are fully in place.

Transport activities, fuel storage, and the use and handling of explosives, could result in the accidental release of hazardous materials or petroleum hydrocarbons. This pathway is consistent with the specifics of the generating events.

An indirect impact on surface water quality could also result from changes in the hydrological regime associated with the diversion of Bibou Creek (CE2) and the construction of various water infrastructures (Section 12.4). These modifications could lead to changes in water inflow volumes downstream of the site, affecting the local water regime, flows and levels of water, dilution of chemical parameters, as well as temperature, conductivity, biochemical oxygen demand (BOD) and pH of surface water.

Finally, the development of pit X22 during this phase could exacerbate some of the impacts mentioned above, particularly with regard to surface runoff, drainage and contact water management, and consequently surface water quality.

12.4.2.2 Operations

The operation phase of the project is mainly characterized by pit mining and ore processing activities. More specifically, drilling and blasting activities, carried out with the aim of extracting ore and waste rock, require the use of explosives, fuel and other hazardous materials, which may be accidentally or indirectly released into the physical environment. These activities generate significant soil and rock disturbance, which could lead to increased erosion rates, mobilization of sediments and fine particles in surface waters, and increased TSS content and turbidity. Blasting and mining could also release heavy metals and other contaminants naturally present in geological formations. These contaminants could be transported by runoff to watercourses, increasing turbidity and altering surface water quality. Keeping pits dry by dewatering during mining could also generate mine water containing heavy metals. All contact water will be collected and redirected to sedimentation ponds.

As detailed in Chapter 5, the bedrock at the Troilus site has not historically or currently produced acidic drainage. However, in certain limited geochemical contexts, acidic drainage may occur. Mine tailings, stored in tailings management facilities, could contain TSS, contaminants and metals, and thus degrade surface water quality. Mining effluents generated by pit operations and ore extraction will be collected, treated and discharged downstream of the site. Mining effluent is treated using physico-chemical processes. These involve the use of coagulant (ferric sulfate), flocculant (polymer) and ballast (microsand).

Site operations, including the frequency of on-site transportation, present a pathway for the release of TSS, petroleum hydrocarbons, oils and greases, and chemical materials into the environment. These contaminants could come into direct or indirect contact with the surface waters of the LSA through runoff and aerial deposition. These pathways have the potential to alter the physico-chemical properties of surface waters. In addition, the access road to the site has several crossings with local watercourses, and runs alongside certain wetlands or water bodies. The risk of accidental release of hazardous materials, petroleum products or ore is particularly high at these crossings, in which case contamination of sediments and surface water could occur. The hydroclimatic characteristics of these locations determine the capacity for transport, burial and mobilization of discharged contaminants.

12.4.2.3 Closure

The closure phase of the study site will involve dismantling the site's infrastructure, flooding the open pits and restoring the site. With the exception of residual materials managed off-site, these activities are likely to generate changes in surface water quality. The scope of dismantling work on site infrastructure will be limited to the PDA. Dismantling activities include dismantling machinery and equipment related to ore extraction, dismantling buildings, piping (related services), traffic lanes and modifying the drainage system. These activities are likely to increase soil erosion and the presence of TSS in surface waters. These activities are also likely to release hydrocarbons, oils and greases, organic matter, sulphides and phenolic and other compounds into the environment. In addition, the use of machinery and vehicles could cause the release of petroleum hydrocarbons, oils and greases, as well as other contaminants.

The pits will be progressively filled with water (through groundwater infiltration, precipitation, runoff). This water will be in contact with the exposed pit walls. Once the water level in the pits has stabilized, the runoff of this water may cause a change in the quality of the site's surface water in terms of pH, temperature, conductivity and dissolved oxygen levels. It should be noted that the regional surface water flow regime will gradually return to initial conditions, since most of the water management infrastructure will be removed. However, the diversion of Bibou Creek (CE2) will be maintained.

12.4.3 Mitigation and Enhancement Measures

The following section details the various mitigation measures that will be put in place over the life cycle of the project, i.e. construction, operation and closure of the site, through measures that will limit changes in concentrations of physico-chemical parameters of the surface water receiving environment, and avoid contamination of water bodies and watercourses in the project's LSA and RSA. The following measures will be implemented:

Ore and waste rock extraction and management

- Troilus is able to develop geological models of the resources. The distribution of acid-generating potential could be added to models of future pits to clearly identify if any areas could be problematic. As a result, Troilus will be able to adapt its methods for mining and storing ore and waste rock, to ensure that if areas are found to contain waste rock with higher acid-generating potential, it can eventually be stored, for example, in pits that have already been mined and flooded when pumping to keep it dry is stopped. It is recommended that Troilus calculate the acid-generating potential of all the samples in the database and use this during operation to optimize waste rock management.
- The bedrock at the Troilus site will not release ARD, although small amounts may be released. Thus, there are a small number of rock formation units within the Troilus site that present a high potential for ARD. These high-risk rock units should be mined in conjunction with high-PL rock units. Exclusive mining of rock units with high ARD potential is likely to result in acidification and metal leaching.
- Use of emulsion explosives.
- Possibility of applying lime (limestone) to sedimentation ponds, if the pH of the solutions in the sedimentation ponds is below 8.

Capture and management of contact water and runoff:

- Installation of drainage ditches and sumps around the mining infrastructures and the J4, 87 and X22 pits, to capture contact water from the mine. A network of contact water collection ditches and sedimentation ponds is planned, to capture contact water and allow the water to settle to reduce TSS. The total length of the ditches will be 19.9 km.
- Installation of clean runoff diversion channels. TSS will be monitored in the clean water diversion channels (DC1 and DC2A) to ensure that the concentration of TSS in these channels is below applicable standards.
- A tailings dam will be built downstream of the existing tailings management facility to serve as a containment structure, thereby limiting the footprint of the new tailings facility. This structure will have the capacity to accommodate the first 10.5 years of mine production. For Years 11 to 22, tailings will be stored in the mined-out Southwest, J and 87 pits.

- Installation of sedimentation ponds SP01, SP02, SP03, SP04. Effluent from SP01 and SP02 will be discharged into the DC1 diversion channel (Bibou Creek (CE2)). Discharge water from sedimentation ponds SP03 and SP04 will be pumped into the tributaries of Lake A (PE43). For sedimentation basin SP02, a pipe (recirculation) will be included in the design to allow pumping to the ore processing plant. Effluent from the sedimentation ponds will only be discharged to the receiving environment once water quality has been verified to meet applicable requirements. Turbidity sensors will be installed on the outlet pipe to monitor the quality of water discharged downstream of the site, in accordance with the requirements of Directive 019 (MDDEP, 2012). If water quality monitoring indicates higher-than-expected TSS concentrations, pre-sedimentation zones will be installed at the inlets to the sedimentation ponds, to which flocculants will be added. Flocculation systems are not currently included in the current design.
- Eight sumps with pumping stations (contact water) (S01a, S01b, S02, S03, S05, S06, S07 and S09) will be installed at various locations in the PDA over the life of the mining project, to manage runoff as well as contact water (see WSP, 2024 in Appendix C.14 for location and design details).
- During the closure phase, sumps and ponds will be retained as water bodies to collect runoff and groundwater infiltration.
- Installation of surface water quality monitoring stations and an environmental monitoring program for surface water quality:
  - Effluent from the sedimentation ponds will be released to the environment only if its pH value is maintained within the 7 to 8 range;
  - Mining effluent will be monitored in all sedimentation ponds prior to discharge into the environment;
  - Monitoring of surface water quality at Lake A (PE43) and Lake B (PE29) will also be implemented, to ensure that parameters do not exceed predicted values;
  - It is recommended that water quality be monitored along the flow paths directly downstream of the waste rock piles and the TSF;
  - Water quality parameters should be compared with the water quality model. It is recommended that this model be calibrated using data obtained from the monitoring program;
  - As a minimum, the following parameters should be analyzed: pH, alkalinity, dissolved and total metals, anions, nitrites and total ammonia nitrogen, as well as along the flow paths leading to these ponds (intermediate effluents) are considered;
- The following locations are suggested for monitoring:
  - All sedimentation ponds;
  - D02;
  - D06c;
  - D10a;
  - D15;

- Junction 2 (near sedimentation basin SP01);
- Junction 3 (near sedimentation basin SP02);
- Junction 26 (near station E1);
- Junction 28;
- Lake A (PE43);
- Lake B (PE29);
- Lake Amont (PE2).

Bibou Creek Diversion (CE2):

- The project's surface water management system will be designed to divert natural flows around the site and maintain existing hydraulic connectivity, as well as fish connectivity between lakes upstream and downstream of the site. This system will provide a primary mitigation measure to maintain environmental surface water quality, and divert potential contact between Bibou Creek (CE2) and the project's mining operations. In addition, the diversion of Bibou Creek (CE2) is designed to contain the 100-year design flow with erosion protection riprap capable of withstanding the design flow without damage;
- Two separate diversion systems will be installed, to ensure that they are effective during the operational phase:
  - The main diversion channel, DC1, will carry water around the western perimeter of the site, between Lake Amont (PE2) and Lake A (PE43). The DC1 channel will replace the existing Bibou Creek;
  - The DC2A diversion channel will divert runoff from the mountain to Lake B (PE29) without coming into contact with the mining infrastructure.
- The design of the Bibou Creek diversion channel (CE2) includes the integration of ecological features (low-water channels, riffles, pits, suitable substrates) to promote biodiversity throughout all phases of the project, including the closure phase.

Engineering measures to reduce potential erosion impacts:

- Levelling for surface drainage, to ensure proper runoff management;
- Revegetation of slopes to minimize erosion and sediment transport;
- Design of embankment slopes to reduce the risk of erosion and landslides;
- Design and construction of safety benches in deep cuts (e.g. during excavation) to reduce runoff velocity by stabilizing slopes, and reduce the potential for erosion and sediment transport;
- Waste rock piles and tailings are reprofiled and covered with reclamation materials to stabilize surfaces and limit erosion and contaminant dispersion.

Installation of a wastewater and mine effluent treatment system:

- The construction phase will include the construction and installation of a domestic wastewater treatment plant and a mine effluent treatment plant, which will be operational during the operation phase;
- The new water treatment plant is designed for a treatment capacity of 1,200 m^3/h. The water treatment plant will be located to the northwest of the SP01 sedimentation basin. This location reduces the length of piping from the Tailings Storage Facility (TSF);
- A pipe will be laid between the TSF and the water treatment plant. An overflow pipe from the water treatment plant to the main diversion channel will also be installed;
- The treatment technology selected is a flocculation lamellar clarifier with ballast. Treatment includes the addition of three chemicals: coagulant (ferric sulfate), flocculant (polymer) and ballast (microsand);
- A 536 m^3 sludge tank will be excavated next to the plant, allowing sludge to be stored for 21 days when operating at maximum capacity. The settled solids will then be transported to the TSF;
- Monitoring stations to ensure treated water quality will be installed;
- During the site closure phase, the addition of granular materials will be considered in the TSF pond footprint, to control suspended solids and reduce dust as the level drops.

Development and implementation of a management plan for residual materials, hazardous materials and petroleum hydrocarbons:

- Design and construction of containment zones around petroleum hydrocarbon storage facilities;
- Use of environmental protection equipment such as liners, impermeable membranes and airtight recovery bins;
- Adoption of an environmental emergency response plan, including spills of chemicals, fuels and other harmful or potentially harmful materials (NHS) to the environment;
- Use of a management protocol for residual materials, fuels and NHS;
- Application of a machinery maintenance program to avoid spills and leaks by performing preventive maintenance on heavy machinery.

12.4.4 Project Residual Impacts

12.4.4.1 Analysis Methods

The analysis of impacts on the surface water quality regime was carried out by combining the estimated concentrations of various parameters in the effluent and the predicted hydrological regime. In discussions with Troilus, the predictive surface water quality model was developed for Year 21 of the operations phase. The decision to model water quality parameters for Year 21 reflects the fact that it represents the scenario with the greatest potential impact on surface water quality. It should be noted that the potential residual impacts discussed are only applicable if the mitigation measures detailed in Section 12.4.3 are implemented.

Geochemical mass balance models were developed using PHREEQC v3.7.3 software and the thermodynamic database llnl.dat (Parkhurst, 1995). This software can handle different ionic strengths, pH, pressures and solution temperatures. In PHREEQC, the mass equations are written in terms of activities, where the equilibrium constant of each reaction is assumed to be valid independently of the ionic strength of the medium. Details of the geochemical model and mass balance are given in Appendix H.5 of the ESIA. Dissolved species concentrations for mine effluent were based on source terms developed by MDAG (2024) (see Appendices F.4, F.5 and G.1.8). The source model developed provides concentrations for dissolved species using an empirical drainage chemistry model (EDCM). The EDCM was developed for ore, waste rock and tailings, with fixed concentrations for dissolved species, regardless of the material mined. The concentrations predicted by the EDCM model were the maximum large-scale concentrations resulting from all geochemical tests carried out and from large-scale monitoring of previous operations at the Troilus site. The EDCM surface water quality parameters are determined using a logarithmic equation dependent on pH and sulfate concentrations. Since the EDCM model provides expected concentrations of dissolved species (rather than loadings), individualized assessment of the effluent resulting from each of the various proposed infrastructures (waste rock piles, ore stockpile and TSF pond) cannot be performed. Consequently, the conservative method stipulates that all contact water (water in contact with waste rock, ore and tailings pond seepage) is considered as fixed effluent, determined by the maximum reported aqueous concentrations provided by the EDCM model.

The mass balance model only predicts dissolved species concentrations. However, water quality inputs from reference conditions (including dewatering, i.e. keeping the pits dry) are in total concentrations. Effluent composition was determined from maximum aqueous concentrations from geochemical testing and the monitoring program, including dissolved and total concentrations. Consequently, the dissolved concentration provided by the mass balance model reflects total concentrations and was used for comparison with regulatory criteria.

The bedrock at the Troilus site will not generate acid rock drainage (ARD), although small quantities of material at the local scale may, given the neutralization potential offered by carbonate minerals, plagioclases and silicates (see Chapter 5). Based on geochemical testing and monitoring since previous operations, the likely pH range of mine effluent is between 6 and 8. As indicated in Section 12.4.3, Troilus will apply lime (limestone) to the sedimentation ponds to maintain a mining effluent pH of 8 at all discharge points, if necessary. In view of this mitigation measure, the geochemical mass balance model used a fixed effluent composition based on a pH of 8, following the numerical model provided by the EDCM model. The predictions presented in this chapter are applicable only if the mining effluent maintains a pH of 8. In the event that the effluent pH differs from 8, the modeling results will be considered invalid.

The modeling performed with PHREEQC software was designed to: (1) calculate the speciation of dissolved species, (2) apply the solubility limits of minerals likely to precipitate, and (3) mix the end components in order to calculate the concentrations at the junction points (assuming complete mixing). Surface water quality parameters obtained from the existing monitoring program were used as reference conditions for the simulations, including water quality in existing pits (data acquired as of 2019). To ensure consistency between the data entered in PHREEQC and the EDCM model, reference conditions were determined based on the 95th percentile of aqueous trace element concentrations. Average values for the main cations and anions were used to avoid any significant change in the overall chemistry of the reference conditions. Thus, the PHREEQC model input data are conservative, representing maximum aqueous trace element concentrations for both effluent and reference conditions.

The solutions analyzed with PHREEQC model was equilibrated with atmospheric partial pressure of oxygen and carbon dioxide during the months from spring to autumn. All reactions (dissolution of mineral phases or atmospheric gases in solution, precipitation of mineral phases, oxidation of dissolved species) were assumed to occur at equilibrium, irrespective of kinetic limitations. Appendix H.5 provides details of the assumptions made to define equilibrium conditions.

To calculate the concentrations of dissolved species at different locations on the site, the predicted water flow rates at the various junctions were used to determine the mixing fractions of the source solutions (i.e., contact water, environmental reference waters, including water from pits J and 87) and the resulting solutions (i.e., solutions from the mixing locations; see Appendix H.5). Water flows were obtained from the hydrological model (see Appendix H.5). Two main scenarios were considered for the hydrological regime:

- Historical hydrological conditions will persist;
- Climate change scenario.

Several scenarios were modeled to understand the variability and potential sensitivity arising from the defined assumptions required to develop the model. Appendix H.5 presents a detailed analysis of the different scenarios and the main assumptions for each. The following two scenarios are presented:

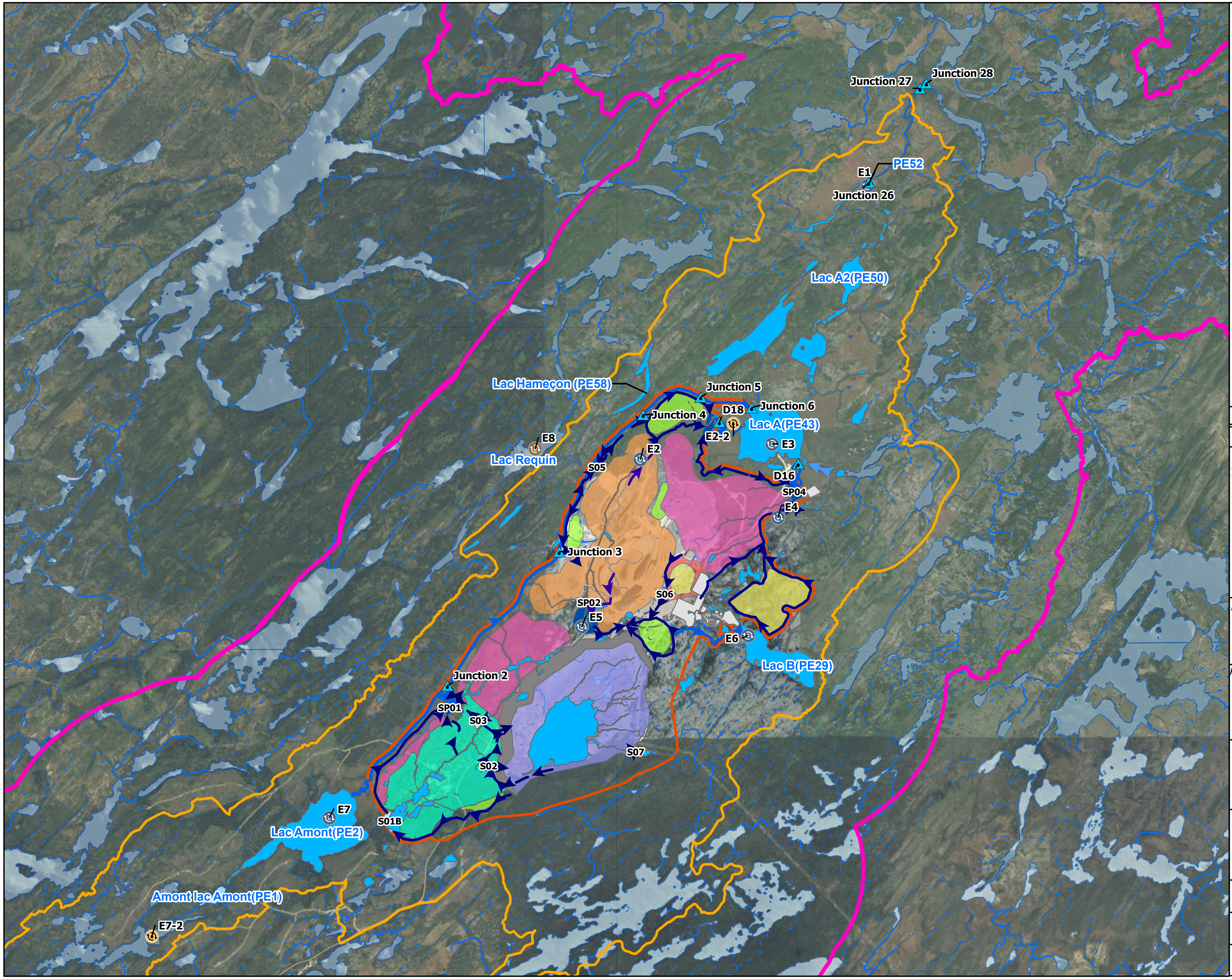
- HST_calcite_pH8: Historical hydrological conditions. Effluent solutions are in equilibrium with calcite and dolomite. Mining effluent with pH 8;
- CC_pre_pH8: Climate change conditions. Mineral precipitation from saturated phases. Mining effluent with pH 8;

To assess the anticipated impact of the project on water quality during the 21st year of operation, predicted surface water quality parameters were compared directly to baseline conditions and regulatory criteria. Water quality parameters that exceed regulatory criteria solely due to the release of mine effluents into the environment are considered impacts. Relative variations between predicted parameters and reference conditions are considered impacts only if the resulting concentration exceeds regulatory criteria. The impacts associated with exceeding regulatory criteria for water quality parameters are described below:

- Prescribed maximum allowable concentrations of deleterious substances (REMMMD, 2002);
- Effluent discharge point requirements (Directive 019, 2025): Determines the maximum concentration of water quality parameters in accordance with the acute lethal toxicity level for rainbow trout (*Oncorhynchus mykiss*) and the daphnia *(Daphnia magna*) test;
- Provincial surface water quality criteria for short- and long-term protection of all aquatic organisms: Acute Toxicity Criterion (ATC): 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 (CALC): highest concentration of a substance that will not produce adverse impacts on aquatic organisms (and their offspring) when exposed daily over their lifetime;

- Federal Surface Water Quality Guidelines for the Protection of Aquatic Life (CCME): These guidelines aim to protect all forms of aquatic life and all aspects of their life cycle, including the most sensitive stages of the most vulnerable species, over the long term, from anthropogenic pressures such as chemical inputs or modifications to physical components.

Map 12.3 shows the locations where water quality parameters have been simulated. Reference conditions are defined by water quality upstream at Lake Amont (E7).



LÉGENDE / LEGEND

- Zone de développement du projet / Project Development Area
- Zone d'étude locale / Local Study Area
- Zone d'étude régionale / Regional Study Area
- Littoral / Body of Water
- Jonctions / Junctions
- Échantillon de qualité de l'eau 2019 / Water Quality Sample 2019
- Échantillon de qualité de l'eau 2022 & 2023 / Water Quality Sample 2022 & 2023
- Échantillon de 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 proposée - Y21 / Proposed Mine Infrastructure - Y21

- Fosse / Open Pit
- Halde à minerai / Ore Stockpile
- Halde à mort-terrain / Overburden Pile
- Halde à stérile / Waste Rock Pile
- Halde à stérile super / Super Waste Rock Pile
- Aire d'entreposage du minerai / ROM Pad
- Parc à résidus miniers / Tailings Management Facility
- Infrastructure existante / Existing Infrastructure
- Infrastructure proposée / Proposed Infrastructure
- Bassin de sédimentation (SP##)/ Sedimentation Pond (SP##)
- Puisard (S##) / Sump (S##)
- Fossé d'eau de contact / Contact Water Ditch
- Conduite d'eau de contact / Contact Water Pipeline
- Direction écoulement / Flow Direction
- Déviation ruisseau Bibou / Bibou Creek Diversion
- Assèchement des fosses / Pit Dewatering

RÉV.	DESCRIPTION	AA/MM/YY	BY	VERIF.
3				

RÉFÉRENCES/REFERENCES

Proposed Infrastructure: 167040485_PublicationDonnes_Infrastructures_Poly, Stantec, 25 January 2024
Base Map: Bing, 06 June 2023

NOTES

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ÉCHELLE (m) / SCALE (m)

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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 Assessement for the Troilus Mine Project

TITRE/TITLE

Année 21 infrastructures projetées / Year 21 Proposed Infrastructure

BluMetric® Environnement — Stantec

NO. PROJET / PROJECT NO.	DATE
240433 / 167040485	06/ 20/ 2025
CONÇU / CHECKED: K. Rausis	RÉVISÉ / VERIFIED: C. Gardois
DESSINÉ / DRAWN: M. Baker	Figure No. 12.3 — ED./REV. 3

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12.4.4.2 Year 21

Year 21 corresponds to the last year of mine operation, during which 15 Mt of ore and waste rock are to be extracted from pit X22, according to the feasibility study (NI 43-101, 2024). Mine effluent will be discharged to the environment via a regulated flow from the sedimentation ponds (Map 12.3). At this stage of mining, a total of 1,550 Mt of material should already have been extracted. In addition, the dewatering of the X22 pit will continue as long as the pit is in operation. Chapter 11 describes pit dewatering in greater detail.

Tables 12.8, 12.9, 12.10, 12.11, 12.12 and 12.13 show the concentrations of various parameters in the reference state of the existing environment, and the simulated concentrations of various parameters in the HST_calcite_pH8 and CC_pre_pH8 scenarios for Junctions 2 (near SP01), 3 (near SP02), 4, 5, Lake A (near SP03 and SP04), the outlet of SP04, and Junctions 26, 27 and 28, respectively. Figures 12.6 to 12.14 compare the predicted concentrations of the parameters of interest for the HST_calcite_pH8 scenario at Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Figure 12.9 illustrates the variability of data between simulated and reference conditions for Year 21 in the form of a box plot. The box plots in this study show the mean values (square inside the box), the values between the 25th, 50thand 75th percentiles define the size of the box, and the ranges are determined by the lower and upper bounds, taking into account an interquartile range coefficient of 1.5.

Table 12-8: General chemistry: existing conditions in the current reference state

Réglementation		Dureté mg/L	pH n/a	Alk mg/L	COD mg/L	F mg/L	Si mg/L	Sulphate mg/L	Cl mg/L	Nitrate (N) mg/L	Nitrite (N) mg/L	Azote ammoniacal mg/L
REMMMD												0.5[a]
CCME (long terme)			6.5-9							2.935483871	0.059956522	0.019[a]
Localisation	**Date**	**État de référence**										
Lac 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
Lac 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
Dénoyage des fosses												
Fosse 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
Fosse 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] Les critères réglementaires concernent l'ammoniac non ionisé.

Table 12.9: Dissolved metals: existing conditions at current reference state

Réglementation[a]		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	Ti mg/L	U mg/L	Zn mg/L	Sn mg/L
REMMMD			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 (dureté 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 (dureté10mg/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 (dureté 40mg/L)					0.165	0.001425046	0.00014				0.0043				0.86			0.024		0.00099									0.055	
CVAA (dureté40mg/L)					0.47	0.012825099	0.0008				0.0059				1.9			0.22		0.025									0.055	
CVAC (dureté 400mg/L)					1.911	0.068822	0.0076				0.0305				6.52			0.169		0.01858									0.388	
CVAA (dureté 400mg/L)					5.45	0.61939	0.0087				0.0517				14.1			1.52		0.477									0.388	
CCME (long terme)		0.005[b]	0.005	1.5			0.00004[d]				0.002[g]	0.3			0.23[i]	0.000026	0.073	0.025[k]		0.001[m]				0.001		0.0008		0.015	0.02[o]	
CCME (long terme)		0.1[c]					0.00037[e]				0.004[h]				1.2[j]			0.15[l]		0.007[n]									0.312[p]	
CCME (long terme)							0.00007[f]																						0.037[q]	
Localisation	**Date**																													
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	0.027296	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	0.0143	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	0.002008661	3.89731E-05	0.00056	0.104	0.000354	0.254012	0.00505	1.80003E-06	0.000630084	0.002380193	0.00671263	7.00025E-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	0.000206248	7.60472E-05	0.0036	0.229998	0.000354	0.340003	0.013001	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	0.239994	0.000354	0.340003	0.0063	2.18001E-06	0.000110016	0.000420033	0.00720016	0.000120002	0.520007	0.840023	0.014	7.07118E-06	1.5002E-05	0.00035356	0.002121	0.000100003	0.0028	3.53566E-06
Fosse J4	Valeurs utilisées	0.10951	0.005625264	0.089498	0.010784	0.000353809	0.001162923	149.6953	0.000552719	0.001993584	0.006689	0.019106	0.0493	11.94542	0.066722	2.40026E-05	0.00932327	0.036182133	2.7556E-05	0.001343547	19.74816	10.48448	0.824644	0.0019102	0.002529564	0.00024258	0.212644	0.019401022	0.135971	7.07607E-07
Fosse 87	Valeurs utilisées	0.109494	0.006733654	0.089482	0.015609	0.000353746	0.001153143	79.25024	0.000552459	0.001992687	0.016389	0.018887	0.049292	12.10511	0.066612	2.39986E-05	0.009321638	0.023415145	4.642E-05	5.54737E-05	19.74503	10.48287	0.824504	0.001909884	0.002529077	0.00024254	0.212606	0.01939769	0.19191	7.07488E-07

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Critère CCME pour:

La concentration d'aluminium dépend des conditions de pH. Des valeurs sont fournies à titre de référence pour[b] pH<6.5 et [c] pH>=6.5

La concentration de cadmium dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [d] 0--17, [e] >=280 et [f] 40 mg/L.

La concentration de cuivre dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [g] 0--82 et [h] >=180 mg/L.

La concentration de manganèse dépend de la dureté de l'eau et des conditions de pH. Des valeurs sont fournies à titre de référence pour une dureté de [i] 10-24 et [j] >=670 mg/L, ainsi que d'un pH de [i] 6.7-6.9 et [j] 6.5-6.7.

La concentration de nickel dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [k] <=60 et [l] >=180 mg/L.

La concentration de plomb dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [m] <=60 et [n] >=180 mg/L.

La concentration de zinc dépend de la dureté, de la concentration en carbone organique dissous (COD) et du pH. Des valeurs sont fournies à titre de référence pour un pH de 6,5 à 6,7 (cas o, p, q), un COD de 8 mg/L (cas o, p, q) et une dureté de [o] 8, [p] 399, and [q] 38 mg/L.

Table 12-10: General chemistry - Existing conditions: Sedimentation pond effluent in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation		Dureté mg/L	pH n/a	Alk mg/L	COD mg/L	F mg/L	Si mg/L	Sulphate mg/L	Cl mg/L	Nitrate (N) mg/L	Nitrite (N) mg/L	Azote ammoniacal mg/L
REMMMD												0.5[a]
CCME (long terme)			6.5-9							2.935483871	0.059956522	0.019[a]
Station	**Date**	**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
Année 21 Conditions historiques												
Jonction 2	Novembre	99.6492365	7.1447	13.84088	8.603318	0.0243066	5.1088297	88.3435	4.43515	0.76137784	0.005249389	0.015692376
	Décembre	160.676592	7.20993	19.72481	8.339858	0.0368702	7.4469969	143.9267	7.234282	1.218086867	0.00839821	0.025105377
	Janvier	196.962035	7.23524	23.21024	8.152647	0.0443955	8.8319676	176.9809	8.899014	1.48958225	0.01027006	0.030701032
	Février	223.576164	7.24987	25.76404	8.009007	0.0499259	9.8474126	201.2265	10.11991	1.688650845	0.011642556	0.034803935
	Mars	334.130777	7.28908	36.37164	7.408592	0.0729273	14.064814	301.9454	15.1921	0.839072029	0.005785058	0.017293692
	Avril	4.56814635	7.57181	5.012157	9.198825	0.0059108	1.491923	1.670099	0.069996	0.327447527	0.002257617	0.006748857
	Mai	80.314209	7.61211	6.009854	7.593768	0.0207767	3.5157228	76.59824	3.845262	0.660666782	0.004555027	0.013616671
	Juin	203.295827	7.58734	8.654946	6.808057	0.0483965	7.0678574	197.6338	9.940535	1.654188583	0.011404953	0.03409365
	Juillet	174.779261	7.50428	8.231623	7.349939	0.04211	6.2975613	169.4594	8.521117	1.424440169	0.009820932	0.029358421
	Août	101.474316	7.4321	6.648342	7.805517	0.0256497	4.1780452	97.31839	4.888201	0.832109531	0.005737055	0.017150192
	Septembre	105.545295	7.57839	6.71646	7.743393	0.026537	4.290345	101.3337	5.09062	0.864960753	0.00596355	0.017827272
	Octobre	117.411772	7.73346	7.122716	7.954304	0.0292955	4.6752528	112.9185	5.673418	0.961202924	0.006627101	0.019810871
Jonction 3	Novembre	245.533032	7.3497	29.80332	7.584551	0.0600654	10.650155	219.9678	10.88492	1.84793374	0.012740747	0.038086835
	Décembre	245.094613	7.36168	31.11428	7.448213	0.0687248	10.692215	219.2377	10.59281	1.850595459	0.012759098	0.038141694
	Janvier	347.113934	7.44839	44.21657	6.479481	0.1048351	14.614596	310.6004	14.75145	2.615209389	0.018030798	0.053900768
	Février	495.012067	7.47691	59.41986	5.669471	0.1358956	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	Mars	425.472163	7.42605	51.07052	6.141448	0.1181929	17.598442	382.3092	18.45137	2.513643779	0.017330545	0.05180745
	Avril	387.528775	7.85021	21.51444	6.799199	0.0951687	12.40345	371.051	18.47477	1.026022797	0.007074007	0.021146841
	Mai	203.766341	7.75232	10.91545	6.34829	0.0485105	6.9212487	195.8279	9.822486	1.638638538	0.011297742	0.033773156
	Juin	261.98928	7.69357	10.99393	5.735426	0.0631336	8.6204667	254.4053	12.73506	2.119989484	0.01461646	0.043694039
	Juillet	236.147714	7.61657	10.21536	6.416878	0.0572783	7.9715433	229.2952	11.47871	1.915457359	0.013206295	0.03947853
	Août	223.090873	7.61294	10.57822	6.619889	0.0548693	7.5984123	215.8852	10.78637	1.806466953	0.01245485	0.037232183
	Septembre	216.788152	7.69726	10.95625	6.589964	0.0530891	7.3875122	209.1226	10.45137	1.750570845	0.01206947	0.036080137
	Octobre	258.626939	7.83949	13.87126	6.758382	0.0630861	8.6204667	248.4688	12.40856	2.076001068	0.014313178	0.042787416
Jonction 4	Novembre	245.141735	7.34904	29.75007	7.572342	0.0597234	10.633331	219.622	10.8672	1.844991839	0.012720464	0.038026201
	Décembre	245.040572	7.36099	31.10187	7.446657	0.0684626	10.689811	219.1897	10.59069	1.850175188	0.012756201	0.038133032
	Janvier	347.102926	7.4478	44.21017	6.479361	0.1045881	14.614596	310.5908	14.75145	2.615209389	0.018030798	0.053900768
	Février	495.012067	7.47644	59.41436	5.669471	0.1356486	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	Mars	425.472163	7.42556	51.06501	6.141448	0.1179459	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	Avril	387.518767	7.84795	21.50894	6.799199	0.0949217	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	Mai	199.663233	7.74828	10.69088	6.220809	0.0472927	6.7824512	191.8991	9.625384	1.605717271	0.011070763	0.033094633
	Juin	256.728299	7.69028	10.76816	5.620514	0.0616232	8.4474204	249.3045	12.48017	2.077542063	0.014323802	0.042819177
	Juillet	232.432902	7.61309	10.04914	6.315971	0.0561308	7.8465654	225.6834	11.29827	1.885337902	0.012998633	0.038857753
	Août	219.932482	7.60958	10.42311	6.526283	0.0538472	7.4908593	212.8305	10.63358	1.780970482	0.012279063	0.036706689
	Septembre	213.517675	7.68798	10.78618	6.490972	0.0520461	7.2763541	205.9815	10.29433	1.724233831	0.011887887	0.035537318
	Octobre	255.952913	7.83627	13.72286	6.688836	0.0621913	8.5315401	245.904	12.28059	2.054707312	0.014166366	0.042348541
Jonction 5	Novembre	244.979612	7.34835	29.7264	7.567793	0.0594422	10.626722	219.4875	10.86082	1.843731025	0.012711771	0.038000215
	Décembre	245.009549	7.36031	31.09351	7.445939	0.0682119	10.68861	219.1705	10.58962	1.850035097	0.012755235	0.038130145
	Janvier	347.092918	7.44722	44.20416	6.479241	0.1043411	14.614596	310.5908	14.7511	2.615209389	0.018030798	0.053900768
	Février	495.00206	7.47598	59.40885	5.669471	0.1354016	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	Mars	425.462155	7.42507	51.05901	6.141448	0.1177008	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	Avril	387.50876	7.84569	21.50338	6.799199	0.0946766	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	Mai	198.143082	7.74447	10.60399	6.173528	0.0466867	6.7307777	190.439	9.552357	1.593529398	0.010986733	0.032843434
	Juin	254.77382	7.68648	10.68092	5.5779	0.0609089	8.3837298	247.4121	12.38517	2.061711837	0.014214659	0.042492908
	Juillet	231.039848	7.60927	9.983474	6.278145	0.0555494	7.7996988	224.3385	11.23091	1.874130662	0.012921364	0.038626766
	Août	218.743583	7.60592	10.3616	6.491211	0.0533114	7.450602	211.6874	10.57651	1.771444329	0.012213384	0.03651035
	Septembre	212.303756	7.69007	10.71916	6.453985	0.0515047	7.2348951	204.8095	10.23583	1.714427496	0.011820276	0.035335204
	Octobre	254.942147	7.83292	13.6635	6.662622	0.0617011	8.4978923	244.9434	12.23273	2.046582064	0.014110346	0.042181075
Jonction 6	Novembre	244.827497	7.34767	29.70267	7.563125	0.0591591	10.620112	219.353	10.85408	1.842610301	0.012704044	0.037977116
	Décembre	244.977525	7.35962	31.0852	7.44522	0.0679592	10.688009	219.1513	10.58856	1.849895007	0.012754269	0.038127257
	Janvier	347.082911	7.44664	44.19815	6.479122	0.1040923	14.613995	310.5812	14.7511	2.615209389	0.018030798	0.053900768
	Février	494.992052	7.47551	59.40334	5.669471	0.1351565	20.219372	444.3736	21.4749	3.714219334	0.025608022	0.07655191
	Mars	425.452148	7.42459	51.0535	6.141448	0.1174538	17.598442	382.3092	18.45137	3.201207936	0.022071019	0.06597849
	Avril	387.50876	7.84344	21.49783	6.799199	0.0944297	12.40345	371.051	18.47477	3.08955581	0.021301223	0.063677284
	Mai	196.623931	7.74065	10.51776	6.126485	0.0460844	6.679705	188.9884	9.479685	1.581341525	0.010902703	0.032592236
	Juin	252.830349	7.68266	10.59428	5.535527	0.0602002	8.3200392	245.539	12.29122	2.046021702	0.014106482	0.042169526
	Juillet	229.647795	7.60545	9.918258	6.24056	0.05497	7.7528321	222.9937	11.16356	1.862923423	0.012844095	0.038395779
	Août	217.56469	7.60226	10.30044	6.456379	0.0527795	7.4103447	210.5539	10.51979	1.761918175	0.012147705	0.036314011
	Septembre	211.079829	7.68665	10.65249	6.417237	0.0509651	7.1934361	203.6376	10.17734	1.704621162	0.011752665	0.035133091
	Octobre	253.94239	7.82958	13.60439	6.636407	0.0612129	8.4648452	243.9828	12.18452	2.038596905	0.014055291	0.042016497
Exutoire SP04	Novembre	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	Décembre	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	Janvier	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	Février	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	Mars	2.75923723	6.49017	3.052154	9.088103	0.0443328	1.491923	2.519462	0.479958	0.050969125	0.000351411	0.001050499
	Avril	2.75923723	7.04409	2.183416	9.088103	0.0443328	1.491923	2.519558	0.479958	0.064734418	0.000446317	0.001334209
	Mai	776.554412	7.91436	21.51619	4.663871	0.1795615	23.759609	761.5733	38.35336	6.290063294	0.043367412	0.129641337
	Juin	794.084678	7.86843	22.03742	4.564041	0.1826981	24.312997	778.7008	39.2077	6.430574062	0.044336176	0.132537334
	Juillet	785.482168	7.82335	21.78041	4.612999	0.1811593	24.04141	770.2955	38.78939	6.361649537	0.04386097	0.131116765
	Août	752.030855	7.78119	20.78456	4.803561	0.1751729	22.985708	737.6255	37.15869	6.093656418	0.042013267	0.125593293
	Septembre	786.453904	7.89875	21.81089	4.607492	0.1813341	24.072054	771.2465	38.83902	6.369494605	0.043915059	0.131278456
	Octobre	785.233981	7.98086	21.77555	4.614435	0.1811156	24.033599	770.0554	38.77876	6.359688271	0.043847448	0.131076342
Lac A	Novembre	241.16463	7.51747	15.98167	6.728816	0.0624686	8.7826975	228.7573	11.47765	1.914476725	0.013199534	0.039458319
	Décembre	247.174174	7.4789	18.0669	6.776816	0.0638555	9.1960858	232.8783	11.6471	1.949779531	0.013442932	0.040185927
	Janvier	259.254319	7.46859	20.22546	6.736118	0.0670891	9.7608895	243.0606	12.11681	2.034814462	0.014029213	0.041938539
	Février	281.883463	7.46654	23.64883	6.638801	0.0728038	10.742086	262.6473	13.04879	2.197459528	0.015150584	0.045290735
	Mars	297.193046	7.45683	26.03921	6.584458	0.0765465	11.42646	275.8171	13.67555	2.306870206	0.015904926	0.047545744
	Avril	323.057704	7.71107	24.91214	6.619051	0.0814766	11.769548	302.9252	15.04285	2.529614096	0.017440654	0.052136606
	Mai	239.469338	7.68082	13.11695	6.346494	0.064283	8.3344597	229.7467	11.56485	1.921060979	0.013244929	0.039594023
	Juin	253.863167	7.59621	11.24243	6.075613	0.068039	8.5748017	245.9808	12.40785	2.053166317	0.014155741	0.04231678
	Juillet	246.350456	7.57107	10.18893	6.182864	0.0660498	8.3098247	239.4488	12.08455	1.999371566	0.013784849	0.041208044
	Août	220.257719	7.55719	9.436928	6.363851	0.0601983	7.5263097	213.9737	10.79665	1.790496636	0.012344742	0.036903027
	Septembre	219.965511	7.64646	9.492033	6.389706	0.0599818	7.5010738	213.6278	10.77964	1.787694826	0.012325424	0.036845281
	Octobre	235.956662	7.79151	10.67752	6.465955	0.062898	7.964333	228.6036	11.51522	1.911394735	0.013178284	0.039394797
Jonction 26	Mai	186.784459	7.45108	11.93287	7.061103	0.0501235	6.8857983	178.0184	8.946162	1.497147136	0.010322217	0.030856948
	Juin	200.078469	7.39069	9.884875	6.749165	0.0539289	7.0468274	193.2823	9.746978	1.621127226	0.011177009	0.033412239
	Juillet	194.003851	7.35263	9.054746	6.835588	0.0523235	6.8341248	187.9798	9.484293	1.577418991	0.010875658	0.032511391
	Août	176.281447	7.34016	8.522164	6.941642	0.0484592	6.2963595	170.7082	8.610451	1.435787499	0.009899167	0.029592295
	Septembre	174.995484	7.42722	8.543235	6.975877	0.0480109	6.2470894	169.4018	8.544868	1.425000531	0.009824795	0.029369971
	Octobre	192.59284	7.5677	9.602343	6.977912	0.0515731	6.7518076	186.0874	9.371208	1.562709489	0.010774242	0.032208221
Jonction 27	Mai	188.982125	7.44806	12.51791	7.093901	0.0501729	7.0179864	179.6802	9.021316	1.511156186	0.010418803	0.031145682
	Juin	194.488238	7.37209	9.738829	6.819189	0.0522513	6.8882017	187.8069	9.470468	1.576158176	0.010866966	0.032485405
	Juillet	188.549725	7.34659	8.931873	6.903458	0.0506839	6.6809067	182.6389	9.214164	1.533570665	0.010573342	0.031607655
	Août	171.69898	7.32003	8.422014	7.001732	0.0470248	6.1683774	166.203	8.382862	1.398859644	0.009644565	0.028831194
	Septembre	170.312941	7.40337	8.439681	7.036924	0.0465537	6.1167039	164.7909	8.312316	1.387302178	0.009564881	0.028592989
	Octobre	188.064413	7.54353	9.485226	7.031417	0.0501786	6.6250272	181.6495	9.147164	1.52628596	0.010523117	0.031457514
Jonction 28	Mai	46.2978153	7.17841	6.716059	8.724933	0.0149892	2.7462078	41.95228	2.095166	0.380639888	0.002624356	0.007845178
	Juin	42.6906738	7.1572	5.940685	8.720863	0.0142074	2.5758654	39.05896	1.958223	0.356530314	0.002458131	0.007348267
	Juillet	44.6265343	7.16064	5.842687	8.698719	0.0145393	2.6224316	41.09831	2.062339	0.373229101	0.002573262	0.007692438
	Août	41.2642914	7.14786	5.741686	8.716075	0.0139899	2.5194451	37.81978	1.896504	0.346331725	0.002387816	0.007138069
	Septembre	40.4744959	7.12182	5.742787	8.7302	0.0140712	2.4942092	37.02441	1.856375	0.339803508	0.002342806	0.00700352
	Octobre	47.7249915	7.1041	6.0558	8.688903	0.0157981	2.6996415	44.01373	2.205664	0.397296648	0.002739198	0.008188482

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Table 12-11: Dissolved metals - Existing conditions: Effluent from sedimentation ponds in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation[a]		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	Ti mg/L	U mg/L	Zn mg/L	Sn mg/L
REMMMD			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 (dureté 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 (dureté10mg/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 (dureté 40mg/L)					0.165	0.001425046	0.00014				0.0043				0.86			0.024		0.00099									0.055	
CVAA (dureté40mg/L)					0.47	0.012825099	0.0008				0.0059				1.9			0.22		0.025									0.055	
CVAC (dureté 400mg/L)					1.911	0.068822	0.0076				0.0305				6.52			0.169		0.01858									0.388	
CVAA (dureté 400mg/L)					5.45	0.61939	0.0087				0.0517				14.1			1.52		0.477									0.388	
CCME (long terme)		0.005[b]	0.005	1.5			0.00004[d]				0.002[g]	0.3			0.23[i]	0.000026	0.073	0.025[k]		0.001[m]				0.001		0.0008		0.015	0.02[o]	
CCME (long terme)		0.1[c]					0.00037[e]				0.004[h]				1.2[j]			0.15[l]		0.007[n]									0.312[p]	
CCME (long terme)							0.00007[f]																						0.037[q]	
Station	**Date**																													
Effluent (pH 8)	n/a	0.398706202	0.034727	0.275817	0.055676	3.98717E-05	0.001822568	289.5395	0.006491	0.00378107	0.05632	1.260813	0.035536	46.3083	0.251572	0.001001526	0.050201	0.050199	3.987252382	0.002515822	50.1944	25.0428	0.85245	0.003987164	0.005019921	0.00010015	0.01001	0.16351396	0.14145	2.0925E-05
	n/a	6.03712E-09	0.034726	0.275817	0.007301	3.98708E-05	0.001781649	301.9436	0.006671	0.00378023	0.006092	0.018333	0.035535	13.9472	0.250463	0.001001526	0.0502	0.04789	6.96693E-06	5.09857E-05	50.1944	25.0405	0.85243	0.003987085	0.005019921	0.00010015	0.01001	0.163511579	0.12408	2.0925E-05
	n/a	0.203033383	0.034727	0.275817	0.007589	3.98717E-05	0.001809753	326.1467	0.006671	0.003772667	0.015595	0.020547	0.035536	14.9629	0.251254	0.001001526	0.050201	0.04956	3.2795E-05	9.57513E-05	50.1944	25.0428	0.85244	0.003987164	0.005019921	0.00010015	0.01001	0.163511579	0.13576	2.0925E-05
Jonction 2	Novembre	0.09839088	0.004209	0.092494	0.004531	9.11672E-06	0.00022367	36.90943	0.000946	0.000441073	0.007922	0.020195	0.004192	1.81797	0.045631	0.000111769	0.005886	0.00782	0.00144474	0.000186167	5.85262	3.18477	0.10093	0.000669715	0.000657248	0.00032291	0.00296	0.01788454	0.03183	2.2879E-06
	Décembre	0.107192258	0.006611	0.107374	0.0048	1.15698E-05	0.000348495	59.64408	0.00141	0.000703079	0.008578	0.019849	0.006657	2.85219	0.061926	0.000181704	0.009371	0.011118	0.000577908	0.000188088	9.3398	4.90579	0.16005	0.000932202	0.001000892	0.00030778	0.00353	0.029327542	0.04012	3.75242E-06
	Janvier	0.112143371	0.008037	0.115991	0.004945	1.30109E-05	0.000422632	73.16239	0.001686	0.000858815	0.008953	0.019731	0.008122	3.46662	0.071551	0.000223297	0.011442	0.01307	0.000401017	0.000190309	11.4124	5.92745	0.19517	0.001087358	0.001204864	0.0002976	0.00386	0.036135169	0.04499	4.6234E-06
	Février	0.115713028	0.009083	0.122261	0.005049	1.40635E-05	0.000477006	83.07769	0.001889	0.000973011	0.009225	0.019667	0.009197	3.91724	0.078594	0.000253786	0.012961	0.0145	0.000322251	0.000192178	12.9325	6.67669	0.22093	0.001201061	0.001354458	0.0002899	0.0041	0.041126635	0.04855	5.2623E-06
	Mars	0.130509704	0.013429	0.148281	0.004901	1.84371E-05	0.000702846	124.2658	0.00273	0.001447445	0.01036	0.019514	0.01366	5.78896	0.107854	0.000380499	0.019272	0.020441	0.000169216	0.000200557	19.2469	9.78881	0.32794	0.001673162	0.001975556	0.00025775	0.00511	0.061866094	0.06333	7.91641E-06
	Avril	0.129058097	0.000473	0.070702	0.004197	5.39875E-06	2.94727E-05	1.485211	0.000987	3.3007E-05	0.003817	0.01847	0.000354	0.20874	0.020616	2.73344E-06	0.000458	0.00272	0.009152747	0.000145977	0.42136	0.51056	0.0089	0.000265629	0.000123672	0.0003536	0.00212	3.46165E-05	0.01905	3.53566E-09
	Mai	0.100611461	0.003655	0.081221	0.003963	7.98218E-06	0.000191621	29.71904	0.00144	0.000383513	0.003718	0.017439	0.003639	1.4827	0.039777	9.69171E-05	0.005108	0.006653	0.000388845	0.000165008	5.07887	2.76797	0.08761	0.000584422	0.000571505	0.000228514	0.0026	0.015501871	0.02661	1.98305E-06
	Juin	0.080035339	0.008874	0.112002	0.004407	1.32001E-05	0.00045857	75.51898	0.002329	0.000954581	0.004085	0.017023	0.009	3.57575	0.074677	0.000249173	0.012688	0.013521	8.62031E-05	0.000169595	12.6647	6.5045	0.21616	0.001149973	0.001317078	0.000224403	0.00379	0.04042445	0.04249	5.17279E-06
	Juillet	0.089867412	0.007675	0.107576	0.004467	1.21935E-05	0.00039744	64.89029	0.002153	0.000822626	0.004137	0.017905	0.007763	3.09573	0.067338	0.000213749	0.010938	0.012025	0.000117514	0.000169303	10.9112	5.65272	0.18652	0.001028375	0.00114799	0.000226742	0.00359	0.034611784	0.03953	4.42871E-06
	Août	0.101952443	0.004564	0.089133	0.004196	9.07617E-06	0.000238284	37.59116	0.001622	0.00048222	0.003913	0.018126	0.004567	1.84779	0.046508	0.000123006	0.006419	0.007928	0.000327981	0.000166543	6.38944	3.42479	0.10988	0.000690932	0.000703408	0.000229143	0.00288	0.019756876	0.03003	2.52757E-06
	Septembre	0.100762557	0.004736	0.089879	0.004194	9.22847E-06	0.000247041	39.10811	0.001649	0.000501071	0.003911	0.018032	0.004744	1.91655	0.047588	0.000128057	0.006669	0.008145	0.000253765	0.000166616	6.64006	3.54709	0.11413	0.00070869	0.000727711	0.000228867	0.00291	0.020585454	0.03049	2.6337E-06
	Octobre	0.102810456	0.005248	0.095009	0.004367	9.89357E-06	0.000273402	43.5207	0.001758	0.000556531	0.004041	0.018284	0.005266	2.12253	0.051554	0.000142654	0.007406	0.008884	0.000192341	0.0001642	7.37629	3.91907	0.12665	0.000770847	0.00080263	0.000229574	0.00309	0.022961935	0.03259	2.93772E-06
Jonction 3	Novembre	0.11698116	0.0098	0.125007	0.004204	2.49394E-05	0.000538166	90.46406	0.002196	0.001089785	0.009973	0.019227	0.011206	4.77034	0.083286	0.000270034	0.013999	0.015814	0.000206518	0.000341238	14.2842	7.3519	0.25841	0.001304735	0.001501301	0.000277749	0.01049	0.044266236	0.0553	5.6113E-06
	Décembre	0.117601736	0.009652	0.124174	0.004569	3.9376E-05	0.000564419	90.56426	0.002146	0.001127543	0.010368	0.019181	0.012858	4.60312	0.082671	0.000258741	0.013772	0.016152	0.00018968	0.000348013	14.4996	7.48087	0.28281	0.001332213	0.001544891	0.000280027	0.01936	0.043085613	0.06144	5.38469E-06
	Janvier	0.13060414	0.013383	0.145265	0.00446	6.83367E-05	0.000817149	128.0773	0.002834	0.001628866	0.01199	0.018907	0.019821	6.63065	0.108107	0.000355626	0.019173	0.02215	9.26518E-05	0.000369471	20.6744	10.5576	0.42341	0.001808974	0.00218961	0.000248859	0.03562	0.060114201	0.08531	7.43315E-06
	Février	0.150249398	0.019148	0.179759	0.003982	7.49174E-05	0.001118598	182.3389	0.003949	0.002261219	0.013522	0.018849	0.025839	9.64349	0.146937	0.000523359	0.027544	0.03006	5.80882E-05	0.000380709	29.0751	14.699	0.56689	0.002437574	0.003017213	0.00020581	0.03742	0.08760416	0.10527	1.09473E-05
	Mars	0.141267244	0.016519	0.164334	0.004311	6.6463E-05	0.00096839	157.3743	0.003448	0.001952493	0.01269	0.018994	0.022417	7.89426	0.12917	0.000449442	0.02373	0.02626	7.87942E-05	0.000374286	25.0812	12.723	0.49091	0.002135552	0.002615648	0.00022637	0.03327	0.075236178	0.09376	9.39447E-06
	Avril	0.065897013	0.016316	0.16495	0.0036	3.25953E-05	0.000866026	142.3009	0.003844	0.00180813	0.005709	0.018231	0.018024	7.82013	0.12705	0.000459371	0.023457	0.024004	3.20362E-05	0.000319647	23.7784	12.037	0.4208	0.002018612	0.002437879	0.00023426	0.01265	0.075298065	0.07236	9.57717E-06
	Mai	0.072472414	0.008764	0.107989	0.003553	1.44258E-05	0.00045639	75.21438	0.002441	0.000949315	0.004317	0.016021	0.009089	3.8747	0.073117	0.000245743	0.012539	0.01333	7.40428E-05	0.000306159	12.5642	6.44242	0.21661	0.001132128	0.001305632	0.000222738	0.00463	0.039957913	0.042	5.10477E-06
	Juin	0.059289234	0.011264	0.121169	0.004019	1.89833E-05	0.000589128	97.19316	0.002841	0.001231264	0.004664	0.015391	0.011928	4.68625	0.089483	0.000317875	0.016172	0.01665	4.71018E-05	0.000306842	16.2672	8.26298	0.28242	0.001404462	0.001671034	0.000199773	0.00648	0.05187364	0.05013	6.61856E-06
	Juillet	0.071290622	0.010207	0.118726	0.004264	1.76675E-05	0.000534158	87.63455	0.002709	0.001112641	0.004583	0.016602	0.010769	4.20695	0.083379	0.000286703	0.014626	0.015358	5.82462E-05	0.000311318	14.7014	7.50754	0.25522	0.001300392	0.001520904	0.000222791	0.00602	0.046722695	0.04767	5.96209E-06
	Août	0.074981697	0.009627	0.116229	0.004105	1.81496E-05	0.00050683	82.66488	0.002618	0.00105256	0.004618	0.01693	0.010294	4.0497	0.079765	0.000269132	0.013778	0.014659	6.6671E-05	0.000312416	13.8834	7.11051	0.2428	0.001243383	0.0014431	0.000223745	0.00653	0.04388777	0.04657	5.59409E-06
	Septembre	0.075154379	0.009334	0.113937	0.003891	1.74872E-05	0.000491069	80.18005	0.002563	0.001019508	0.00456	0.016779	0.009954	4.02588	0.077655	0.000260867	0.013356	0.014244	6.91118E-05	0.000312064	13.451	6.8944	0.23499	0.001208957	0.001399388	0.000223674	0.00624	0.042521484	0.04539	5.42089E-06
	Octobre	0.074514916	0.011039	0.127223	0.003858	2.07785E-05	0.000581641	95.32953	0.002887	0.001210172	0.004875	0.017371	0.011866	4.99978	0.089917	0.00030941	0.01582	0.016637	5.21257E-05	0.000314426	15.956	8.14482	0.27945	0.001407857	0.001651674	0.000240042	0.00755	0.050512115	0.05199	6.43657E-06
Jonction 4	Novembre	0.11679229	0.009785	0.124812	0.004197	2.48998E-05	0.000537384	90.31978	0.002373	0.001088048	0.01035	0.019196	0.011188	4.76281	0.083154	0.000269613	0.013977	0.01579	0.00020767	0.000485304	14.2615	7.34017	0.258	0.001302603	0.001498866	0.000277704	0.01047	0.044197208	0.05525	5.60228E-06
	Décembre	0.117577453	0.00965	0.124142	0.004568	3.9367E-05	0.000564374	90.54422	0.002326	0.001127318	0.01076	0.019176	0.012855	4.60215	0.082654	0.000258681	0.013769	0.016149	0.000190365	0.000492556	14.4965	7.47926	0.28274	0.001331897	0.001544526	0.000280021	0.01935	0.043076092	0.06146	5.3835E-06
	Janvier	0.130601441	0.013383	0.145265	0.00446	6.83358E-05	0.000817216	128.0733	0.003015	0.001628866	0.012383	0.018907	0.01982	6.6304	0.108107	0.000355626	0.019172	0.022151	9.28841E-05	0.000514022	20.674	10.5574	0.4234	0.001808974	0.00218961	0.000248857	0.03562	0.060111821	0.08535	7.43303E-06
	Février	0.150249398	0.019148	0.179759	0.003982	7.49174E-05	0.001118677	182.3389	0.004129	0.002261219	0.013916	0.018849	0.025839	9.64349	0.146937	0.000523359	0.027544	0.030061	5.81997E-05	0.000525314	29.0751	14.699	0.56689	0.002437574	0.003017213	0.00020581	0.03742	0.08760416	0.10531	1.09473E-05
	Mars	0.141267244	0.016519	0.164334	0.004311	6.6463E-05	0.000968848	157.3743	0.003628	0.001952521	0.013083	0.018994	0.022417	7.89426	0.12917	0.000449442	0.02373	0.026261	7.89614E-05	0.000518891	25.0812	12.723	0.49091	0.002135552	0.002615648	0.00022637	0.03327	0.075236178	0.09379	9.39447E-06
	Avril	0.065897013	0.016316	0.16495	0.0036	3.25953E-05	0.000866105	142.2969	0.004024	0.001808158	0.006103	0.018231	0.018024	7.82013	0.127055	0.000459371	0.023457	0.024005	3.22375E-05	0.000464252	23.7784	12.037	0.4208	0.002018612	0.002437879	0.00023426	0.01265	0.075298065	0.0724	9.57717E-06
	Mai	0.071018109	0.008588	0.105821	0.003482	1.41356E-05	0.000447318	73.69943	0.002572	0.000930268	0.004624	0.015699	0.008906	3.79693	0.07165	0.000240808	0.012286	0.013064	7.69512E-05	0.00044461	12.3121	6.31299	0.21227	0.001109388	0.001279454	0.000222282	0.00454	0.039155756	0.04119	5.00232E-06
	Juin	0.058102046	0.011038	0.118748	0.003939	1.86029E-05	0.000577415	95.24136	0.002964	0.001206615	0.004768	0.015083	0.011689	4.59219	0.087692	0.000311516	0.015848	0.016318	4.87837E-05	0.000445314	15.9415	8.09746	0.27676	0.001376352	0.00163755	0.000199572	0.00635	0.050835834	0.04916	6.48608E-06
	Juillet	0.07016819	0.010047	0.116856	0.004197	1.7389E-05	0.000525839	86.25587	0.002846	0.001095163	0.004904	0.016341	0.0106	4.14084	0.082072	0.00028219	0.014395	0.015117	6.00798E-05	0.000451033	14.4699	7.3896	0.2512	0.001279942	0.001496917	0.00022431	0.00593	0.045987185	0.04695	5.86831E-06
	Août	0.073921322	0.00949	0.114586	0.004047	1.78928E-05	0.000499748	81.49461	0.002761	0.001037714	0.004946	0.016691	0.010148	3.99234	0.078638	0.00026534	0.013584	0.014452	6.86317E-05	0.000452608	13.6871	7.00981	0.23936	0.001225775	0.001422766	0.0002341	0.00643	0.043266515	0.04594	5.51503E-06
	Septembre	0.07402655	0.009194	0.112229	0.003833	1.7225E-05	0.000483785	78.96969	0.002705	0.001004215	0.004885	0.016527	0.009805	3.9656	0.07649	0.000256936	0.013156	0.014031	7.16113E-05	0.000451965	13.2488	6.79072	0.23146	0.001190796	0.001378445	0.00023318	0.00615	0.041883567	0.04474	5.33946E-06
	Octobre	0.073745942	0.010925	0.125904	0.003818	2.05649E-05	0.000575728	94.34361	0.003037	0.001197708	0.005218	0.017192	0.011744	4.94825	0.088989	0.000306241	0.015657	0.016466	5.32904E-05	0.000455799	15.7918	8.0609	0.27656	0.001393328	0.001634628	0.00023794	0.00747	0.049993212	0.05149	6.37033E-06
Jonction 5	Novembre	0.116722138	0.009779	0.124737	0.004195	2.48844E-05	0.000537148	90.25966	0.002552	0.001087404	0.010737	0.019184	0.011181	4.75989	0.08311	0.000269453	0.013968	0.015781	0.000208571	0.000629598	14.2529	7.33558	0.25784	0.001301814	0.001497892	0.00027688	0.01047	0.044168645	0.05525	5.59884E-06
	Décembre	0.11756666	0.009649	0.124131	0.004567	3.93643E-05	0.000564408	90.53219	0.002506	0.001127234	0.011152	0.019174	0.012853	4.60191	0.082649	0.000258661	0.013767	0.016149	0.000191018	0.000637099	14.4953	7.47857	0.28272	0.001331818	0.001544404	0.00028017	0.01935	0.043071331	0.06149	5.38302E-06
	Janvier	0.130598743	0.013382	0.145265	0.00446	6.83349E-05	0.000817295	128.0692	0.003195	0.001628866	0.012777	0.018907	0.01982	6.6304	0.108107	0.000355606	0.019172	0.022151	9.31133E-05	0.000658606	20.6736	10.5574	0.4234	0.001808974	0.00218961	0.00024857	0.03562	0.060111821	0.08539	7.43303E-06
	Février	0.150249398	0.019148	0.179759	0.003982	7.49174E-05	0.001118767	182.3349	0.00431	0.002261247	0.014309	0.018849	0.025839	9.64349	0.146937	0.000523359	0.027544	0.030062	5.83081E-05	0.000669919	29.0751	14.699	0.56689	0.002437574	0.003017213	0.00020581	0.03742	0.08760416	0.10535	1.09473E-05
	Mars	0.141267244	0.016519	0.164334	0.004311	6.6463E-05	0.000968559	157.3703	0.003809	0.001952549	0.013477	0.018994	0.022417	7.89426	0.12917	0.000449442	0.02373	0.026261	7.91256E-05	0.000663496	25.0812	12.723	0.49091	0.002135552	0.002615648	0.00022637	0.03327	0.075236178	0.09383	9.39447E-06
	Avril	0.065897013	0.016316	0.16495	0.0036	3.25953E-05	0.000866195	142.2929	0.004205	0.001808186	0.006496	0.018231	0.018024	7.82013	0.127055	0.000459371	0.023457	0.024006	3.24419E-05	0.000608857	23.7784	12.037	0.4208	0.002018612	0.002437879	0.00023426	0.01265	0.075298065	0.07243	9.57717E-06
	Mai	0.07047578	0.008523	0.105016	0.003455	1.40284E-05	0.000444002	73.13834	0.002733	0.00092321	0.004982	0.01558	0.008839	3.768	0.071106	0.000238983	0.012193	0.012965	7.86269E-05	0.000585837	12.2182	6.26494	0.21065	0.001100939	0.001269713	0.00022112	0.0045	0.03885822	0.04091	4.96421E-06
	Juin	0.057659549	0.010954	0.117851	0.003909	1.84615E-05	0.000573109	94.51595	0.003122	0.001197484	0.005125	0.014968	0.0116	4.55743	0.087033	0.000309149	0.015728	0.016195	4.98027E-05	0.000586521	15.8203	8.03584	0.27465	0.001365929	0.001625131	0.00019424	0.0063	0.050450227	0.04882	6.43681E-06
	Juillet	0.069747278	0.009986	0.116164	0.004172	1.72854E-05	0.000522781	85.73887	0.00301	0.001088637	0.005268	0.016244	0.010536	4.11605	0.081583	0.000280505	0.014309	0.015027	6.12537E-05	0.000592924	14.3835	7.34523	0.2497	0.001272282	0.001488029	0.00022298	0.00589	0.045713452	0.04671	5.83317E-06
	Août	0.073524694	0.009439	0.11397	0.004025	1.77973E-05	0.000497151	81.05375	0.002927	0.00103214	0.005313	0.016601	0.010094	3.97095	0.078215	0.000263916	0.013511	0.014376	6.99016E-05	0.000594788	13.6136	6.97211	0.23808	0.001219221	0.001415095	0.00023283	0.0064	0.043035627	0.04573	5.48547E-06
	Septembre	0.07360294	0.009142	0.111592	0.003811	1.71268E-05	0.000481109	78.52082	0.00287	0.000998528	0.005251	0.016433	0.009749	3.943	0.076056	0.000255471	0.01308	0.013952	7.25777E-05	0.000594001	13.1734	6.7521	0.23013	0.001184005	0.001370531	0.00023185	0.00611	0.041643158	0.04452	5.30907E-06
	Octobre	0.07345724	0.010882	0.125418	0.003803	2.04838E-05	0.000573559	93.97089	0.003206	0.001193058	0.005591	0.017124	0.011698	4.92881	0.088643	0.000305037	0.015596	0.016402	5.40647E-05	0.000598601	15.7296	8.02918	0.27549	0.00138788	0.001628296	0.000237	0.00744	0.049795648	0.05132	6.34529E-06

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Critère CCME pour:

La concentration d'aluminium dépend des conditions de pH. Des valeurs sont fournies à titre de référence pour [b] pH<6.5 et [c] pH>=6.5

La concentration de cadmium dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [d] 0--17, [e] >=280 et [f] 40 mg/L.

La concentration de cuivre dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [g] 0--82 et [h] >=180 mg/L.

La concentration de manganèse dépend de la dureté de l'eau et des conditions de pH. Des valeurs sont fournies à titre de référence pour une dureté de [i] 10-24 et [j] >=670 mg/L, ainsi que d'un pH de [i] 6.7-6.9 et [j] 6.5-6.7.

La concentration de nickel dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [k] <=60 et [l] >=180 mg/L.

La concentration de plomb dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [m] <=60 et [n] >=180 mg/L.

La concentration de zinc dépend de la dureté, de la concentration en carbone organique dissous (COD) et du pH. Des valeurs sont fournies à titre de référence pour un pH de 6.5 à 6.7 (cas o, p, q), un COD de 8 mg/L (cas o, p, q) et une dureté de [o] 8, [p] 399, [q] 38 mg/L.

Table 12-11: Dissolved metals - Existing conditions: Effluent from sedimentation ponds in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation[a]		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	Ti mg/L	U mg/L	Zn mg/L	Sn mg/L
REMMMD			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 (dureté 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 (dureté10mg/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 (dureté 40mg/L)					0.165	0.001425046	0.00014				0.0043				0.86			0.024		0.00099									0.055	
CVAA (dureté40mg/L)					0.47	0.012825099	0.0008				0.0059				1.9			0.22		0.025									0.055	
CVAC (dureté 400mg/L)					1.911	0.068822	0.0076				0.0305				6.52			0.169		0.01858									0.388	
CVAA (dureté 400mg/L)					5.45	0.61939	0.0087				0.0517				14.1			1.52		0.477									0.388	
CCME (long terme)		0.005[b]	0.005	1.5			0.00004[d]				0.002[g]	0.3			0.23[i]	0.000026	0.073	0.025[k]		0.001[m]				0.001		0.0008		0.015	0.02[o]	
CCME (long terme)		0.1[c]					0.00037[e]				0.004[h]				1.2[j]			0.15[l]		0.007[n]									0.312[p]	
CCME (long terme)							0.00007[f]																						0.037[q]	
Station	**Date**																													
Jonction 6	Novembre	0.116649288	0.009773	0.124661	0.004192	2.48691E-05	0.000536901	90.20355	0.002731	0.00108676	0.011124	0.019173	0.011175	4.75697	0.083061	0.000269272	0.01396	0.015772	0.000209479	0.000773809	14.2439	7.33121	0.25768	0.001301024	0.001497039	0.00027671	0.01046	0.044142461	0.05525	5.5954E-06
	Décembre	0.117555867	0.009648	0.12412	0.004567	3.93607E-05	0.000564442	90.52017	0.002686	0.00112715	0.011544	0.019173	0.012852	4.60142	0.082643	0.000258621	0.013766	0.016148	0.000191675	0.000781641	14.4941	7.47788	0.2827	0.00133166	0.001544282	0.00028015	0.01935	0.043068951	0.06152	5.38255E-06
	Janvier	0.130598743	0.013382	0.145265	0.00446	6.8334E-05	0.000817362	128.0652	0.003375	0.001628894	0.01317	0.018906	0.01982	6.6304	0.108107	0.000355606	0.019172	0.022152	9.33425E-05	0.000803211	20.6736	10.5574	0.42339	0.001808974	0.002189488	0.00024857	0.03562	0.060111821	0.08542	7.43291E-06
	Février	0.150249398	0.019148	0.179759	0.003982	7.49174E-05	0.001118845	182.3309	0.00449	0.002261275	0.014703	0.018849	0.025839	9.64349	0.146943	0.000523359	0.027544	0.030063	5.84196E-05	0.000814503	29.0751	14.699	0.56689	0.002437574	0.003017213	0.00020581	0.03742	0.08760416	0.10538	1.09473E-05
	Mars	0.141267244	0.016519	0.164334	0.004311	6.6463E-05	0.000968649	157.3663	0.003989	0.001952577	0.01387	0.018994	0.022417	7.89426	0.129176	0.000449442	0.02373	0.026262	7.92928E-05	0.000808101	25.0812	12.723	0.49091	0.002135552	0.002615648	0.00022637	0.03327	0.075236178	0.09387	9.39447E-06
	Avril	0.065897013	0.016316	0.16495	0.0036	3.25953E-05	0.000866274	142.2929	0.004385	0.001808214	0.00689	0.018231	0.018024	7.82013	0.127055	0.000459371	0.023457	0.024007	3.26463E-05	0.000753462	23.7784	12.037	0.4208	0.002018612	0.002437879	0.00023426	0.01265	0.075298065	0.07247	9.57717E-06
	Mai	0.069938847	0.008458	0.104217	0.003429	1.3922E-05	0.000440697	72.57725	0.002893	0.000916207	0.005338	0.015461	0.008771	3.73932	0.070568	0.000237158	0.0121	0.012867	8.0349E-05	0.000725967	12.1252	6.21735	0.20904	0.00109257	0.001259972	0.00021945	0.00447	0.038560683	0.04063	4.92647E-06
	Juin	0.057222448	0.010871	0.116953	0.003879	1.83218E-05	0.000568849	93.79454	0.003279	0.001188408	0.00548	0.014855	0.011512	4.52292	0.086374	0.000306802	0.015608	0.016073	5.08496E-05	0.000726671	15.7003	7.97492	0.27257	0.001355585	0.001612833	0.00019276	0.00625	0.050067001	0.04849	6.3879E-06
	Juillet	0.069231763	0.009927	0.115462	0.004147	1.71817E-05	0.000519735	85.22186	0.003172	0.001082166	0.00563	0.016146	0.010473	4.0915	0.081094	0.00027882	0.014224	0.014939	6.24524E-05	0.000733985	14.2975	7.30132	0.24821	0.001264702	0.00147914	0.00022163	0.00586	0.045439719	0.04646	5.79827E-06
	Août	0.073130763	0.009389	0.113364	0.004004	1.77017E-05	0.000494565	80.6169	0.003092	0.001026623	0.005678	0.016512	0.01004	3.94956	0.077798	0.000262492	0.013438	0.014299	7.11963E-05	0.000736202	13.5405	6.93486	0.2368	0.001212668	0.001407546	0.00023159	0.00636	0.042804739	0.04552	5.45591E-06
	Septembre	0.073184726	0.009089	0.110954	0.003789	1.70285E-05	0.000478445	78.06794	0.003034	0.000992842	0.005614	0.01634	0.009693	3.9204	0.075622	0.000254027	0.013006	0.013873	7.38972E-05	0.000735208	13.0983	6.71347	0.22883	0.001177215	0.001362738	0.00023052	0.00608	0.041407509	0.0443	5.2788E-06
	Octobre	0.073168537	0.01084	0.12492	0.003789	2.04036E-05	0.000571389	93.60217	0.003374	0.001182408	0.005963	0.017057	0.011653	4.90961	0.088296	0.000303834	0.015534	0.016338	5.48545E-05	0.000740864	15.6683	7.99791	0.2744	0.001382432	0.001621843	0.00023606	0.00741	0.049600464	0.05116	6.32048E-06
Exutoire SP04	Novembre	0.239339742	0.000225	0.070702	0.005665	1.30091E-05	7.94981E-05	0.571753	0.000109	4.82136E-05	0.006274	0.029477	0.000354	0.32335	0.017624	2.18001E-06	0.000169	0.00077	0.01729451	0.000184771	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00875	3.53578E-09
	Décembre	0.239339742	0.000225	0.070702	0.005665	1.30091E-05	7.94981E-05	0.571753	0.000109	4.82136E-05	0.006274	0.029477	0.000354	0.32335	0.017624	2.18001E-06	0.000169	0.00077	0.01729451	0.000184771	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00875	3.53578E-09
	Janvier	0.239339742	0.000225	0.070702	0.005665	1.30091E-05	7.94981E-05	0.571753	0.000109	4.82136E-05	0.006274	0.029477	0.000354	0.32335	0.017624	2.18001E-06	0.000169	0.00077	0.01729451	0.000184771	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00875	3.53578E-09
	Février	0.239339742	0.000225	0.070702	0.005665	1.30091E-05	7.94981E-05	0.571753	0.000109	4.82136E-05	0.006274	0.029477	0.000354	0.32335	0.017624	2.18001E-06	0.000169	0.00077	0.01729451	0.000184771	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00875	3.53578E-09
	Mars	0.239339742	0.000225	0.070702	0.005665	1.30091E-05	7.94981E-05	0.571753	0.000109	4.82136E-05	0.006274	0.029477	0.000354	0.32335	0.017624	2.18001E-06	0.000169	0.00077	0.01729451	0.000184771	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00875	3.53578E-09
	Avril	0.091057298	0.000225	0.070702	0.005665	1.30091E-05	7.9344E-05	0.571753	0.000495	4.81884E-05	0.003346	0.020737	0.000354	0.32335	0.017619	2.18001E-06	0.000169	0.000769	0.018670674	0.000127355	0.51668	0.8317	0.017	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.00867	3.53578E-09
	Mai	4.74281E-07	0.033246	0.267018	0.003615	3.8719E-05	0.001708693	289.0105	0.006579	0.003620012	0.006343	0.018239	0.034026	13.3306	0.240475	0.000955864	0.048054	0.045869	1.08718E-05	0.000192064	48.0635	24.0036	0.81659	0.003816453	0.00480745	0.00011102	0.00967	0.156501628	0.11916	2.00276E-06
	Juin	6.19766E-08	0.033991	0.27145	0.004725	3.92985E-05	0.001745565	295.5191	0.006716	0.003700681	0.006413	0.018257	0.034786	13.6409	0.245507	0.000980243	0.049134	0.046887	9.05952E-06	0.000193624	49.1348	24.5255	0.83463	0.003902361	0.004914477	0.00010555	0.00984	0.160031597	0.12165	2.04787E-06
	Juillet	1.12602E-07	0.033626	0.269266	0.005313	3.90146E-05	0.001727466	292.3249	0.006649	0.003661187	0.006379	0.018284	0.034413	13.4888	0.243035	0.000969632	0.048604	0.046388	9.0558E-06	0.000192984	48.6109	24.268	0.82577	0.003860196	0.004861877	0.00010824	0.00976	0.158298746	0.12043	2.02579E-06
	Août	2.97795E-06	0.032204	0.260824	0.005135	3.79079E-05	0.00165732	279.9048	0.006387	0.003507412	0.006247	0.018317	0.032964	12.8967	0.233443	0.000928471	0.046542	0.044446	1.09672E-05	0.000190127	46.5622	23.2725	0.79136	0.003696354	0.004657929	0.00011868	0.00944	0.151567289	0.11567	1.93948E-06
	Septembre	1.55816E-07	0.033668	0.269515	0.00406	3.90462E-05	0.001729489	292.6856	0.006656	0.003665669	0.006383	0.018245	0.034455	13.506	0.243315	0.000970836	0.048664	0.046444	9.29988E-06	0.000192922	48.6696	24.2979	0.82678	0.003865013	0.004867843	0.00010793	0.00977	0.15849631	0.12057	2.02828E-06
	Octobre	2.38689E-07	0.033615	0.269212	0.00298	3.90065E-05	0.001726904	292.2327	0.006647	0.003660067	0.006377	0.018233	0.034402	13.4844	0.242969	0.000969351	0.048589	0.046373	1.10282E-05	0.000192876	48.5953	24.2611	0.82553	0.003859012	0.004860416	0.00010831	0.00976	0.158251141	0.1204	2.02507E-06
Lac A	Novembre	0.080715274	0.010146	0.121072	0.004147	2.0464E-05	0.000546355	89.13347	0.003284	0.001116591	0.007644	0.01804	0.010929	4.51636	0.083528	0.000284717	0.014536	0.015311	0.00012939	0.000927282	14.7135	7.56662	0.25862	0.001273151	0.001518104	0.0002414	0.00703	0.046482286	0.04855	5.92149E-06
	Décembre	0.085404665	0.010317	0.122737	0.004219	2.24349E-05	0.000559395	91.37383	0.003347	0.001141183	0.00848	0.018176	0.01133	4.61722	0.084934	0.000288609	0.01478	0.015696	0.000139323	0.001049903	15.0079	7.71353	0.26619	0.001302682	0.001551588	0.00024383	0.00823	0.047198753	0.05059	6.00352E-06
	Janvier	0.089109231	0.010742	0.125591	0.004268	2.51115E-05	0.000586734	95.85054	0.003648	0.001195579	0.009203	0.018242	0.012048	4.83621	0.087956	0.000299802	0.015394	0.016406	0.000134519	0.00117097	15.6882	8.05171	0.28094	0.001358665	0.001623061	0.00024256	0.00974	0.049131547	0.05342	6.23928E-06
	Février	0.094535218	0.011569	0.130866	0.004279	2.87732E-05	0.000636274	104.1908	0.003917	0.001295911	0.010047	0.018307	0.01325	5.27419	0.093708	0.000322408	0.01659	0.017693	0.000121442	0.001279978	16.9691	8.68599	0.30668	0.001460365	0.00175444	0.0002386	0.01169	0.052959052	0.05792	6.71436E-06
	Mars	0.099598638	0.012125	0.134509	0.004317	3.12245E-05	0.000669628	109.8819	0.004132	0.001363359	0.010737	0.018374	0.014058	5.54105	0.097614	0.000337613	0.017396	0.018569	0.000116588	0.001382563	17.8304	9.11291	0.32398	0.001529534	0.001843081	0.00023633	0.01301	0.055534525	0.06103	7.03404E-06
	Avril	0.089934866	0.013316	0.142973	0.004169	3.16237E-05	0.000725992	119.226	0.004394	0.001489908	0.010167	0.018339	0.015266	6.15719	0.105932	0.000372275	0.019118	0.020115	5.44426E-05	0.001365034	19.5226	9.94468	0.35154	0.001667004	0.00201184	0.00022473	0.0129	0.061159148	0.06432	7.75782E-06
	Mai	0.068757056	0.010162	0.118467	0.004024	1.98492E-05	0.000547377	88.5323	0.00319	0.001118635	0.006346	0.017363	0.010856	4.4692	0.082786	0.000286483	0.014575	0.015048	6.90095E-05	0.000808971	14.7487	7.58639	0.25826	0.001249937	0.001512868	0.00022637	0.00641	0.046758399	0.04639	5.96043E-06
	Juin	0.059637296	0.010858	0.12131	0.004149	1.95339E-05	0.000580911	94.06707	0.003225	0.001192078	0.005831	0.017018	0.011447	4.60847	0.087038	0.000307605	0.015592	0.015821	6.08263E-05	0.000740926	15.7418	8.07309	0.27366	0.001313973	0.001606136	0.00022401	0.00589	0.050178875	0.04726	6.40357E-06
	Juillet	0.060614027	0.010584	0.120132	0.004312	1.87769E-05	0.000565251	91.3578	0.003201	0.001160118	0.005723	0.017153	0.011106	4.42691	0.085313	0.000299742	0.015194	0.015454	6.01634E-05	0.000744863	15.3261	7.86779	0.26593	0.001285785	0.001565468	0.00021842	0.00555	0.048867335	0.04629	6.23809E-06
	Août	0.064604597	0.009486	0.113775	0.004281	1.78892E-05	0.00050928	81.64289	0.003051	0.001040628	0.005675	0.017272	0.010005	3.9814	0.078007	0.000267547	0.013597	0.014021	7.58083E-05	0.000768816	13.7341	7.08361	0.23926	0.001168687	0.001409859	0.00022781	0.00545	0.043604516	0.04306	5.56346E-06
	Septembre	0.064796166	0.009473	0.113862	0.004174	1.77774E-05	0.000508224	81.49461	0.003052	0.001038779	0.005651	0.01731	0.00998	4.00036	0.077968	0.000267186	0.013578	0.014007	7.43835E-05	0.000767075	13.7114	7.07234	0.23873	0.001168134	0.001407789	0.00022877	0.0054	0.043537868	0.04303	5.55563E-06
	Octobre	0.065435628	0.010129	0.118996	0.004085	1.88913E-05	0.000541656	87.28187	0.003234	0.001111213	0.005875	0.017466	0.010713	4.37441	0.082731	0.000284568	0.014524	0.014966	6.3459E-05	0.000805034	14.665	7.54202	0.25555	0.001250332	0.001505441	0.00023054	0.00592	0.046579877	0.04582	5.94215E-06
Jonction 26	Mai	0.085018829	0.007967	0.108154	0.004087	1.6951E-05	0.000430546	69.00229	0.002839	0.000873604	0.006214	0.018861	0.008526	3.51766	0.068865	0.000221853	0.011375	0.012313	0.000178533	0.000370639	11.509	5.98631	0.20242	0.001032402	0.001200785	0.00025801	0.00572	0.036128028	0.04071	4.60334E-06
	Juin	0.074609352	0.008618	0.110392	0.004159	1.64851E-05	0.000461887	74.0922	0.002845	0.000942088	0.005643	0.019062	0.009055	3.6596	0.07271	0.000241851	0.012328	0.012989	0.000146295	0.00033784	12.4376	6.44196	0.21656	0.001087832	0.001286394	0.00024412	0.00508	0.039365221	0.04116	5.02333E-06
	Juillet	0.075426892	0.008396	0.10943	0.004287	1.58813E-05	0.000449206	71.89993	0.002824	0.000916151	0.005583	0.019202	0.008779	3.51377	0.07131	0.000235453	0.012004	0.012693	0.000151502	0.000339414	12.1001	6.27529	0.2103	0.001065012	0.001253519	0.00024769	0.00481	0.038296471	0.04039	4.88872E-06
	Août	0.07773921	0.007649	0.104998	0.004264	1.53441E-05	0.000411446	65.29909	0.002737	0.000835258	0.005585	0.019244	0.008038	3.21263	0.06631	0.000213568	0.010919	0.011713	0.000188655	0.000371634	11.021	5.74399	0.19232	0.000984631	0.00114771	0.00025344	0.00477	0.034726038	0.03818	4.43049E-06
	Septembre	0.078205991	0.007596	0.104857	0.004179	1.51936E-05	0.000408231	64.79009	0.002726	0.000828872	0.00546	0.018931	0.007971	3.20899	0.065997	0.000211984	0.01084	0.011646	0.000184074	0.000351245	10.9381	5.70307	0.19077	0.000979815	0.001139832	0.0002548	0.00471	0.034459445	0.03801	4.39702E-06
	Octobre	0.077353374	0.00832	0.109949	0.004106	1.63643E-05	0.000445575	71.20257	0.002926	0.000909233	0.005595	0.018567	0.008772	3.59398	0.07109	0.000232664	0.011889	0.012664	0.000147931	0.000401305	11.9965	6.22494	0.20934	0.001065881	0.001246579	0.0002536	0.00521	0.037860878	0.04076	4.82972E-06
Jonction 27	Mai	0.086618835	0.008041	0.108922	0.004104	1.73512E-05	0.000435008	69.81187	0.003073	0.000882511	0.006859	0.018871	0.008643	3.56044	0.069469	0.000223698	0.011478	0.012459	0.000177827	0.000542512	11.6212	6.04171	0.20479	0.001044167	0.001213265	0.0002593	0.00596	0.036446987	0.04139	4.64204E-06
	Juin	0.076166186	0.008385	0.109267	0.00416	1.61688E-05	0.000449589	72.01616	0.002962	0.000916123	0.005956	0.019127	0.008806	3.56093	0.071222	0.000235031	0.011989	0.012696	0.000160692	0.000414276	12.0943	6.27253	0.21063	0.001064381	0.001253154	0.00024724	0.00499	0.038241725	0.04056	4.87981E-06
	Juillet	0.076967538	0.008169	0.108316	0.004285	1.55803E-05	0.000437212	69.87199	0.002941	0.00089083	0.005897	0.019223	0.008537	3.41898	0.069854	0.000228773	0.011672	0.012407	0.000160556	0.000414939	11.7651	6.10976	0.20451	0.001042035	0.001221009	0.00025074	0.00473	0.037199158	0.03981	4.7484E-06
	Août	0.079107174	0.007458	0.104084	0.004262	1.50792E-05	0.000401329	63.59577	0.002862	0.000813915	0.005911	0.019325	0.007834	3.13267	0.065096	0.000207952	0.010641	0.011475	0.000208125	0.000450018	10.7387	5.60468	0.18743	0.000965523	0.001120411	0.00025611	0.0047	0.033800105	0.0377	4.3125E-06
	Septembre	0.079603635	0.0074	0.10392	0.004179	1.49251E-05	0.000397901	63.05071	0.002849	0.00080708	0.005776	0.019007	0.007762	3.1266	0.064755	0.000206247	0.010555	0.011401	0.000205108	0.000427578	10.6496	5.56054	0.18578	0.000960233	0.001111949	0.00025752	0.00464	0.033516851	0.03752	4.27641E-06
	Octobre	0.078599921	0.008131	0.109008	0.004109	1.61003E-05	0.000435627	69.52331	0.003051	0.000888169	0.005903	0.018619	0.008569	3.51256	0.069876	0.000227128	0.011614	0.012424	0.00016347	0.00048	11.7182	6.08723	0.20452	0.001046615	0.001219548	0.00025601	0.00513	0.036949228	0.04026	4.7135E-06
Jonction 28	Mai	0.119549803	0.002186	0.079369	0.004177	8.11736E-06	0.000121092	16.94538	0.001362	0.000225228	0.004645	0.019938	0.002231	0.96775	0.031677	5.27271E-05	0.002952	0.004923	0.003386052	3.98901E-05	2.95614	1.76237	0.05325	0.000442018	0.000370345	0.00033237	0.003	0.008273171	0.02411	1.05298E-06
	Juin	0.118432767	0.002063	0.078447	0.004189	7.56212E-06	0.000113684	15.64204	0.001275	0.000210341	0.004458	0.020061	0.002051	0.8821	0.03078	4.93933E-05	0.002774	0.004721	0.003087898	3.44097E-05	2.76609	1.66795	0.04942	0.000426068	0.000350559	0.00033225	0.0027	0.007709042	0.02337	9.83038E-07
	Juillet	0.117709662	0.00215	0.078898	0.004216	7.61728E-06	0.000118147	16.37427	0.001311	0.000219853	0.0045	0.020043	0.002137	0.9082	0.031343	5.19849E-05	0.002902	0.004828	0.002517547	3.57938E-05	2.89296	1.73058	0.05152	0.000434793	0.000362772	0.0003312	0.00269	0.008132258	0.02357	1.03738E-06
	Août	0.118084705	0.002008	0.078036	0.004211	7.52562E-06	0.000111017	15.12183	0.001297	0.000204526	0.004481	0.020116	0.001997	0.85116	0.030388	4.78247E-05	0.002695	0.004641	0.003147863	3.66412E-05	2.68828	1.62981	0.04813	0.000419396	0.000342681	0.00033218	0.00269	0.007453637	0.02315	9.50285E-07
	Septembre	0.11834103	0.001974	0.077901	0.004193	7.46353E-06	0.000109173	14.82205	0.001288	0.000200714	0.004502	0.020281	0.001959	0.84115	0.030181	4.68438E-05	0.002646	0.0046	0.004449071	3.64734E-05	2.6382	1.60505	0.04724	0.000416174	0.000337872	0.00033278	0.00267	0.007291064	0.02307	9.2963E-07
	Octobre	0.11718622	0.002275	0.079713	0.004176	7.91657E-06	0.000124869	17.48683	0.001377	0.000234136	0.004698	0.02041	0.002287	0.98601	0.032205	5.55293E-05	0.003083	0.005001	0.004992661	4.08205E-05	3.07919	1.82263	0.05492	0.000449377	0.000381511	0.00033065	0.00283	0.008719713	0.02406	1.11167E-06

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Critère CCME pour:

La concentration d'aluminium dépend des conditions de pH. Des valeurs sont fournies à titre de référence pour [b] pH<6.5 et [c] pH>=6.5

La concentration de cadmium dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [d] 0--17, [e] >=280 et [f] 40 mg/L.

La concentration de cuivre dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [g] 0--82 et [h] >=180 mg/L.

La concentration de manganèse dépend de la dureté de l'eau et des conditions de pH. Des valeurs sont fournies à titre de référence pour une dureté de [i] 10-24 et [j] >=670 mg/L, ainsi que d'un pH de [i] 6.7-6.9 et [j] 6.5-6.7.

La concentration de nickel dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [k] <=60 et [l] >=180 mg/L.

La concentration de plomb dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [m] <=60 et [n] >=180 mg/L.

La concentration de zinc dépend de la dureté, de la concentration en carbone organique dissous (COD) et du pH. Des valeurs sont fournies à titre de référence pour un pH de 6.5 à 6.7 (cas o, p, q), un COD de 8 mg/L (cas o, p, q) et une dureté de [o] 8, [p] 399, and [q] 38 mg/L.

Table 12-12: General chemistry - Climate change scenario: Effluents from sedimentation ponds in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation		Dureté mg/L	pH n/a	Alk mg/L	DOC mg/L	F mg/L	Si mg/L	Sulphate mg/L	Cl mg/L	Nitrate (N) mg/L	Nitrite (N) mg/L	Azote ammoniacal mg/L
REMMMD												0.5[a]
CCME (long terme)			6.5-9							2.935483871	0.059956522	0.019[a]
Station	**Date**	**Effluent**										
Effluent (pH 8)	n/a	910.82566	8	126.122	4.465648	1.001539	34.73362	795.6938	40.0514	5.776351443	0.039825579	0.11905348
	n/a	808.56664	7.76991	22.58191	4.465648	0.186044	24.85857	795.59774	40.0514	5.776491534	0.039826545	0.119056367
	n/a	873.19748	7.13689	88.42584	4.465648	0.186051	34.73362	795.57853	40.0514	5.770607733	0.039785979	0.118935099
Année 21 Conditions historiques												
Jonction 2	Novembre	25.936186	6.97274	6.814308	8.958468	0.010275	2.291961	21.233102	1.05542	0.184134949	0.001269535	0.003795113
	Décembre	192.65178	7.23389	22.86559	8.158513	0.04362	8.688363	173.60924	8.72885	1.288790541	0.008885683	0.026562615
	Janvier	186.07981	7.22945	22.23942	8.208068	0.042256	8.439008	167.59588	8.42647	1.245572623	0.008587713	0.025671872
	Février	4.5681564	6.90502	4.960145	9.198706	0.005911	1.491863	1.6700031	0.07	0.003227965	2.22555E-05	6.653E-05
	Mars	319.82096	7.28647	35.12114	7.480771	0.070163	13.55769	289.83223	14.5824	0.316408395	0.002181506	0.006521335
	Avril	4.5681464	7.57243	5.013108	9.198825	0.005911	1.491923	1.6700031	0.07	0.199755039	0.001377229	0.004117051
	Mai	122.0884	7.67471	6.718762	6.939488	0.030103	4.677656	118.24025	5.94284	0.883438689	0.006090948	0.018208111
	Juin	164.81773	7.54429	7.952495	7.251785	0.03995	6.002361	160.24729	8.05779	1.188471736	0.008194026	0.024494994
	Juillet	104.1035	7.40317	6.660904	7.680072	0.02629	4.248405	100.28664	5.03745	0.756670799	0.005216935	0.015595362
	Août	86.748378	7.41491	6.328923	7.872549	0.022422	3.757387	83.117836	4.17317	0.633363144	0.00436678	0.01305393
	Septembre	157.95354	7.63597	7.909952	7.496093	0.038468	5.83298	153.41743	7.71286	1.140042452	0.007860126	0.023496843
	Octobre	148.04004	7.77299	7.765258	7.691683	0.036277	5.565179	143.58088	7.21797	1.069787068	0.007375744	0.022048844
Jonction 3	Novembre	127.46564	7.27072	17.89172	8.187839	0.034171	6.157562	113.1971	5.55253	0.861850744	0.005942108	0.017763173
	Décembre	421.9837	7.42674	49.31932	6.475531	0.105994	17.44703	380.51287	18.7034	2.809935179	0.019373353	0.057914163
	Janvier	643.62178	7.47949	73.33877	5.109395	0.158359	25.88904	581.09576	28.6167	4.268277248	0.029428025	0.08797132
	Février	659.89119	7.48903	75.23266	5.020457	0.161794	26.49891	595.64885	29.3466	4.37334512	0.030152425	0.090136821
	Mars	663.07046	7.47061	74.95488	5.026323	0.161669	26.6359	599.04937	29.544	2.097014642	0.014458058	0.043220516
	Avril	188.17268	7.78721	12.82436	8.065865	0.047044	6.737988	179.42087	8.94829	1.271643464	0.008767461	0.026209205
	Mai	226.88382	7.7798	11.27171	5.69389	0.053974	7.529314	219.41065	11.0037	1.612301524	0.011116159	0.033230337
	Juin	213.79581	7.63495	9.889029	6.25648	0.053047	7.299187	207.88345	10.3794	1.534411208	0.010579137	0.031624979
	Juillet	177.86863	7.55593	8.981673	6.64347	0.044696	6.285544	172.54297	8.60868	1.279796731	0.008823675	0.026377248
	Août	240.60113	7.63198	11.27742	6.565066	0.059216	8.131371	233.67556	11.6747	1.722272564	0.011874364	0.035496895
	Septembre	253.79014	7.72304	11.87301	6.405386	0.06198	8.48948	246.34587	12.3164	1.813051206	0.012500246	0.037367888
	Octobre	231.87161	7.83813	11.97907	6.690153	0.056539	7.86399	224.09837	11.2075	1.652507497	0.011393363	0.034059002
Jonction 4	Novembre	127.19243	7.26987	17.84853	8.170243	0.033857	6.144343	112.95695	5.54048	0.860001549	0.005929359	0.01772506
	Décembre	421.89664	7.42629	49.30451	6.474214	0.10573	17.44342	380.43602	18.6995	2.809374817	0.01936949	0.057902614
	Janvier	643.61078	7.47914	73.33326	5.109395	0.158116	25.88904	581.09576	28.6167	4.268137157	0.029427059	0.087968432
	Février	659.88118	7.48868	75.22765	5.020457	0.161551	26.49891	595.64885	29.3466	4.37334512	0.030152425	0.090136821
	Mars	663.07046	7.47027	74.94988	5.026323	0.161428	26.6359	599.04937	29.544	4.396039781	0.030308895	0.090604569
	Avril	188.16268	7.78407	12.81941	8.065865	0.046801	6.737988	179.42087	8.94829	1.335720857	0.009209249	0.027529872
	Mai	221.19051	7.77605	10.98467	5.551447	0.052384	7.340646	213.92562	10.7282	1.571955461	0.01083799	0.032398785
	Juin	210.10102	7.63172	9.713754	6.14863	0.051894	7.173007	204.31001	10.2004	1.507934105	0.010396589	0.031079273
	Juillet	174.9174	7.55261	8.827819	6.533346	0.043713	6.180995	169.68038	8.46617	1.258573021	0.008677346	0.025939817
	Août	237.42073	7.62912	11.12331	6.478164	0.05819	8.023818	230.58242	11.5202	1.699437813	0.011716928	0.03502626
	Septembre	250.32652	7.715	11.70614	6.318005	0.060894	8.374116	242.98377	12.1484	1.788395279	0.012330254	0.036859717
	Octobre	229.40875	7.83474	11.84739	6.61941	0.0557	7.780471	221.72569	11.0891	1.634996185	0.01127263	0.033698086
Jonction 5	Novembre	127.10637	7.26899	17.83271	8.165336	0.033595	6.140738	112.88011	5.53729	0.859483214	0.005925785	0.017714377
	Décembre	421.8536	7.42583	49.29515	6.473615	0.105479	17.44222	380.3976	18.6977	2.809234727	0.019368524	0.057899727
	Janvier	643.60077	7.47879	73.32775	5.109395	0.157873	25.88844	581.08615	28.6163	4.268137157	0.029427059	0.087968432
	Février	659.87117	7.48834	75.22315	5.020457	0.16131	26.49891	595.64885	29.3466	4.37334512	0.030152425	0.090136821
	Mars	663.06045	7.46994	74.94487	5.026323	0.161184	26.6359	599.04937	29.544	4.396039781	0.030308895	0.090604569
	Avril	188.16268	7.78095	12.8145	8.065865	0.046559	6.737988	179.42087	8.94829	1.335720857	0.009209249	0.027529872
	Mai	219.09792	7.77257	10.87571	5.498898	0.051645	7.271547	211.89875	10.6268	1.557105869	0.010735608	0.032092727
	Juin	208.71897	7.62815	9.645286	6.10853	0.051313	7.12614	202.96517	10.1337	1.49812777	0.010328978	0.030877159
	Juillet	173.80456	7.549	8.767309	6.492169	0.043199	6.142541	168.61412	8.41264	1.250643899	0.008622678	0.025776394
	Août	236.22082	7.62597	11.06245	6.445606	0.057656	7.98356	229.4201	11.4624	1.690892293	0.01165801	0.034850132
	Septembre	249.01752	7.7169	11.64058	6.285327	0.060337	8.330254	241.72538	12.0853	1.779009215	0.01226554	0.036666266
	Octobre	228.47704	7.83127	11.79473	6.592717	0.055234	7.749227	220.83233	11.0441	1.628411932	0.011227234	0.033562381
Jonction 6	Novembre	127.09636	7.26811	17.82781	8.165336	0.033354	6.140738	112.88011	5.53729	0.859483214	0.005925785	0.017714377
	Décembre	421.8436	7.42538	49.29019	6.473615	0.105238	17.44222	380.3976	18.6977	2.809234727	0.019368524	0.057899727
	Janvier	643.59076	7.47845	73.32275	5.109395	0.157632	25.88844	581.08615	28.6163	4.268137157	0.029427059	0.087968432
	Février	659.87117	7.48799	75.21814	5.020457	0.161068	26.49891	595.64885	29.3466	4.37334512	0.030152425	0.090136821
	Mars	663.05044	7.4696	74.94037	5.026323	0.160943	26.6359	599.04937	29.544	4.396039781	0.030308895	0.090604569
	Avril	188.15267	7.77783	12.8096	8.065865	0.046318	6.737988	179.42087	8.94829	1.335720857	0.009209249	0.027529872
	Mai	219.08791	7.76927	10.87081	5.498898	0.051404	7.271547	211.89875	10.6268	1.557105869	0.010735608	0.032092727
	Juin	208.71897	7.62442	9.640381	6.10853	0.051072	7.12614	202.96517	10.1337	1.49812777	0.010328978	0.030877159
	Juillet	173.80456	7.54525	8.762404	6.492169	0.042955	6.142541	168.61412	8.41264	1.250643899	0.008622678	0.025776394
	Août	236.21081	7.62265	11.05755	6.445606	0.057415	7.98356	229.4201	11.4624	1.690892293	0.01165801	0.034850132
	Septembre	249.00752	7.71411	11.63567	6.285327	0.060096	8.330254	241.72538	12.0853	1.779009215	0.01226554	0.036666266
	Octobre	228.46704	7.82776	11.78978	6.592717	0.054991	7.749227	220.83233	11.0441	1.628411932	0.011227234	0.033562381
Exutoire SP04	Novembre	871.3701	7.33429	88.24065	4.475344	0.185508	34.66393	793.91669	39.9699	5.75855995	0.039702914	0.118686788
	Décembre	2.7593373	6.49727	3.062134	9.088103	0.044333	1.491923	2.5194617	0.47996	0.050906085	0.000350977	0.0010492
	Janvier	2.7593373	6.49727	3.062134	9.088103	0.044333	1.491923	2.5194617	0.47996	0.050906085	0.000350977	0.0010492
	Février	2.7593373	6.49727	3.062134	9.088103	0.044333	1.491923	2.5194617	0.47996	0.050906085	0.000350977	0.0010492
	Mars	2.7593373	6.49727	3.062134	9.088103	0.044333	1.491923	2.5194617	0.47996	0.050906085	0.000350977	0.0010492
	Avril	2.7593373	7.04478	2.184437	9.088103	0.044333	1.491923	2.5195577	0.47996	0.064734418	0.000446317	0.001334209
	Mai	782.7471	7.93124	21.81124	4.612999	0.181169	24.04141	770.29553	38.7894	5.588490087	0.038530352	0.115181564
	Juin	777.49012	7.84642	21.65268	4.643043	0.180223	23.87497	765.13711	38.5342	5.551366106	0.038274397	0.11441642
	Juillet	775.06129	7.81172	21.57941	4.656929	0.179788	23.79806	762.76443	38.4136	5.534275065	0.038156562	0.114064165
	Août	765.59412	7.81032	21.29648	4.711033	0.178087	23.49824	753.48503	37.9492	5.467591989	0.037696809	0.112689794
	Septembre	690.15204	7.73935	19.09057	5.142312	0.164532	21.13988	679.49002	34.2589	4.935248102	0.034026516	0.101717921
	Octobre	776.59445	7.97092	21.62766	4.64819	0.180063	23.84673	764.26297	38.4881	5.545202124	0.038231899	0.114289377
Lac A	Novembre	251.90871	7.44217	18.7698	6.742342	0.06351	9.50132	237.61402	11.9357	1.751551478	0.012076231	0.036100348
	Décembre	283.44962	7.43546	24.08306	6.681056	0.070773	10.94457	264.41476	13.2193	1.949079078	0.013438103	0.04017149
	Janvier	337.17535	7.44956	31.26669	6.449915	0.083224	13.16774	311.78194	15.5324	2.295382785	0.015825725	0.047308982
	Février	381.91228	7.4584	37.21403	6.255283	0.093539	15.01116	351.253	17.462	2.583689027	0.017813478	0.053251117
	Mars	426.76527	7.45959	43.06602	6.063164	0.103771	16.85939	390.91617	19.4057	2.873115993	0.019808959	0.059216351
	Avril	326.89968	7.78753	29.80432	6.915069	0.079396	12.55306	302.98285	15.0634	2.233462786	0.015398812	0.04603278
	Mai	248.69232	7.72056	14.33727	6.182026	0.066614	8.759865	238.63225	12.0225	1.757155098	0.012114865	0.036215842
	Juin	258.69182	7.61809	12.07186	6.126605	0.068898	8.838577	250.93754	12.65	1.84513193	0.01272143	0.038029088
	Juillet	224.0606	7.55874	10.05294	6.306514	0.061329	7.727596	217.97935	10.9977	1.607258267	0.011081388	0.033126393
	Août	233.79496	7.58176	10.04739	6.362893	0.063172	7.967337	227.83511	11.4854	1.67884451	0.011574946	0.034601821
	Septembre	219.05583	7.65302	9.724365	6.40778	0.059987	7.502876	213.28202	10.7516	1.573916728	0.010851512	0.032439208
	Octobre	222.98283	7.78928	10.13167	6.47984	0.059978	7.611631	216.84584	10.926	1.59969338	0.011029231	0.032970477
Jonction 26	Mai	196.46479	7.48282	13.5659	6.972525	0.05216	7.369487	186.77906	9.39141	1.384570413	0.009546046	0.028536686
	Juin	202.78652	7.4105	10.50585	6.802192	0.05433	7.222878	196.1257	9.88381	1.45035691	0.009999617	0.029892578
	Juillet	176.29446	7.34806	8.943334	6.935657	0.048569	6.370866	170.91956	8.62038	1.26846341	0.008745536	0.026143663
	Août	185.11113	7.35372	8.965356	6.964984	0.050323	6.592581	179.82432	9.06173	1.33303112	0.009190704	0.027474435
	Septembre	173.22015	7.43052	8.704145	7.004006	0.047741	6.218849	168.07618	8.46971	1.248402451	0.008607224	0.025730196
	Octobre	183.07963	7.56319	9.184075	6.976236	0.049476	6.494041	177.5573	8.94404	1.316696568	0.009078084	0.027137772
Jonction 27	Mai	202.32823	7.51882	14.74548	7.012146	0.052838	7.671717	191.58206	9.62113	1.419817182	0.009789058	0.029263139
	Juin	196.98013	7.39794	10.33878	6.872336	0.052608	7.055239	190.42934	9.59667	1.409450485	0.009717584	0.029049476
	Juillet	171.3337	7.34212	8.823565	7.001014	0.047034	6.230265	166.0301	8.37364	1.233272677	0.00850291	0.025418364
	Août	180.04229	7.33655	8.84844	7.027587	0.048778	6.449578	174.8292	8.80968	1.297069889	0.008942766	0.026733256
	Septembre	168.45054	7.40657	8.593785	7.066011	0.046261	6.085459	163.37885	8.23255	1.214556587	0.008373871	0.025032616
	Octobre	178.90947	7.5392	9.080722	7.028186	0.048169	6.377475	173.44594	8.73701	1.287137473	0.008874286	0.026528544
Jonction 28	Mai	43.026841	7.19642	6.97672	8.784304	0.014071	2.70559	38.540233	1.92309	0.316016142	0.002178802	0.00651325
	Juin	40.797141	7.16164	5.99604	8.760484	0.013734	2.540175	37.235738	1.86502	0.306111744	0.002110515	0.006309115
	Juillet	39.091748	7.15646	5.782226	8.743487	0.013469	2.47354	35.720872	1.7903	0.29511464	0.002034695	0.00608246
	Août	40.152751	7.15024	5.771666	8.75821	0.013667	2.497995	36.808271	1.84358	0.303029753	0.002089266	0.006245594
	Septembre	37.222036	7.12007	5.717562	8.773651	0.01345	2.407506	33.903416	1.6971	0.282114242	0.001945062	0.005814515
	Octobre	43.613777	7.09387	5.920364	8.712604	0.015073	2.58626	40.148277	2.01143	0.3270973	0.002255202	0.006741638

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Table 12-13: Dissolved metals - Climate change scenario: sedimentation pond effluent in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation[a]		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	Ti mg/L	U mg/L	Zn mg/L	Sn mg/L
REMMMD			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 (dureté 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 (dureté10mg/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 (dureté 40mg/L)					0.165	0.001425046	0.00014				0.0043				0.86			0.024		0.00099									0.055	
CVAA (dureté40mg/L)					0.47	0.012825099	0.0008				0.0059				1.9			0.22		0.025									0.055	
CVAC (dureté 400mg/L)					1.911	0.068822	0.0076				0.0305				6.52			0.169		0.01858									0.388	
CVAA (dureté 400mg/L)					5.45	0.61939	0.0087				0.0517				14.1			1.52		0.477									0.388	
CCME (long terme)		0.005[b]	0.005	1.5			0.00004[d]				0.002[g]	0.3			0.23[i]	0.000026	0.073	0.025[k]		0.001[m]				0.001		0.0008		0.015	0.02[o]	
CCME (long terme)		0.1[c]					0.00037[e]				0.004[h]				1.2[j]			0.15[l]		0.007[n]									0.312[p]	
CCME (long terme)							0.00007[f]																						0.037[q]	
Station	**Date**																													
Effluent																														
Effluent (pH 8)	n/a	0.398706202	0.034727	0.275817	0.055676	3.98717E-05	0.001822568	288.3973	0.006491	0.00378107	0.05632	1.260813	0.035536	46.30832	0.251572	0.001001526	0.050201	0.050199	3.987252382	0.002515822	50.1944	25.04276	0.852446	0.003987164	0.005019921	0.00010015	0.010013	0.16351396	0.14145	2.0925E-05
	n/a	6.04656E-09	0.034726	0.275817	0.007286	3.98708E-05	0.001781762	300.8856	0.006491	0.00378023	0.006103	0.018333	0.035535	13.90368	0.250463	0.001001526	0.0502	0.047887	6.97932E-06	5.10893E-05	50.1944	25.04046	0.852429	0.003987085	0.005019921	0.00010015	0.010012	0.163511579	0.124085	2.0925E-05
	n/a	0.203354463	0.034727	0.275817	0.007575	3.98717E-05	0.001809753	325.0927	0.006491	0.003772667	0.015608	0.02054	0.035536	14.92011	0.251254	0.001001526	0.050201	0.049559	3.28229E-05	9.58466E-05	50.1944	25.04276	0.852437	0.003987164	0.005019921	0.00010015	0.010012	0.163511579	0.135775	2.0925E-05
Année 21 Conditions historiques																														
Jonction 2	Novembre	0.089754089	0.001312	0.074812	0.004224	6.17668E-06	7.32119E-05	9.448789	0.000762	0.000124852	0.006877	0.021423	0.001217	0.568859	0.02604	2.73364E-05	0.001679	0.003849	0.007952823	0.000166659	1.643653	1.108889	0.029591	0.000353867	0.000242802	0.00034261	0.002287	0.0040672	0.021921	5.19617E-07
	Décembre	0.112909646	0.007891	0.115008	0.004921	1.28559E-05	0.000415179	71.55526	0.001895	0.000842877	0.008673	0.019736	0.007972	3.394436	0.07054	0.000219044	0.01123	0.012867	0.00041511	0.000171715	11.20049	5.822389	0.191572	0.001071171	0.00118386	0.00029813	0.003826	0.035440124	0.044502	4.53448E-06
	Janvier	0.112167654	0.007632	0.113559	0.004902	1.26026E-05	0.000401745	69.1065	0.001851	0.000814643	0.008611	0.019756	0.007707	3.283362	0.068826	0.000211482	0.010854	0.012516	0.000441686	0.000170942	10.82397	5.637551	0.185202	0.001043377	0.001146979	0.00030059	0.003769	0.034202374	0.043649	4.37613E-06
	Février	0.088092027	0.000473	0.070701	0.004197	5.39875E-06	2.96908E-05	1.485211	0.000626	3.3035E-05	0.006747	0.02201	0.000354	0.208739	0.020627	2.73344E-06	0.000458	0.00273	0.008217649	0.000167235	0.421362	0.510557	0.0089	0.000265621	0.000123672	0.0003536	0.00212	3.46165E-05	0.019305	3.53566E-09
	Mars	0.129929601	0.012906	0.145157	0.005012	1.79117E-05	0.000675833	118.9315	0.002754	0.001390444	0.010047	0.019523	0.013123	5.548588	0.104338	0.000365274	0.018514	0.019727	0.000180212	0.000184659	18.48802	9.41454	0.315082	0.001616469	0.001900917	0.00026161	0.004985	0.059371551	0.06159	7.59732E-06
	Avril	0.129058097	0.000473	0.070702	0.004197	5.39875E-06	2.96357E-05	1.485211	0.000626	3.30294E-05	0.003909	0.018468	0.000354	0.208736	0.020619	2.73344E-06	0.000458	0.002722	0.009107835	0.000149008	0.421362	0.510557	0.0089	0.000265629	0.000123672	0.0003536	0.00212	3.46165E-05	0.019105	3.53566E-09
	Mai	0.088137895	0.005434	0.08888	0.003938	9.55562E-06	0.00028253	45.28413	0.001383	0.000578939	0.003782	0.016455	0.005472	2.188908	0.050947	0.000149271	0.007701	0.008907	0.000178849	0.000168756	7.675387	4.034245	0.131544	0.000768233	0.000823292	0.00025624	0.002922	0.024088526	0.031335	3.08219E-06
	Juin	0.089211761	0.007271	0.104028	0.004358	1.1705E-05	0.000376834	61.18307	0.00173	0.00077879	0.004134	0.017591	0.007351	2.924621	0.064338	0.000202175	0.010355	0.011458	0.000127903	0.000171622	10.32899	5.360524	0.176616	0.00098092	0.001089326	0.00026447	0.003468	0.032721834	0.038044	4.18678E-06
	Juillet	0.099955809	0.004687	0.089075	0.004157	9.14196E-06	0.00024468	38.57187	0.001292	0.000495917	0.003968	0.017882	0.004695	1.891585	0.047134	0.000126727	0.006601	0.008067	0.000325101	0.00016945	6.571642	3.511227	0.112951	0.000701812	0.000720369	0.00028634	0.002888	0.02037099	0.030255	2.60628E-06
	Août	0.104011135	0.003951	0.085329	0.004131	8.44901E-06	0.000207044	32.10689	0.001171	0.000415164	0.003948	0.018119	0.003937	1.597252	0.042362	0.000105141	0.005529	0.007116	0.000434965	0.000168982	5.498785	2.985222	0.094787	0.000623879	0.000615619	0.00029527	0.002738	0.016833643	0.028168	2.15352E-06
	Septembre	0.093183443	0.006985	0.103815	0.004424	1.15257E-05	0.00036231	58.62209	0.001693	0.000747055	0.00419	0.018052	0.007053	2.81063	0.062805	0.000193577	0.009935	0.011127	0.000123418	0.000171804	9.907118	5.159364	0.16951	0.000954547	0.001049669	0.00027449	0.003446	0.031305562	0.037556	4.00575E-06
	Octobre	0.096704534	0.006567	0.102321	0.004448	1.11787E-05	0.000340997	54.9269	0.00163	0.000701034	0.004206	0.018252	0.006622	2.643898	0.060262	0.000181221	0.009324	0.010607	0.000126057	0.000170472	9.295621	4.862566	0.15917	0.000912304	0.000990737	0.00028289	0.00338	0.029277556	0.036534	3.74613E-06
Jonction 3	Novembre	0.102057671	0.005212	0.097097	0.004033	1.77216E-05	0.000293895	46.77503	0.001395	0.000579415	0.008475	0.01952	0.006176	2.59067	0.052219	0.000137537	0.007339	0.009433	0.000646608	0.000312893	7.542062	4.02298	0.140481	0.000797101	0.000833557	0.0003089	0.007852	0.022463978	0.038472	2.8342E-06
	Décembre	0.14222239	0.016605	0.165771	0.004225	4.70328E-05	0.000927528	155.5387	0.003288	0.001889106	0.012163	0.018991	0.02008	8.160161	0.129494	0.000461156	0.023868	0.025681	8.28053E-05	0.000354167	24.62215	12.4708	0.4553	0.00208944	0.002541618	0.0002287	0.021363	0.076247801	0.085452	9.62513E-06
	Janvier	0.171224846	0.02517	0.216611	0.003469	6.63945E-05	0.001397756	236.7247	0.004714	0.002864303	0.014802	0.018862	0.030211	12.75381	0.187317	0.000705816	0.036298	0.037776	4.46549E-05	0.000383589	37.38892	18.77735	0.686976	0.003050699	0.003813523	0.000164	0.029899	0.116791265	0.119377	1.4758E-05
	Février	0.173337501	0.025796	0.220351	0.003318	6.71966E-05	0.001430693	242.4959	0.004821	0.002933207	0.014979	0.018837	0.030876	13.20515	0.191536	0.00072401	0.037207	0.038638	4.24898E-05	0.000385268	38.30382	19.22864	0.70273	0.003119236	0.003903747	0.00015936	0.030148	0.119773767	0.121581	1.51391E-05
	Mars	0.173871735	0.025955	0.221389	0.003417	6.58664E-05	0.001435527	244.075	0.004854	0.002944971	0.014984	0.018891	0.030854	13.0197	0.192591	0.000729345	0.03744	0.038803	4.43018E-05	0.00038533	38.49071	19.31876	0.703773	0.003132343	0.003919941	0.00015847	0.029274	0.120580685	0.121463	1.52495E-05
	Avril	0.099008757	0.008107	0.116186	0.003908	1.72565E-05	0.000429972	68.99428	0.001917	0.000883772	0.005048	0.018247	0.008713	3.859634	0.071897	0.000223357	0.011541	0.012934	9.06199E-05	0.000308044	11.63917	6.0447	0.204969	0.001106782	0.001233307	0.00029634	0.00643	0.036339874	0.044315	4.62815E-06
	Mai	0.061064619	0.009756	0.110176	0.003432	1.55902E-05	0.000508078	83.84718	0.002079	0.001060515	0.004342	0.014853	0.010169	4.253861	0.078825	0.000275069	0.013991	0.01454	6.01387E-05	0.000309412	14.03355	7.150508	0.242041	0.001229328	0.001446265	0.00020033	0.005014	0.044801801	0.044322	5.72242E-06
	Juin	0.070454195	0.009262	0.11104	0.004039	1.78306E-05	0.000488742	79.29032	0.002016	0.001014466	0.004569	0.016059	0.009958	3.838732	0.076551	0.000258861	0.013258	0.014095	7.03352E-05	0.000311587	13.3724	6.845664	0.234445	0.001194981	0.001389647	0.00022435	0.006514	0.04223585	0.044852	5.38136E-06
	Juillet	0.078796886	0.007748	0.103234	0.004007	1.58461E-05	0.000410176	65.93633	0.001769	0.000846574	0.004515	0.016509	0.008333	3.211663	0.066706	0.000214792	0.011057	0.012118	9.83943E-05	0.000312686	11.15279	5.756408	0.196067	0.001032955	0.001171977	0.00024211	0.005866	0.03499263	0.040303	4.45709E-06
	Août	0.072758418	0.010393	0.121234	0.00411	1.9351E-05	0.000547209	89.13347	0.002237	0.001137822	0.004853	0.017013	0.01113	4.379518	0.085022	0.000291237	0.01489	0.015698	5.76174E-05	0.000319896	15.00749	7.666858	0.262422	0.001329134	0.001554875	0.00023396	0.006958	0.047520092	0.049268	6.05682E-06
	Septembre	0.069501746	0.010938	0.123861	0.004066	1.96835E-05	0.000574627	93.96287	0.002326	0.001196951	0.004851	0.016793	0.01167	4.653921	0.088511	0.000297384	0.015683	0.01639	5.29837E-05	0.000318446	15.7961	8.052396	0.275539	0.001385827	0.00163134	0.0002266	0.006961	0.05014555	0.050701	6.39372E-06
	Octobre	0.075656235	0.009989	0.119256	0.003949	1.81271E-05	0.000524636	85.63065	0.002174	0.001090401	0.004813	0.017063	0.01061	4.38365	0.082407	0.000279803	0.014303	0.015148	5.98227E-05	0.000316166	14.39404	7.365232	0.250839	0.001284126	0.001493752	0.00023917	0.00636	0.045606339	0.047778	5.81643E-06
Jonction 4	Novembre	0.101839121	0.0052	0.096889	0.004025	1.76837E-05	0.000293434	46.67484	0.001392	0.00057821	0.008912	0.019478	0.006163	2.58508	0.05211	0.000137242	0.007323	0.009414	0.000652091	0.000459611	7.526032	4.014473	0.140174	0.000795443	0.000831767	0.00030823	0.007835	0.022415897	0.038452	2.82815E-06
	Décembre	0.142192711	0.016601	0.165739	0.004224	4.70238E-05	0.000927505	155.5066	0.003287	0.00188877	0.012616	0.018987	0.020076	8.158459	0.129472	0.000461056	0.023863	0.025678	8.29973E-05	0.000501486	24.61746	12.46827	0.455212	0.002089045	0.002541131	0.00022866	0.021358	0.076231139	0.085497	9.62323E-06
	Janvier	0.171222148	0.02517	0.2166	0.003469	6.63936E-05	0.001397868	236.7207	0.004714	0.002864303	0.015258	0.018862	0.030211	12.75356	0.187317	0.000705816	0.036298	0.037777	4.47199E-05	0.000530971	37.38853	18.77712	0.686967	0.003050699	0.003813401	0.000164	0.029898	0.116788885	0.119436	1.4758E-05
	Février	0.173337501	0.025796	0.220351	0.003318	6.71966E-05	0.001430805	242.4919	0.004821	0.002933207	0.015435	0.018837	0.030876	13.20515	0.191541	0.00072401	0.037207	0.03864	4.25518E-05	0.000532649	38.30382	19.22864	0.70273	0.003119236	0.003903747	0.00015936	0.030148	0.119773767	0.121639	1.51391E-05
	Mars	0.173871735	0.025955	0.221389	0.003417	6.58664E-05	0.001435639	244.075	0.004854	0.002944971	0.015439	0.018891	0.030854	13.0197	0.192596	0.000729345	0.03744	0.038805	4.43637E-05	0.000532711	38.49071	19.31876	0.703773	0.003132343	0.003919941	0.00015847	0.029274	0.120580685	0.121528	1.52495E-05
	Avril	0.099008757	0.008107	0.116186	0.003908	1.72565E-05	0.00043013	68.99027	0.001917	0.000883828	0.005504	0.018247	0.008713	3.859634	0.071897	0.000223357	0.011541	0.012936	9.1512E-05	0.000455426	11.63917	6.0447	0.204969	0.001106782	0.001233307	0.00029634	0.00643	0.036339874	0.044377	4.62815E-06
	Mai	0.059534766	0.009512	0.107419	0.003346	1.51999E-05	0.000495521	81.74309	0.002027	0.001034017	0.004689	0.014481	0.009915	4.147162	0.076853	0.000268189	0.013641	0.014177	6.27993E-05	0.000449065	13.68206	6.971418	0.235987	0.001198613	0.001410103	0.00019532	0.004888	0.043680685	0.043275	5.57913E-06
	Juin	0.069240025	0.009102	0.109127	0.003969	1.75233E-05	0.000480491	77.91965	0.001982	0.000997044	0.004946	0.015783	0.009787	3.772622	0.075232	0.000254388	0.01303	0.013853	7.2683E-05	0.000453602	13.14211	6.727726	0.230406	0.001174451	0.001365782	0.00022049	0.006402	0.041507481	0.044141	5.28865E-06
	Juillet	0.07749098	0.00762	0.101523	0.003941	1.55839E-05	0.000403533	64.8422	0.00174	0.000832569	0.004895	0.016235	0.008195	3.158435	0.065602	0.000211241	0.010874	0.011919	0.000101764	0.000454887	10.96786	5.661001	0.192817	0.00101582	0.001152544	0.00023809	0.005768	0.03441184	0.039697	4.38313E-06
	Août	0.071795177	0.010256	0.119623	0.004056	1.9095E-05	0.000540138	87.95518	0.002208	0.001122809	0.005245	0.016788	0.010983	4.321672	0.083901	0.000287385	0.014693	0.015491	5.91351E-05	0.000463051	14.80887	7.565473	0.258952	0.001311526	0.001534298	0.00023087	0.006866	0.046891695	0.048678	5.97669E-06
	Septembre	0.068554694	0.010789	0.122175	0.00401	1.94149E-05	0.00056696	92.68038	0.002294	0.00118065	0.005241	0.016564	0.011511	4.590485	0.087308	0.000303091	0.015469	0.016168	5.46098E-05	0.000461476	15.58067	7.942735	0.27178	0.001366877	0.00160918	0.00022351	0.006867	0.049460027	0.050071	6.30647E-06
	Octobre	0.074854884	0.009884	0.117991	0.003907	1.79351E-05	0.000519252	84.72088	0.002151	0.001078889	0.005217	0.016883	0.010498	4.337227	0.081539	0.000276034	0.014152	0.014989	6.1232E-05	0.000460191	14.24195	7.287297	0.248184	0.001270545	0.001477923	0.00023663	0.006292	0.045125521	0.047335	5.75494E-06
Jonction 5	Novembre	0.101777063	0.005197	0.096831	0.004022	1.76729E-05	0.000293412	46.64278	0.001391	0.000577902	0.009363	0.019466	0.006159	2.583622	0.052082	0.000137159	0.007319	0.00941	0.00065621	0.000606723	7.52134	4.011945	0.140087	0.00079489	0.000831256	0.00030805	0.00783	0.022402329	0.038491	2.82649E-06
	Décembre	0.14217922	0.0166	0.165717	0.004224	4.70193E-05	0.000927584	155.4906	0.003287	0.00188863	0.01307	0.018986	0.020075	8.15773	0.129461	0.000461016	0.023861	0.025677	8.31769E-05	0.000648826	24.61512	12.46674	0.455168	0.002088808	0.002540888	0.00022864	0.021356	0.076223998	0.08555	9.6224E-06
	Janvier	0.17121945	0.025169	0.2166	0.003469	6.63927E-05	0.001398093	236.7167	0.004714	0.002864303	0.015713	0.018862	0.030211	12.75356	0.187322	0.000705816	0.036298	0.037778	4.4785E-05	0.000678352	37.38814	18.77689	0.686958	0.00305062	0.003813401	0.000164	0.029898	0.116788885	0.119495	1.4758E-05
	Février	0.173337501	0.025796	0.220351	0.003318	6.71966E-05	0.00143103	242.4879	0.004821	0.002933207	0.01589	0.018837	0.030876	13.20515	0.191547	0.00072401	0.037207	0.038641	4.26137E-05	0.00068003	38.30382	19.22864	0.70273	0.003119236	0.003903747	0.00015936	0.030148	0.119773767	0.121705	1.51391E-05
	Mars	0.173871735	0.025955	0.221389	0.003417	6.58664E-05	0.001435864	244.071	0.004854	0.002945252	0.015895	0.018891	0.030854	13.0197	0.192602	0.000729345	0.03744	0.038806	4.44288E-05	0.000680093	38.49071	19.31876	0.703773	0.003132343	0.003919941	0.00015847	0.029274	0.120580685	0.121587	1.52495E-05
	Avril	0.099008757	0.008107	0.116186	0.003908	1.72565E-05	0.000430298	68.99027	0.001917	0.000883856	0.005959	0.018247	0.008713	3.859634	0.071903	0.000223357	0.011541	0.012938	9.24102E-05	0.000602807	11.63917	6.0447	0.204969	0.001106782	0.001233307	0.00029634	0.00643	0.036339874	0.044439	4.62815E-06
	Mai	0.058970852	0.009422	0.106402	0.003314	1.50567E-05	0.000490991	80.96958	0.002008	0.00102427	0.0051	0.014344	0.009821	4.108031	0.076128	0.000265661	0.013512	0.014044	6.42334E-05	0.000592178	13.55264	6.905437	0.233753	0.001187243	0.001396709	0.00019347	0.004842	0.043266515	0.042927	5.52631E-06
	Juin	0.068786736	0.009042	0.108413	0.003943	1.74088E-05	0.000477512	77.40665	0.001969	0.000990546	0.005369	0.01568	0.009722	3.748074	0.074743	0.000252723	0.012945	0.013764	7.41264E-05	0.000598021	13.0561	6.683586	0.228898	0.001166713	0.001356772	0.00021904	0.00636	0.041236128	0.043915	5.25399E-06
	Juillet	0.077002614	0.007572	0.100884	0.003916	1.54856E-05	0.000401161	64.42939	0.001729	0.000827359	0.00532	0.016133	0.008144	3.138505	0.065195	0.000209897	0.010806	0.011846	0.000103871	0.000599409	10.89865	5.625137	0.191599	0.001009425	0.001145287	0.00023659	0.005732	0.034195233	0.039508	4.35559E-06
	Août	0.071436323	0.010204	0.119029	0.004035	1.89986E-05	0.000537586	87.51031	0.002196	0.001117179	0.005674	0.016703	0.010928	4.300041	0.083484	0.000285941	0.014619	0.015415	6.01015E-05	0.000608091	14.73419	7.52731	0.257655	0.001304972	0.001526505	0.00022971	0.006832	0.046656047	0.048496	5.94666E-06
	Septembre	0.068198538	0.010733	0.121537	0.00399	1.93149E-05	0.000564183	92.19543	0.002282	0.001174571	0.005669	0.016478	0.011451	4.566666	0.086857	0.000301527	0.015388	0.016086	5.52665E-05	0.000606474	15.50013	7.901584	0.270369	0.001359846	0.001600779	0.00022235	0.006831	0.049205336	0.049874	6.27382E-06
	Octobre	0.07455269	0.009844	0.117516	0.003892	1.7863E-05	0.000517329	84.37621	0.002143	0.001074576	0.005652	0.016814	0.010455	4.319971	0.081215	0.000275731	0.014095	0.01493	6.21705E-05	0.000605728	14.18447	7.25787	0.247185	0.001265413	0.001471957	0.00023569	0.006267	0.044942238	0.047206	5.73167E-06

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Critère CCME pour:

La concentration d'aluminium dépend des conditions de pH. Des valeurs sont fournies à titre de référence pour [b] pH<6.5 et [c] pH>=6.5

La concentration de cadmium dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [d] 0--17, [e] >=280 et [f] 40 mg/L.

La concentration de cuivre dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [g] 0--82 et [h] >=180 mg/L.

La concentration de manganèse dépend de la dureté de l'eau et des conditions de pH. Des valeurs sont fournies à titre de référence pour une dureté de [i] 10-24 et [j] >=670 mg/L, ainsi que d'un pH de [i] 6.7-6.9 et [j] 6.5-6.7.

La concentration de nickel dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [k] <=60 et [l] >=180 mg/L.

La concentration de plomb dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [m] <=60 et [n] >=180 mg/L.

La concentration de zinc dépend de la dureté, de la concentration en carbone organique dissous (COD) et du pH. Des valeurs sont fournies à titre de référence pour un pH de 6.5 à 6.7 (cas o, p, q), un COD de 8 mg/L (cas o, p, q) et une dureté de [o] 8, [p] 399, and [q] 38 mg/L.

Table 12-13: Dissolved metals - Climate change scenario: sedimentation pond effluent in equilibrium with calcite (mineral precipitation permitted, pH = 8)

Réglementation[a]		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	Ti mg/L	U mg/L	Zn mg/L	Sn mg/L
REMMMD			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 (dureté 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 (dureté10mg/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 (dureté 40mg/L)					0.165	0.001425046	0.00014				0.0043				0.86			0.024		0.00099									0.055	
CVAA (dureté40mg/L)					0.47	0.012825099	0.0008				0.0059				1.9			0.22		0.025									0.055	
CVAC (dureté 400mg/L)					1.911	0.068822	0.0076				0.0305				6.52			0.169		0.01858									0.388	
CVAA (dureté 400mg/L)					5.45	0.61939	0.0087				0.0517				14.1			1.52		0.477									0.388	
CCME (long terme)		0.005[b]	0.005	1.5			0.00004[d]				0.002[g]	0.3			0.23[i]	0.000026	0.073	0.025[k]		0.001[m]				0.001		0.0008		0.015	0.02[o]	
CCME (long terme)		0.1[c]					0.00037[e]				0.004[h]				1.2[j]			0.15[l]		0.007[n]									0.312[p]	
CCME (long terme)							0.00007[f]																						0.037[q]	
Station	**Date**	**Effluent**																												
Jonction 6	Novembre	0.101777063	0.005197	0.096831	0.004022	1.76729E-05	0.00029358	46.63877	0.001391	0.00057793	0.009818	0.019466	0.006159	2.583622	0.052086	0.000137159	0.007319	0.009412	0.000659772	0.000754104	7.52134	4.011945	0.140087	0.00079489	0.000831256	0.00030805	0.00783	0.022402329	0.038553	2.82649E-06
	Décembre	0.14217922	0.0166	0.165717	0.004224	4.70193E-05	0.000927753	155.4866	0.003287	0.001888658	0.013526	0.018986	0.020075	8.15773	0.129467	0.000461016	0.023861	0.025678	8.33504E-05	0.000796207	24.61512	12.46712	0.455168	0.002088808	0.002540888	0.00022864	0.021356	0.076223998	0.085609	9.6224E-06
	Janvier	0.17121945	0.025169	0.2166	0.003469	6.63927E-05	0.001398205	236.7127	0.004714	0.002864303	0.016169	0.018862	0.030211	12.75356	0.187322	0.000705816	0.036298	0.03778	4.48531E-05	0.000825733	37.38814	18.77689	0.686958	0.00305062	0.003813401	0.000164	0.029898	0.116788885	0.11956	1.4758E-05
	Février	0.173337501	0.025796	0.220351	0.003318	6.71966E-05	0.001431143	242.4879	0.004821	0.002933487	0.016346	0.018837	0.030876	13.20515	0.191547	0.00072401	0.037207	0.038643	4.26726E-05	0.000827412	38.30382	19.22864	0.70273	0.003119236	0.003903747	0.00015936	0.030148	0.119773767	0.121764	1.51391E-05
	Mars	0.173871735	0.025955	0.221389	0.003417	6.58664E-05	0.001435976	244.067	0.004854	0.002945252	0.01635	0.018891	0.030854	13.0197	0.192602	0.000729345	0.03744	0.038807	4.44907E-05	0.000827474	38.49071	19.31876	0.703773	0.003132343	0.003919941	0.00015847	0.029274	0.120580685	0.121653	1.52495E-05
	Avril	0.099008757	0.008107	0.116186	0.003908	1.72565E-05	0.000430467	68.98626	0.001917	0.000883884	0.006415	0.018247	0.008713	3.859634	0.071908	0.000223357	0.011541	0.012939	9.33208E-05	0.000750209	11.63917	6.0447	0.204969	0.001106782	0.001233307	0.00029634	0.00643	0.036339874	0.044502	4.62815E-06
	Mai	0.058970852	0.009422	0.106402	0.003314	1.50567E-05	0.000491159	80.96558	0.002008	0.001024298	0.005556	0.014344	0.009821	4.108031	0.076133	0.000265661	0.013512	0.014046	6.48807E-05	0.000739559	13.55264	6.905437	0.233753	0.001187243	0.001396709	0.00019347	0.004842	0.043266515	0.042989	5.52631E-06
	Juin	0.068786736	0.009042	0.108413	0.003943	1.74088E-05	0.000477681	77.40665	0.001969	0.000990574	0.005825	0.01568	0.009722	3.748074	0.074749	0.000252723	0.012945	0.013766	7.49875E-05	0.000745402	13.0561	6.683586	0.228898	0.001166713	0.001356772	0.00021904	0.00636	0.041236128	0.043977	5.25399E-06
	Juillet	0.077002614	0.007572	0.100884	0.003916	1.54856E-05	0.000401329	64.42939	0.001729	0.000827387	0.005776	0.016133	0.008144	3.138505	0.065195	0.000209897	0.010806	0.011847	0.000105156	0.00074679	10.89865	5.625137	0.191599	0.001009425	0.001145287	0.00023659	0.005732	0.034195233	0.039571	4.35559E-06
	Août	0.071436323	0.010204	0.119029	0.004035	1.89986E-05	0.000537755	87.50631	0.002196	0.001117207	0.006129	0.016703	0.010928	4.300041	0.083489	0.000285941	0.014619	0.015416	6.07179E-05	0.000755472	14.73419	7.52731	0.257655	0.001304972	0.001526505	0.00022971	0.006832	0.046656047	0.048558	5.94666E-06
	Septembre	0.068198538	0.010733	0.121537	0.00399	1.93149E-05	0.000564352	92.19142	0.002282	0.001174599	0.006125	0.016478	0.011451	4.566666	0.086863	0.000301527	0.015388	0.016087	5.57404E-05	0.000753856	15.50013	7.901584	0.270369	0.001359849	0.001600779	0.00022235	0.006831	0.049205336	0.049936	6.27382E-06
	Octobre	0.07455269	0.009844	0.117516	0.003892	1.7863E-05	0.000517487	84.37221	0.002143	0.001074632	0.006108	0.016814	0.010455	4.319971	0.081215	0.000275731	0.014095	0.014932	6.28086E-05	0.00075311	14.18447	7.25787	0.247185	0.001265413	0.001471957	0.00023569	0.006267	0.044942238	0.047268	5.73167E-06
Exutoire SP04	Novembre	0.203427313	0.034654	0.275385	0.002984	3.98149E-05	0.001806268	324.4114	0.006477	0.003764824	0.015999	0.019416	0.035462	14.88949	0.250765	0.00099944	0.050095	0.049457	4.86133E-05	0.000238197	50.09274	24.98988	0.850685	0.003978794	0.005009572	0.00010069	0.009996	0.163168818	0.135559	2.08811E-05
	Décembre	0.237747831	0.000225	0.070702	0.005665	1.30091E-05	7.96419E-05	0.571793	0.000134	4.82332E-05	0.006119	0.029271	0.000354	0.323354	0.017627	2.18001E-06	0.000169	0.000771	0.017277164	0.000149681	0.516684	0.831701	0.017001	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.008793	3.53578E-09
	Janvier	0.237747831	0.000225	0.070702	0.005665	1.30091E-05	7.96419E-05	0.571793	0.000134	4.82332E-05	0.006119	0.029271	0.000354	0.323354	0.017627	2.18001E-06	0.000169	0.000771	0.017277164	0.000149681	0.516684	0.831701	0.017001	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.008793	3.53578E-09
	Février	0.237747831	0.000225	0.070702	0.005665	1.30091E-05	7.96419E-05	0.571793	0.000134	4.82332E-05	0.006119	0.029271	0.000354	0.323354	0.017627	2.18001E-06	0.000169	0.000771	0.017277164	0.000149681	0.516684	0.831701	0.017001	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.008793	3.53578E-09
	Mars	0.237747831	0.000225	0.070702	0.005665	1.30091E-05	7.96419E-05	0.571793	0.000134	4.82332E-05	0.006119	0.029271	0.000354	0.323354	0.017627	2.18001E-06	0.000169	0.000771	0.017277164	0.000149681	0.516684	0.831701	0.017001	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.008793	3.53578E-09
	Avril	0.091070789	0.000225	0.070702	0.005665	1.30091E-05	7.95082E-05	0.571793	0.000134	4.82136E-05	0.003434	0.020732	0.000354	0.323354	0.017622	2.18001E-06	0.000169	0.00077	0.018627001	0.000130318	0.516684	0.831701	0.017001	8.91222E-06	6.74733E-05	0.00035356	0.00212	0.000137981	0.008722	3.53578E-09
	Mai	1.95025E-07	0.033626	0.269266	0.003589	3.90137E-05	0.001727578	291.2989	0.006288	0.003661187	0.006452	0.018236	0.034413	13.44674	0.24304	0.000969632	0.048604	0.046385	1.03994E-05	0.000195715	48.61092	24.268	0.825775	0.003860196	0.004861877	0.00010824	0.009761	0.158298746	0.120463	2.02579E-05
	Juin	2.21413E-07	0.033402	0.267937	0.004753	3.88398E-05	0.001716449	289.3471	0.006246	0.003636818	0.006431	0.018269	0.034184	13.35365	0.241524	0.000963153	0.048279	0.046079	9.7078E-06	0.00019533	48.2864	24.11167	0.820351	0.003834377	0.004829732	0.00010988	0.009709	0.157237137	0.119711	2.01213E-05
	Juillet	2.26005E-07	0.033298	0.26732	0.005326	3.87587E-05	0.001711391	288.4454	0.006228	0.003625895	0.006423	0.018292	0.034079	13.31063	0.240826	0.000960144	0.048129	0.045938	9.41633E-06	0.000195216	48.13783	24.0381	0.817836	0.003822454	0.004814877	0.00011064	0.009686	0.156746798	0.119364	2.00584E-05
	Août	6.13075E-07	0.032894	0.264921	0.005076	3.84451E-05	0.001691493	284.9305	0.006153	0.003582199	0.006384	0.018293	0.033667	13.14293	0.238101	0.00094845	0.047543	0.045386	1.00863E-05	0.000194364	47.55526	23.75533	0.808067	0.003775867	0.00475692	0.00011361	0.009594	0.154835426	0.118017	1.98139E-05
	Septembre	0.00130596	0.029676	0.245787	0.004296	3.59388E-05	0.001532652	256.904	0.00556	0.003234035	0.006084	0.018355	0.030385	11.81709	0.216379	0.000855215	0.042875	0.040989	1.61816E-05	0.000187655	42.92211	21.49704	0.73012	0.003404676	0.00429484	0.00013725	0.008857	0.139592054	0.107243	1.78623E-05
	Octobre	4.28926E-07	0.033363	0.26771	0.002985	3.88101E-05	0.001714651	289.0145	0.00624	0.003632897	0.006428	0.018232	0.034146	13.33785	0.241271	0.00096205	0.048224	0.046027	1.13822E-05	0.000195238	48.23166	24.08408	0.819431	0.003829955	0.004824253	0.00011016	0.009701	0.157058616	0.11958	2.00988E-05
Lac A	Novembre	0.089330479	0.010542	0.123829	0.004109	1.97646E-05	0.000565184	93.28555	0.00222	0.001155188	0.008365	0.018278	0.011207	4.607742	0.08633	0.000296612	0.015111	0.015914	0.000151502	0.000882734	15.25146	7.828016	0.266216	0.001317842	0.001570948	0.00024052	0.006519	0.048376996	0.050269	6.16924E-06
	Décembre	0.098590544	0.011683	0.13159	0.004158	2.41454E-05	0.000631958	104.8681	0.002421	0.001290785	0.009679	0.018415	0.012783	5.243804	0.0944	0.000328005	0.016761	0.017708	0.000132877	0.001009064	16.99486	8.691052	0.300388	0.001459497	0.001750056	0.00023747	0.008838	0.053656477	0.056511	6.82808E-06
	Janvier	0.109291422	0.013705	0.144324	0.004099	2.99295E-05	0.000745698	124.5785	0.002766	0.001524668	0.011057	0.018496	0.015327	6.338744	0.10831	0.000384892	0.01969	0.020695	0.00010305	0.001123107	20.03592	10.19435	0.357271	0.00169614	0.00205677	0.00022633	0.011656	0.063139549	0.065746	8.02207E-06
	Février	0.11806312	0.01539	0.154918	0.004034	3.46302E-05	0.00084025	140.9663	0.003054	0.001719226	0.012208	0.018556	0.017432	7.265494	0.119897	0.000432412	0.022132	0.023176	8.65655E-05	0.001224676	22.56715	11.44569	0.404471	0.001892829	0.002311979	0.00021691	0.01393	0.071049249	0.073369	9.01864E-06
	Mars	0.12683212	0.017085	0.165566	0.003986	3.90714E-05	0.000934666	157.4584	0.003344	0.001913867	0.013282	0.018625	0.019515	8.157244	0.131549	0.000480333	0.024588	0.025661	7.56565E-05	0.00130391	25.10541	12.69978	0.451392	0.002089755	0.002567431	0.00020743	0.01604	0.079016077	0.080895	1.0024E-05
	Avril	0.1137083	0.013356	0.145178	0.003981	2.96483E-05	0.000724182	120.4464	0.002754	0.001484754	0.010698	0.018268	0.019484	6.348952	0.106794	0.000373739	0.019169	0.020355	4.50575E-05	0.001197575	19.50067	9.929511	0.348325	0.001681216	0.00201184	0.00024493	0.011834	0.061297205	0.065596	7.78548E-06
	Mai	0.069752675	0.01054	0.119905	0.003885	1.99241E-05	0.000567522	91.93492	0.00215	0.001159334	0.006576	0.017018	0.011208	4.645658	0.085105	0.000297856	0.015127	0.015523	5.94944E-05	0.000755368	15.29643	7.855144	0.267118	0.001284679	0.001564494	0.00021912	0.006272	0.048612644	0.047427	6.19951E-06
	Juin	0.062837306	0.011077	0.123202	0.004228	1.98484E-05	0.000592478	95.85054	0.002247	0.00121597	0.006233	0.017073	0.011687	4.699615	0.088703	0.000313763	0.015909	0.016175	5.6236E-05	0.000736969	16.05767	8.228038	0.279157	0.001343031	0.001639011	0.00021554	0.006047	0.051188117	0.048534	6.53202E-06
	Juillet	0.065171209	0.009656	0.114554	0.004265	1.81415E-05	0.00051897	83.04963	0.002001	0.001059646	0.006001	0.017171	0.01019	4.051887	0.0791	0.000272502	0.013845	0.014523	6.98365E-05	0.000750064	13.98507	7.207063	0.243636	0.001185979	0.001434089	0.00022527	0.005528	0.044423335	0.043783	5.66781E-06
	Août	0.064388745	0.010089	0.11798	0.004335	1.87021E-05	0.000540498	86.66467	0.002088	0.001106899	0.006056	0.017357	0.010652	4.223723	0.082248	0.000284818	0.014469	0.01487	6.60113E-05	0.000765293	14.61025	7.514896	0.254405	0.001239751	0.001497892	0.0002266	0.005763	0.04643706	0.045474	5.92505E-06
	Septembre	0.065424836	0.009457	0.113905	0.004259	1.81929E-05	0.000508606	81.1339	0.001976	0.001038499	0.006004	0.017329	0.010019	3.998173	0.077924	0.000266404	0.013553	0.014021	7.34914E-05	0.000789805	13.69848	7.065446	0.239141	0.001169713	0.001407789	0.00022971	0.005682	0.043433135	0.043448	5.53972E-06
	Octobre	0.066765818	0.009621	0.115516	0.004156	1.80947E-05	0.000515452	82.51659	0.002019	0.001054913	0.006154	0.017395	0.010163	4.113378	0.079221	0.000271037	0.013789	0.014284	6.83622E-05	0.000815415	13.92134	7.172578	0.242585	0.001193796	0.001431654	0.000232	0.005644	0.044175785	0.044244	5.63588E-06
Jonction 26	Mai	0.088221538	0.008345	0.110143	0.003988	1.7143E-05	0.000450567	72.57725	0.001833	0.000914246	0.006564	0.018773	0.008892	3.700679	0.071348	0.000232985	0.011924	0.012834	0.000152871	0.000349671	12.05361	6.253677	0.211401	0.001071645	0.001253641	0.00025374	0.005685	0.037946569	0.04211	4.83684E-06
	Juin	0.077399243	0.008746	0.111656	0.004221	1.66707E-05	0.000468654	75.09014	0.00189	0.000955841	0.00595	0.018995	0.009195	3.712103	0.073562	0.000245382	0.012511	0.01321	0.00013604	0.000334338	12.61937	6.531163	0.219733	0.001106151	0.001305754	0.00024591	0.005184	0.039938871	0.042058	5.09646E-06
	Juillet	0.0790694	0.007658	0.105017	0.00425	1.53694E-05	0.000412503	65.29909	0.001702	0.000836323	0.005829	0.019212	0.00805	3.215795	0.066376	0.000213829	0.010933	0.01174	0.000174088	0.000344884	11.03471	5.750431	0.192571	0.000985737	0.001149073	0.00025319	0.004786	0.034766503	0.038432	4.43572E-06
	Août	0.078116952	0.008047	0.107943	0.004306	1.58777E-05	0.000432018	68.57346	0.001778	0.000878926	0.005871	0.019194	0.008465	3.371347	0.069161	0.000224942	0.011495	0.012286	0.000170148	0.000360279	11.59773	6.027917	0.202288	0.001032955	0.001206167	0.00025356	0.00499	0.036587424	0.03989	4.66791E-06
	Septembre	0.079018135	0.007538	0.104675	0.004246	1.54604E-05	0.000406242	64.11278	0.001687	0.000823718	0.005768	0.01892	0.007954	3.188573	0.065684	0.000210078	0.010756	0.011602	0.000184839	0.000360031	10.86229	5.665139	0.18996	0.000976577	0.0011335	0.00025617	0.004921	0.034161909	0.03825	4.35713E-06
	Octobre	0.078138537	0.007951	0.107338	0.004164	1.57767E-05	0.00042676	67.71178	0.001764	0.000868338	0.005864	0.018574	0.008372	3.400513	0.068519	0.000222053	0.011355	0.012165	0.00015988	0.000421652	11.45658	5.956189	0.199923	0.001024348	0.001192797	0.00025419	0.005	0.036116127	0.039635	4.60749E-06
Jonction 27	Mai	0.091256961	0.008555	0.111905	0.004009	1.77396E-05	0.000462291	74.74547	0.001876	0.000938139	0.00739	0.018681	0.009158	3.809809	0.072936	0.000238742	0.012226	0.013188	0.000133584	0.000530598	12.36445	6.406789	0.217219	0.001099992	0.001286273	0.00025503	0.006014	0.038903445	0.043452	4.95709E-06
	Juin	0.078910209	0.008504	0.110457	0.00422	1.63409E-05	0.000455594	72.93394	0.001853	0.000928868	0.006304	0.019036	0.008936	3.609536	0.072178	0.000238261	0.012158	0.012904	0.000146881	0.000412639	12.2624	6.354832	0.213565	0.001081515	0.001271174	0.00024906	0.005094	0.038772529	0.04144	4.94748E-06
	Juillet	0.080512912	0.007451	0.104026	0.004249	1.5081E-05	0.000401588	63.4555	0.001671	0.000813158	0.006193	0.019234	0.007828	3.129026	0.065058	0.000207731	0.01063	0.01148	0.000184619	0.000422937	10.72818	5.599158	0.18727	0.00096497	0.001119461	0.00025609	0.004709	0.033764401	0.037931	4.30775E-06
	Août	0.079546973	0.007835	0.106899	0.004303	1.55839E-05	0.000420878	66.68979	0.001745	0.000855229	0.006238	0.01926	0.008238	3.282633	0.067805	0.000218703	0.011186	0.012019	0.000186261	0.000439699	11.28455	5.873426	0.196865	0.001011399	0.001175824	0.00025638	0.004909	0.035561519	0.039365	4.5371E-06
	Septembre	0.080431968	0.007338	0.103717	0.004245	1.51756E-05	0.000395753	62.34133	0.001657	0.000801422	0.006129	0.018996	0.00774	3.104478	0.064415	0.000204221	0.010465	0.011352	0.000206239	0.000437337	10.56749	5.519614	0.184843	0.000956442	0.001104972	0.00025893	0.004842	0.033197892	0.037764	4.23415E-06
	Octobre	0.079328423	0.007777	0.106483	0.004164	1.55343E-05	0.000417573	66.16477	0.001738	0.000848899	0.006224	0.018626	0.008185	3.325896	0.067403	0.000216938	0.0111	0.011945	0.000176519	0.000504035	11.19893	5.829056	0.195463	0.001006582	0.001167849	0.00025652	0.004933	0.035275884	0.039209	4.50006E-06
Jonction 28	Mai	0.122137333	0.002043	0.078779	0.004162	7.83195E-06	0.000113471	15.72941	0.00087	0.000208823	0.004603	0.019833	0.002068	0.910757	0.0308	4.85287E-05	0.002743	0.004758	0.003597293	3.68215E-05	2.74126	1.655838	0.049419	0.000428405	0.000349768	0.00033488	0.002905	0.007577888	0.02386	9.64673E-07
	Juin	0.119609162	0.001986	0.078193	0.004201	7.46055E-06	0.000109735	14.93747	0.000857	0.000201759	0.004475	0.020031	0.001971	0.849508	0.030331	4.71146E-05	0.002663	0.004637	0.003276095	3.3844E-05	2.652468	1.611767	0.047463	0.000419357	0.000339893	0.00033392	0.002681	0.007333433	0.023292	9.35079E-07
	Juillet	0.119002078	0.001919	0.077606	0.004208	7.40477E-06	0.000106488	14.31346	0.000842	0.000194588	0.00448	0.02006	0.001902	0.813756	0.029824	4.5203E-05	0.002565	0.004533	0.003146005	3.52903E-05	2.556677	1.564776	0.045853	0.000410513	0.000329982	0.00033341	0.002657	0.007022567	0.022992	8.95251E-07
	Août	0.119010172	0.001967	0.078047	0.004218	7.4656E-06	0.000108821	14.70742	0.000853	0.000199818	0.004508	0.0201	0.001954	0.832519	0.030192	4.6561E-05	0.002635	0.004605	0.0032699	3.56467E-05	2.625881	1.598823	0.047044	0.000416972	0.00033719	0.00033388	0.002686	0.007244172	0.023203	9.2354E-07
	Septembre	0.119366329	0.001842	0.077283	0.004206	7.34772E-06	0.000102419	13.61049	0.000831	0.000186132	0.004503	0.020287	0.001826	0.785975	0.029347	4.29002E-05	0.002453	0.00444	0.005112839	3.57006E-05	2.443839	1.509071	0.043972	0.000403336	0.000319279	0.00033447	0.002663	0.006645529	0.022819	8.46865E-07
	Octobre	0.11791742	0.002109	0.078717	0.004189	7.66919E-06	0.000116348	15.97068	0.000875	0.000215716	0.004733	0.020475	0.002108	0.90699	0.031098	5.07152E-05	0.002842	0.004786	0.005951608	4.10546E-05	2.835604	1.701933	0.050691	0.000431611	0.000357573	0.00033186	0.00275	0.007928505	0.023616	1.01079E-06

Notes: [a] Les critères réglementaires concernent l'ammoniac non ionisé.

Critère CCME pour:

La concentration d'aluminium dépend des conditions de pH. Des valeurs sont fournies à titre de référence pour [b] pH<6.5 et [c] pH>=6.5

La concentration de cadmium dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [d] 0--17, [e] >=280 et [f] 40 mg/L.

La concentration de cuivre dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [g] 0--82 et [h] >=180 mg/L.

La concentration de manganèse dépend de la dureté de l'eau et des conditions de pH. Des valeurs sont fournies à titre de référence pour une dureté de [i] 10-24 et [j] >=670 mg/L, ainsi que d'un pH de [i] 6.7-6.9 et [j] 6.5-6.7.

La concentration de nickel dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [k] <=60 et [l] >=180 mg/L.

La concentration de plomb dépend de la dureté de l'eau. Des valeurs sont fournies à titre de référence pour une dureté de [m] <=60 et [n] >=180 mg/L.

La concentration de zinc dépend de la dureté, de la concentration en carbone organique dissous (COD) et du pH. Des valeurs sont fournies à titre de référence pour un pH de 6.5 à 6.7 (cas o, p, q), un COD de 8 mg/L (cas o, p, q) et une dureté de [o] 8, [p] 399, and [q] 38 mg/L.

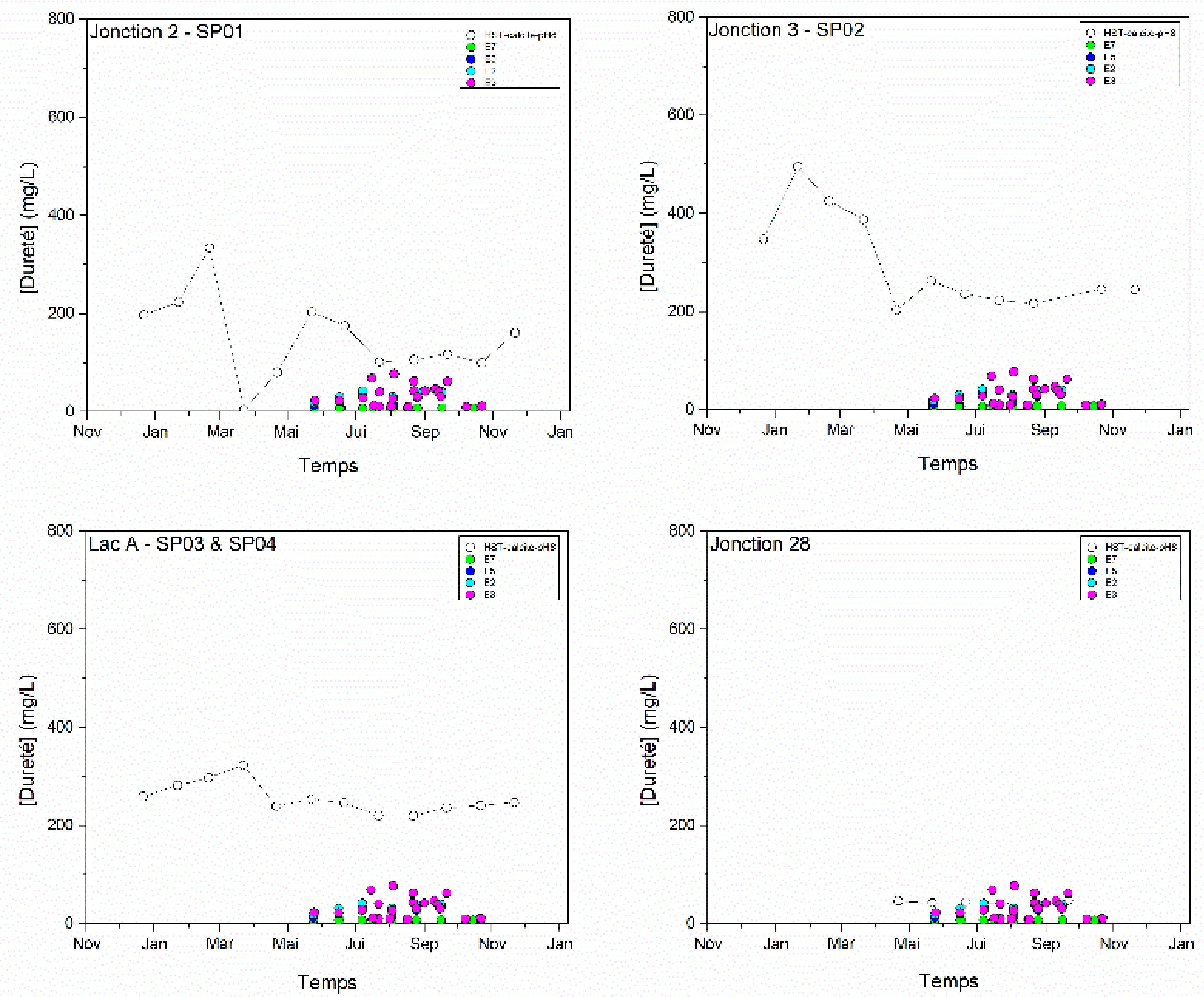

Figure 12.6 **Year 21: Simulated vs. reference hardness (mg/l) for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Simulated values are shown in red and black. Solid lines represent the HST_Calcite_pH8 scenario.**

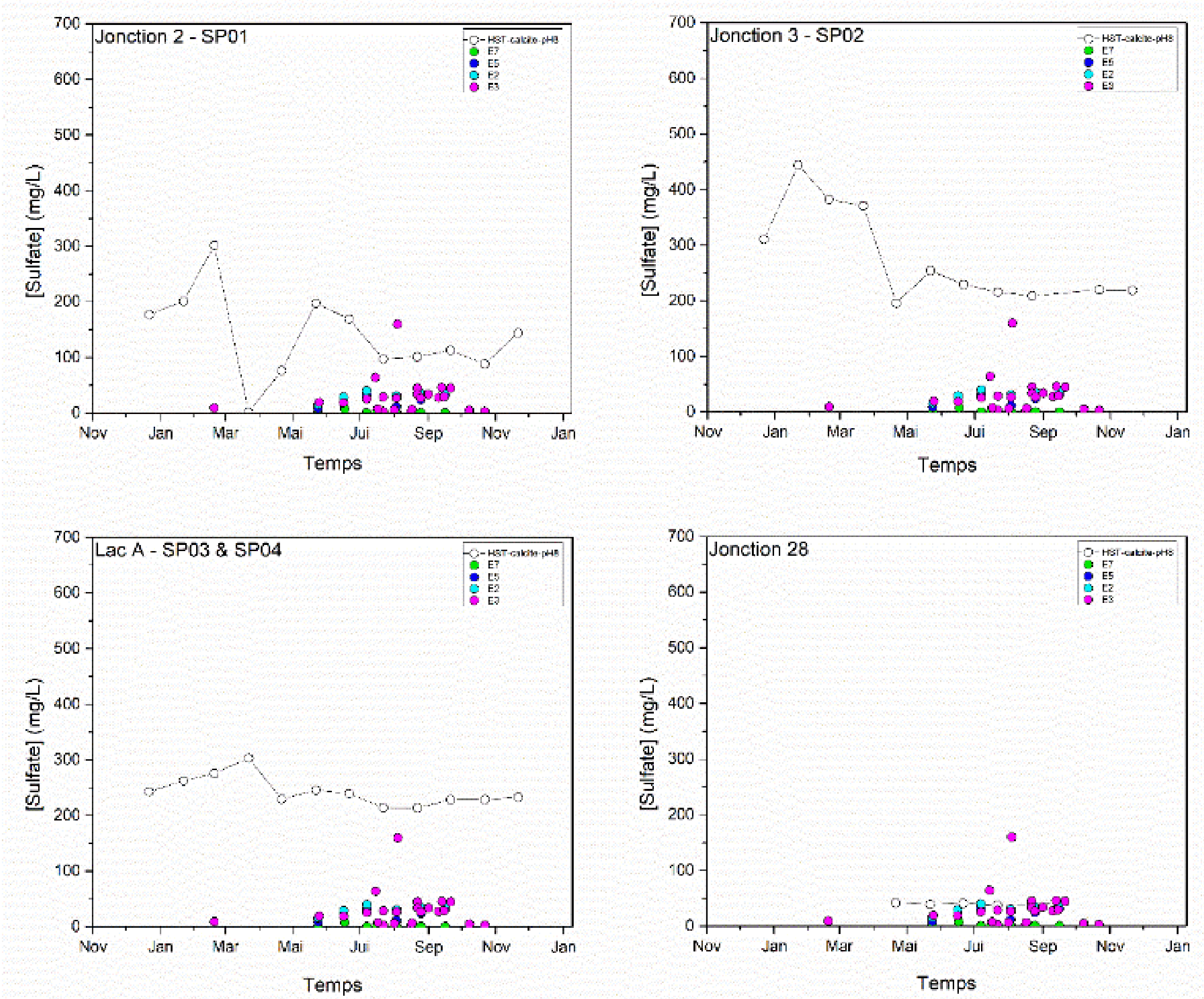

Figure 12.7 **Year 21: Simulated sulfate vs. sulfate baseline concentration (mg/l) for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Simulated values are shown in red and black. Solid lines represent the HST_Calcite_pH8 scenario.**

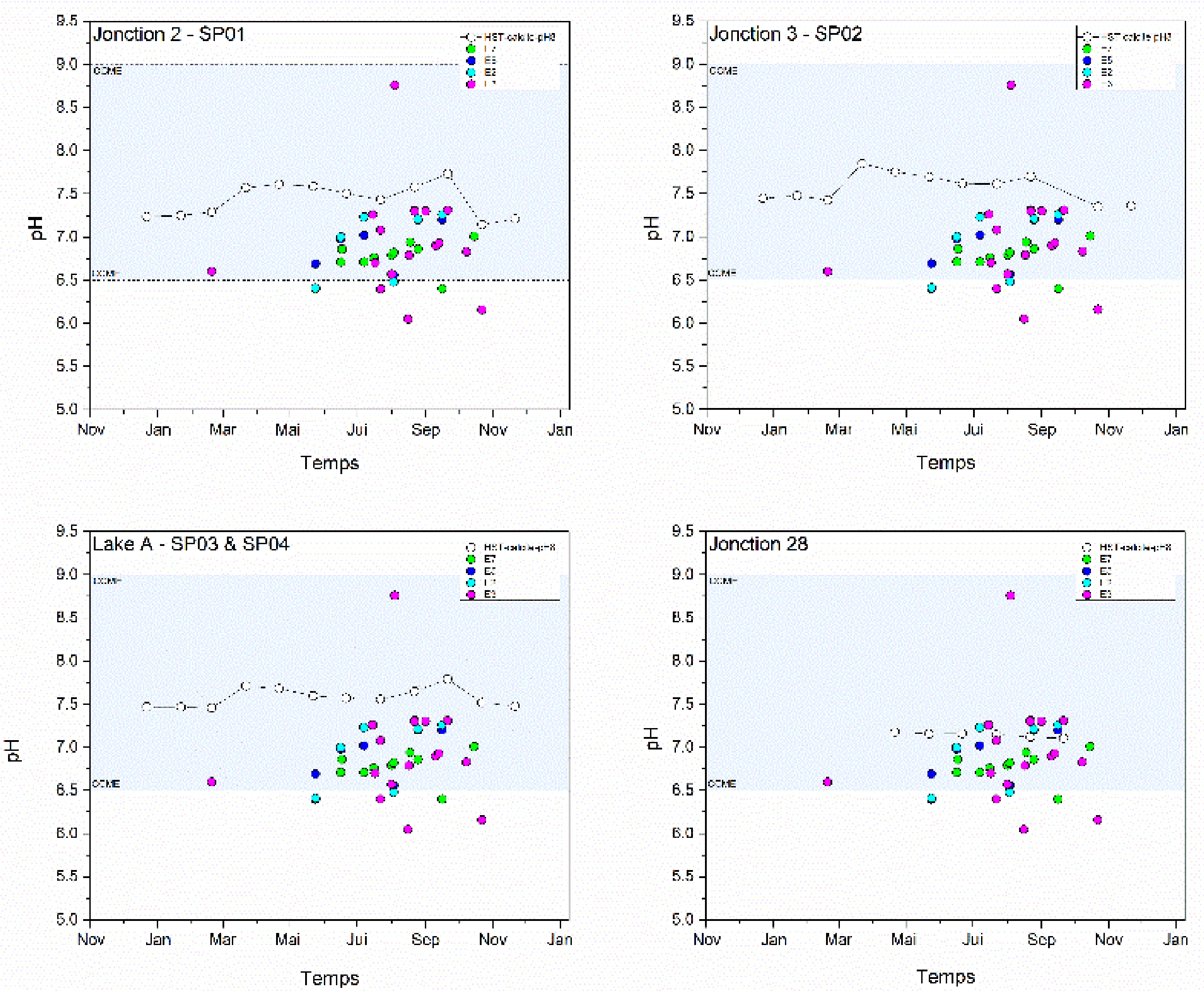

Figure 12.8 **Year 21: Simulated pH values vs. reference conditions for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Simulated values are red and black. Solid lines represent the HST_Calcite_pH8 scenario. The shaded area illustrates the acceptable pH range according to CCME.**

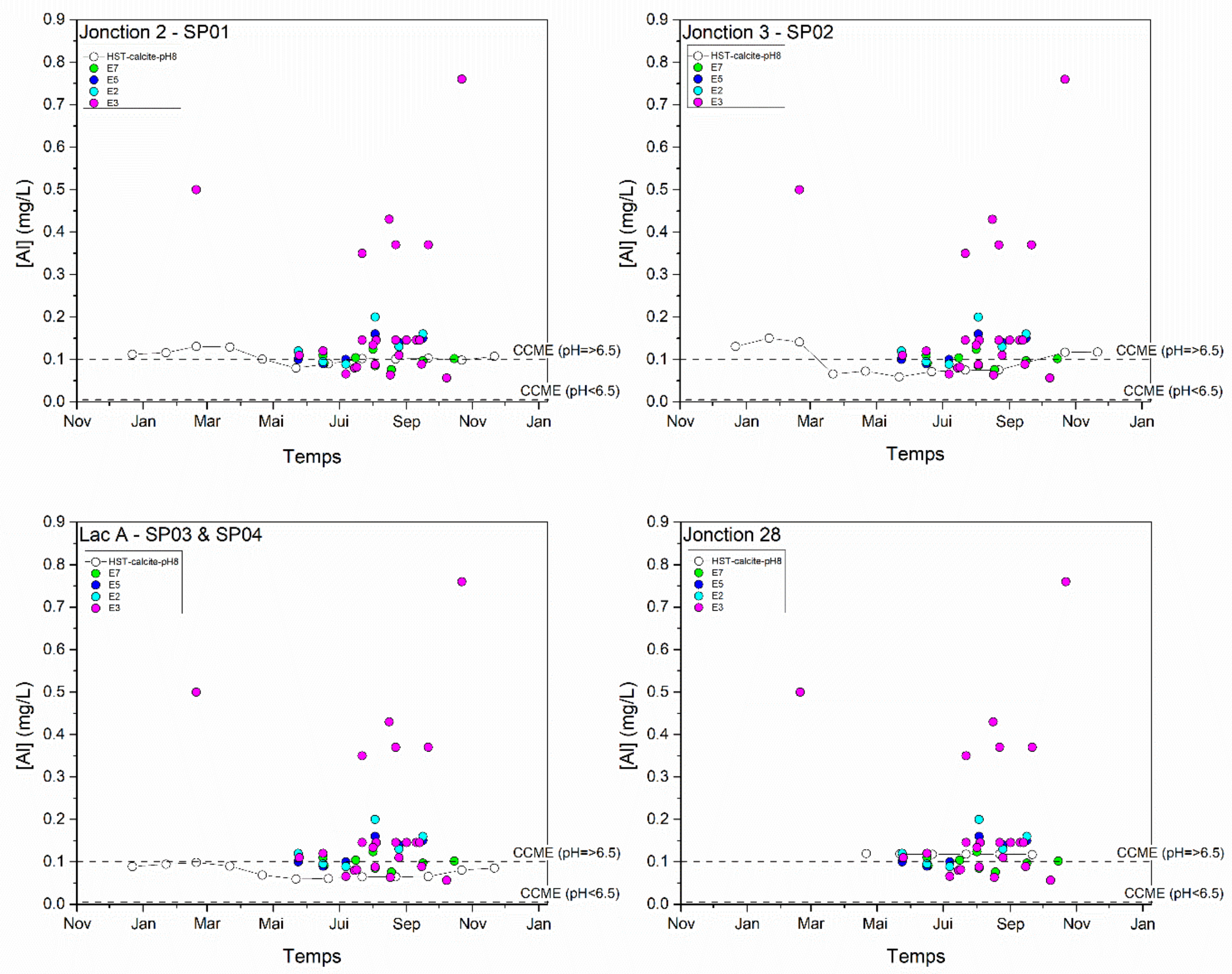

Figure 12.9 **Year 21: Simulated aluminum concentrations vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Solid lines represent the HST_Calcite_pH8 scenario. CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable).**

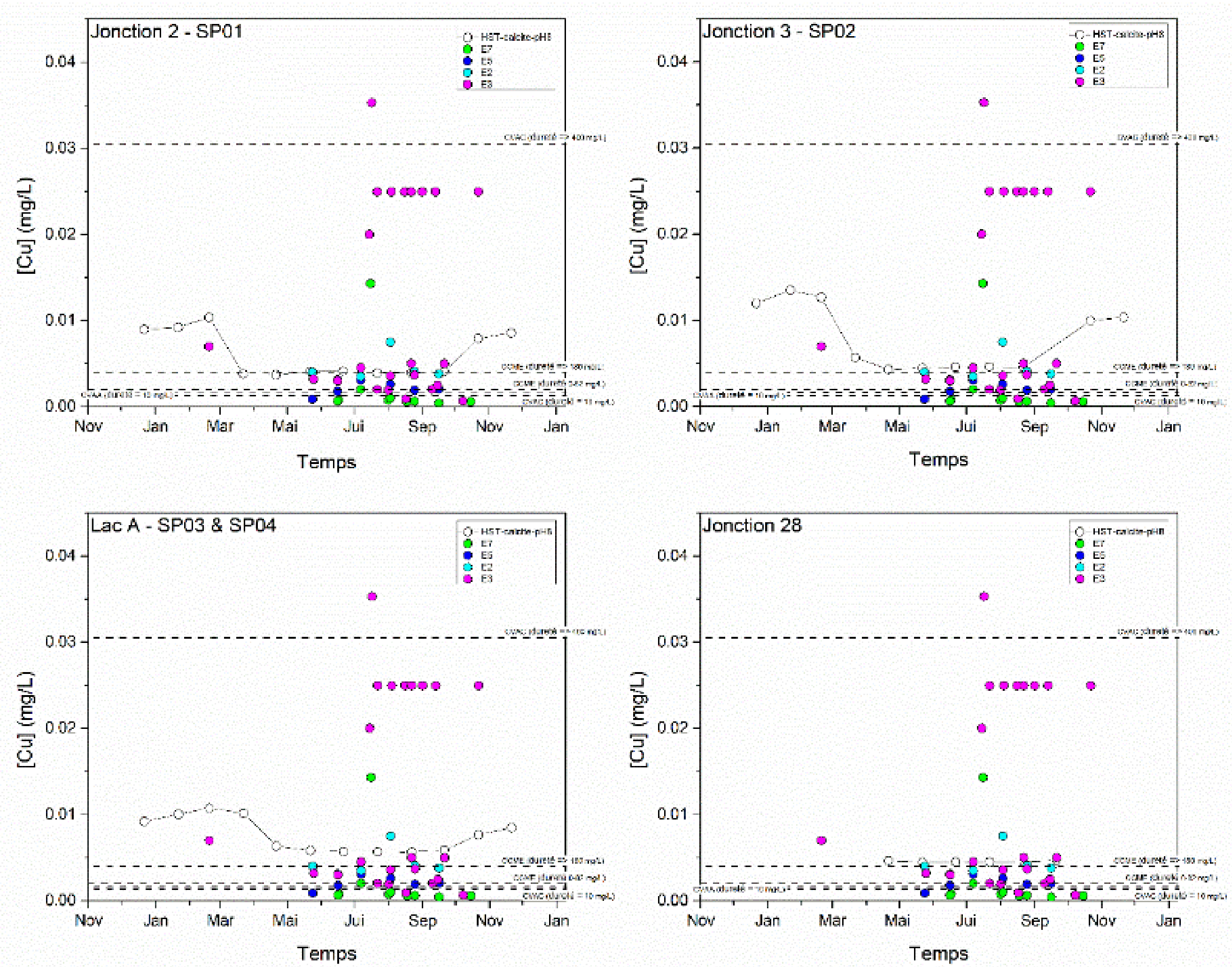

Figure 12.10 **Year 21: Simulated copper concentrations vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable). Solid lines represent the HST_Calcite_pH8 scenario.**

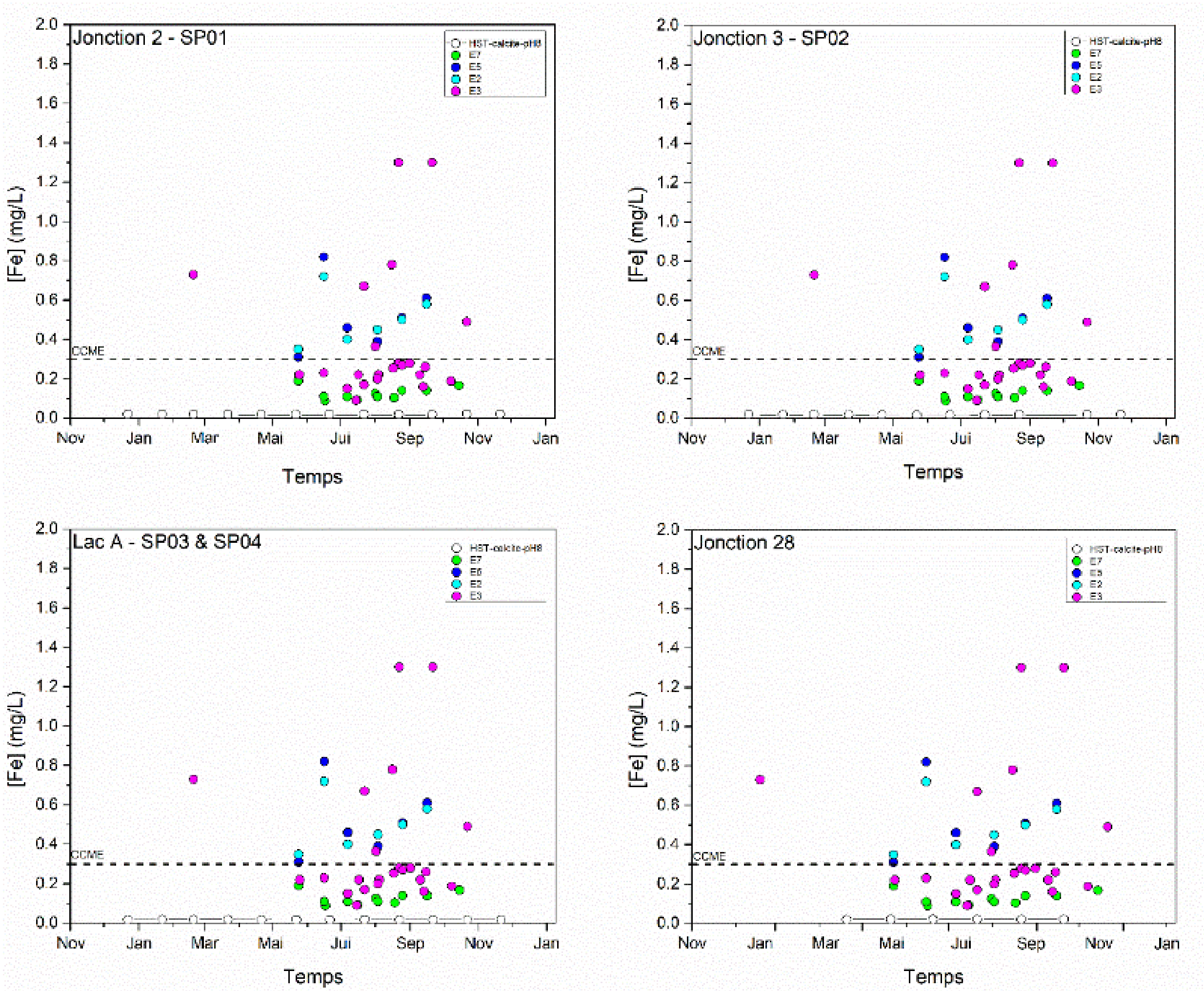

Figure 12.11 **Year 21: Simulated iron concentrations vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable). Solid lines represent the HST_Calcite_pH8 scenario.**

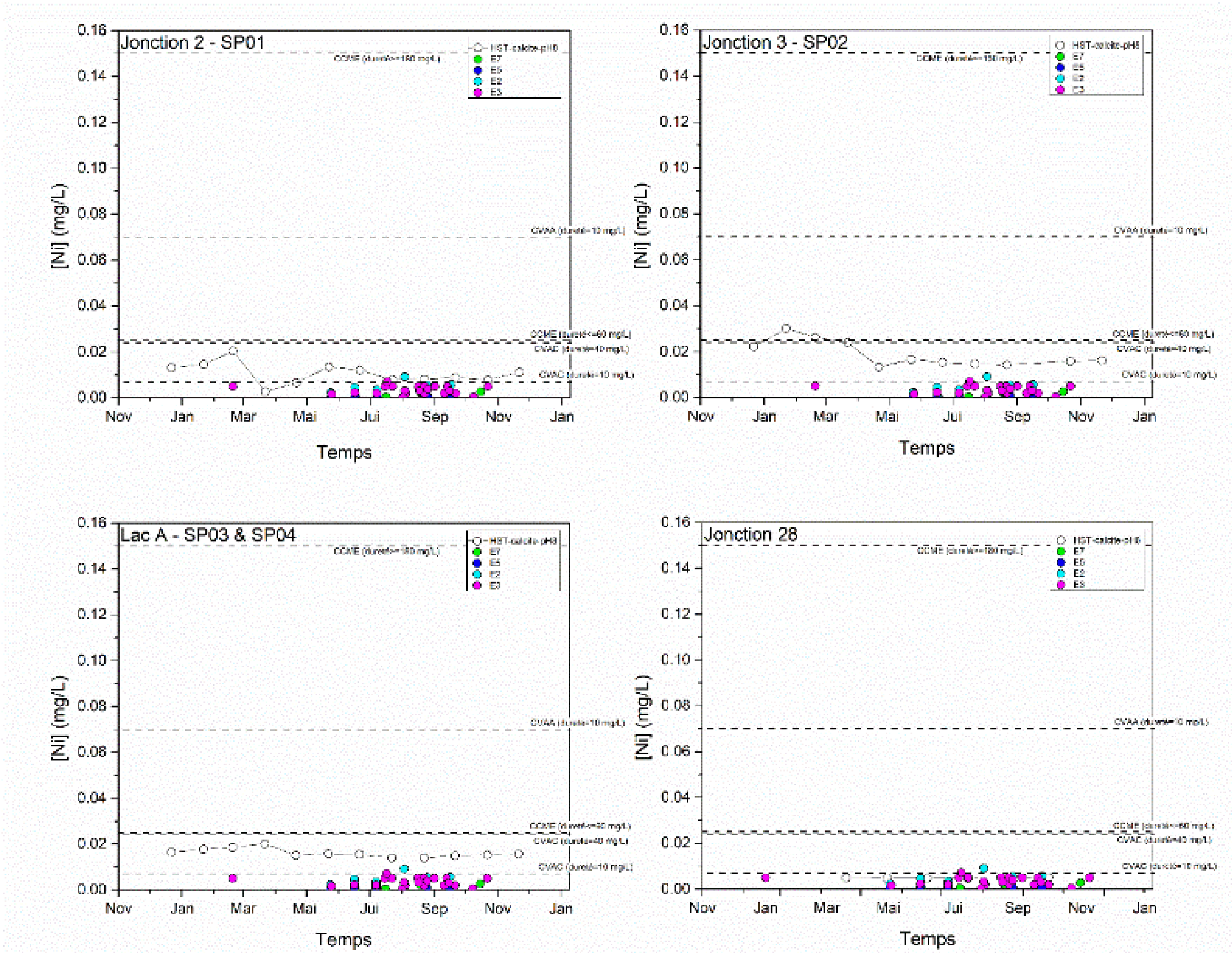

Figure 12.12 **Year 21: Simulated nickel concentrations vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable). Solid lines represent the HST_Calcite_pH8 scenario.**

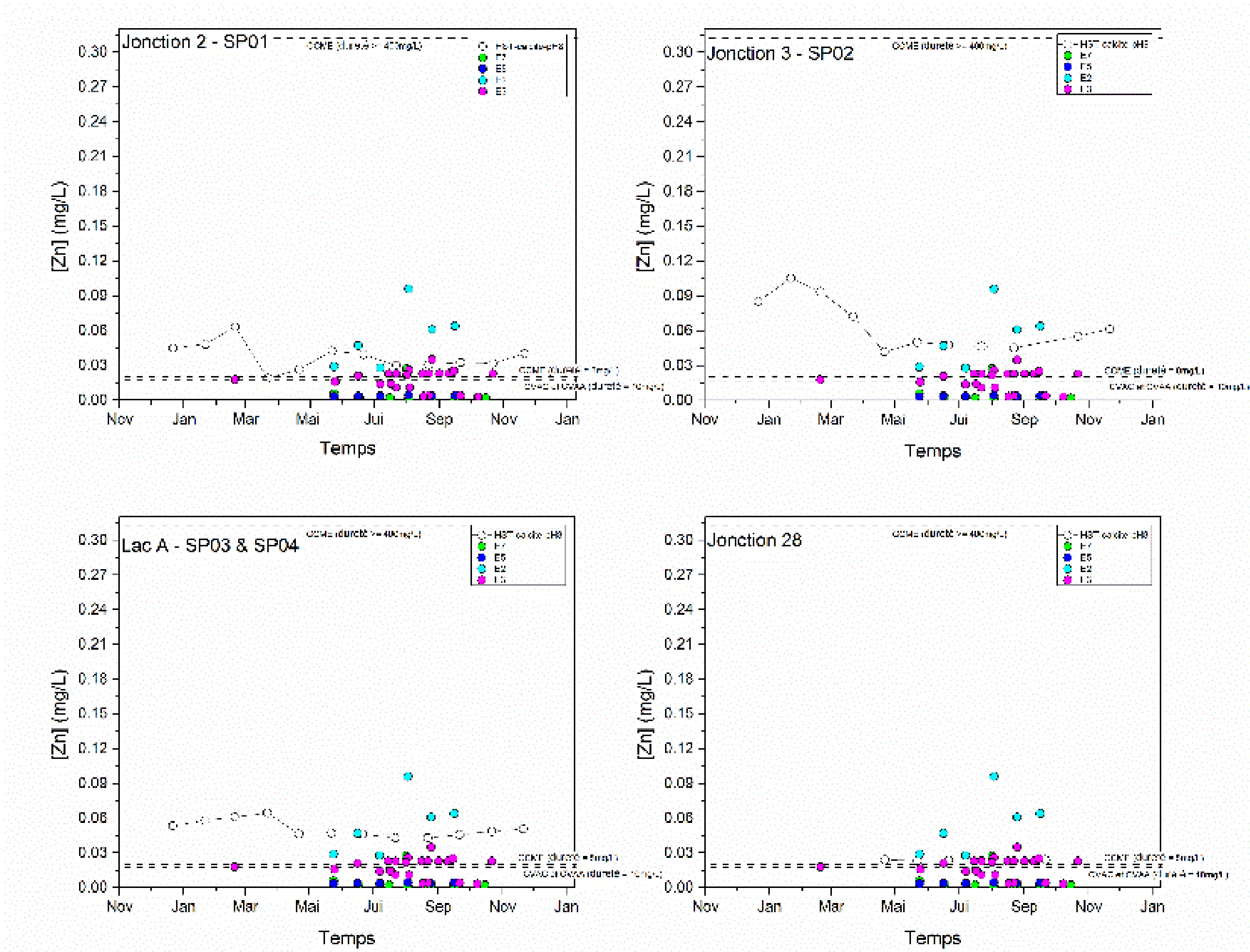

Figure 12.13 **Year 21: Simulated zinc concentrations vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable). Solid lines represent the HST_Calcite_pH8 scenario. The CCME criterion for zinc is dependent on hardness, pH and COD. For reference, regulatory limits are given for a pH of 6.5 and a COD content of 8 mg/**

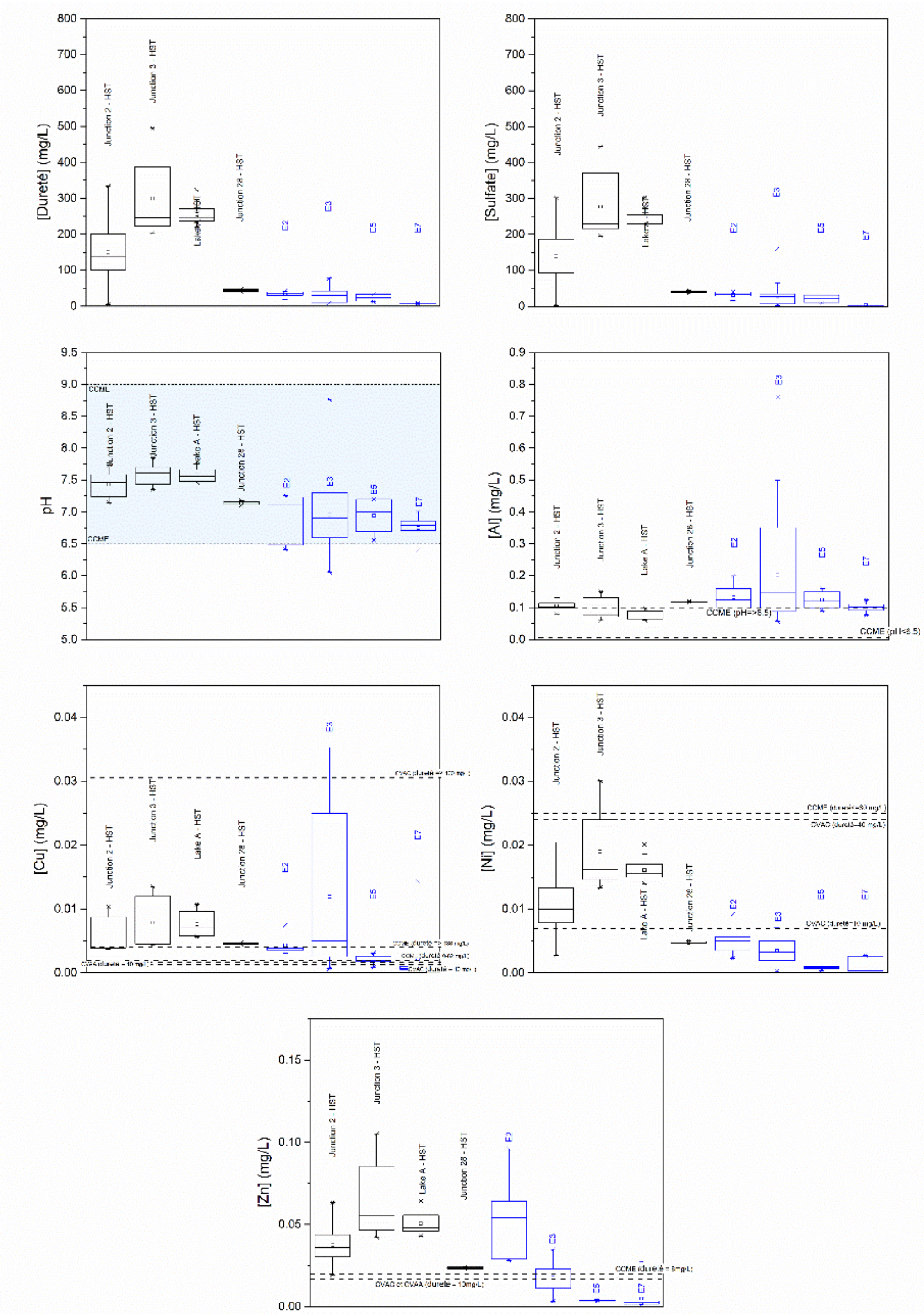

Figure 12.14 **Year 21: Simulated water quality parameters vs. reference parameters for Junctions 2 (near SP01), 3 (near SP02), 28 and Lake A (near SP03 and SP04). Simulated and reference values are illustrated by the black and blue boxes, respectively. CCME regulatory limits are shown, depending on pH and hardness conditions (where applicable). Solid lines represent the HST_Calcite_pH8 scenario.**

The following key observations can be drawn from the modeling results based on the HST_calcite_pH8 scenario, for Year 21:

- Mine effluent discharge and pit dewatering in the environment would increase hardness concentrations by at least one order of magnitude along Bibou Creek and Lake A (PE43), relative to baseline conditions.
- According to the source models developed by MDAG (2024), the anticipated maximum concentrations of dissolved mining effluent meet the criteria of the MDMER and Directive 019 (MDDEP, 2012).
- All simulated parameters at the various locations assessed (Map 12.3) meet the effluent discharge criteria of the MDMER and Directive 019 (MDDEP, 2012).
- pH conditions will be maintained at a neutral alkaline level during Year 21 at all locations assessed.
- Aluminum concentrations will be controlled by the solubility of aluminum oxide phases.
- The model predicts virtually complete oxidation of Fe^{2+} to Fe^{3+} under atmospheric conditions. Fe^{3+} concentrations are controlled by the solubility of iron oxyhydroxide phases.
- Exceedances of regulatory criteria for dissolved metals caused by the release of mining effluents into the environment are anticipated in Junctions 2 (in the vicinity of SP01) to 27 (including Lake A (in the vicinity of SP03 and SP04)) based on simulated concentrations. A summary of exceedances is provided below.
- The simulated concentration of dissolved metals at Junction 28 remains within the variability of reference conditions, with the exception of cadmium concentrations.
- CCME criteria for several elements are similar to or below the detection limits stipulated by Directive 019 (MDDEP, 2012). The following examples, based on exceedances observed in water quality model results, illustrate this observation:
  - The CCME criterion for cadmium is 0.00007 mg/l, an order of magnitude below the detection limit expected in Directive 019 (0.0007 mg/l).
  - The CCME criterion for arsenic is 0.005 mg/l. This criterion is of the same order of magnitude as the detection limit provided by Directive 019 (0.001 mg/l).
  - The CCME criterion for copper is 0.002 to 0.004 mg/l. This criterion is of the same order of magnitude as the detection limit provided by Directive 019 (0.003 mg/l).
  - The CCME criterion for selenium is 0.001 mg/l, below the detection limit provided by Directive 019 (0.005 mg/l).
  - The CCME criterion for un-ionized ammonia is 0.019 mg/l. This criterion is an order of magnitude lower than the detection limit provided by Directive 019 (0.13 mg/l). It should be noted that the criterion provided by Directive 019 applies to ammoniacal nitrogen.
- Parameter exceedances of CCME criteria whose thresholds are at or below the respective detection limits cannot be confirmed. Thus, parameters whose concentrations exceed CCME regulatory criteria, but remain below the detection limits set out in Directive 019 (MDDEP, 2012) are reported as exceedances for indicative purposes; however, they should not be considered actual exceedances. If

one of these parameters has a concentration exceeding another regulatory criterion (including CVAC, CVAA, Directive 019 or REMMMD), then it should be treated as an exceedance. In addition, if the concentration of a parameter exceeds both the detection limit in Directive 019 (MDDEP, 2012) and the CCME criteria, then this parameter must also be treated as an exceedance.

- The mass balance model provides dissolved concentrations for total ammonia nitrogen, while the CCME and REMMMD criteria are specified only for un-ionized ammonia.
- The main difference between the climate change scenarios and historical conditions lies in the fact that, during the winter months, the ratio of effluent water to clean water is higher, while the opposite is observed during the rest of the year. In addition, climate change scenarios lead to an increase in precipitation, which increases the relative volume of clean water to contact water. This results in an increase in dissolved metal concentrations and water hardness, observed during winter in the climate change scenarios, compared to historical reference conditions. For the rest of the year, dissolved metal concentrations and water hardness are higher in the scenarios representative of historical reference conditions, than in the climate change scenarios.
- Summary of simulated conditions at Junction 2 (near SP01):
  - Anticipated average sulfate and hardness concentrations are 139 and 150 mg/l respectively.
  - Since the CVAC and CVAA criteria for aluminum and copper are hardness-dependent, increasing hardness at Junction 2 (near SP01) will have a beneficial impact and eliminate exceedances of reference conditions.
  - However, exceedances of CCME criteria are expected for 9 of the 12 data points (one per month) for aluminum and 8 of the 12 points for copper.
  - The majority of simulated data points (11 out of 12) show uranium concentrations exceeding CCME criteria.
  - Exceedances of CCME criteria for selenium and cadmium are anticipated for 5 of the 12 data points for each of these elements.
  - Arsenic concentrations are expected to exceed CCME criteria for 7 of the 12 data points.
  - Dissolved total ammonia nitrogen concentrations are expected to exceed CCME criteria at 6 of the 12 data points.
- Summary of simulated conditions at Junction 3 (near SP02):
  - Anticipated average sulfate and hardness concentrations are 275 and 296 mg/l respectively.
  - No exceedances of CVAC and CVAA criteria are anticipated for aluminum and copper.
  - However, exceedances of CCME criteria are anticipated for 5 of the 12 data points (months) for aluminum and for all 12 data points for copper.
  - Simulated data indicate uranium concentrations exceeding both CVAC and CCME criteria.
  - Arsenic concentrations are expected to exceed CCME criteria for 7 of the 12 data points (months).
  - Selenium and cadmium will also exceed CCME criteria.

  - Simulated nitrate concentration exceeds CCME criteria for 1 of 12 data points, reaching a maximum value of 3.7 mg/l.
  - Total dissolved ammonia nitrogen concentrations are expected to exceed CCME criteria at all 12 data points.
- Summary of simulated conditions at Lake A (PE43) (station E3):
  - Average sulfate and hardness concentrations are estimated at 243 and 250 mg/l respectively.
  - No exceedances are anticipated for CVAC, CVAA or CCME aluminum criteria.
  - Copper concentrations exceed CCME criteria.
  - Simulated data indicate uranium concentrations exceeding CVAC and CCME criteria.
  - Selenium and cadmium will exceed CCME criteria.
  - Total dissolved ammonia nitrogen concentrations are expected to exceed CCME criteria within 12 data points (months).
- Summary of simulated conditions at Junction 28:
  - Simulated average sulfate and hardness concentrations are 44 and 40 mg/l respectively.
  - Copper concentrations will exceed CVAC and CCME criteria, due to lower hardness concentrations compared to Junctions 2 (near SP01) and 3 (near SP02), as well as Lake A (PE43) (near SP03 and SP04).
  - Aluminum concentrations exceed CCME criteria.
  - Simulated trace element data are within the variability of baseline data collected at surface water sampling stations E2, E3, E5 and E7, with the exception of cadmium.

The potential impacts on surface water quality anticipated during the construction and closure phases of the Troilus mining project have not been quantitatively assessed using the predictive model. However, certain conclusions can be inferred for the construction and closure phases from the results obtained for Year 21 of the operations phase. It should be noted that the impact assessments for the construction and closure phases have only been carried out qualitatively, which introduces a degree of uncertainty. To estimate the potential impacts likely to occur during the construction and closure phases of the Troilus mining project, a quantitative water quality model should be developed.

During the construction phase, no mining of ore or waste rock is planned. Consequently, the exceedances of surface water quality criteria simulated by the predictive surface water quality model are not applicable during this phase, with the exception of those already observed at reference conditions in the existing environment. Thus, no new impacts on water quality are anticipated beyond those already observed under reference conditions in the existing environment.

During the closure phase, all extracted waste rock will remain on site. The TSF will have reached its maximum capacity, and some of the tailings will be disposed of in pits. The closure plan calls for backfilling the pits to form pit lakes. Flooding the tailings pits should inhibit dissolution and leaching resulting from oxidation of the sulphide minerals present in the tailings. This would reduce the potential residual impacts of tailings on water quality in surface environments. However, a hydrogeological contaminant transport model would need to be developed to assess the impacts of tailings in pit lakes. Pit dewatering will cease upon closure. Pit dewatering contributed to elevated sulphate and hardness concentrations expected in receiving environments. It was also identified as a source of metal loading in mine effluent released to the environment in Year 21 of operations (notably for arsenic, cadmium, copper, selenium and uranium). Although the potential impact on the receiving environment and along flow paths is likely to be similar to that anticipated by modelling in the operational phase (with the same exceedances of regulatory criteria for certain metals as for Year 21), the magnitude of this impact is expected to be reduced and could be confined to the spatial limits of the LSA.

12.4.5 Summary of Project Residual Impacts

Table 12.14 summarizes the anticipated residual impacts of the project on surface water quality.

Table 12.14 Residual impacts of the project on surface water quality

Residual impact	Residual Impact Characterization							
	Project phase	Direction	Magnitude	Geographic extent	Timing	Duration	Frequency	Reversibility
Modification of physico-chemical parameters of the receiving environment	C	A	L	LSA	SE	LT	C	R
	O	A	M	RSAa	SE	LT	C	R
	D	A	M	LSA	SE	LT	C	R

Project phase :
C: Construction
O: Operation
D: Decommissioning and Closure

Direction :
P: Positive
A: Adverse

Magnitude :
N: No Measurable Change
L: Low
M: Moderate
H: High

Geographic extent :
PDA: Project Development Area
LSA: Local Study Area
RSA: Regional Study Area

Timing :
NS: No sensitivity
SM: Moderate sensitivity
SE: High sensitivity

Duration :
ST : Short term
MT: Medium-term
LT : Long term
N/A: Not applicable

Frequency :
S : Single event
IR: Irregular event
R: Regular event
C : Continuous

Reversibility :
R : Reversible
I: Irreversible

a Moderate impacts on surface water quality are predicted up to Junction 27. No other exceedances of regulatory criteria other than those reported at reference conditions in the existing environment are observed at Junction 28. This is located directly at the LSA boundary.

Exceedances of regulatory criteria are anticipated for metals (see Section 12.4.4), caused solely by the release of mining effluent into the environment during the operational phase of the Troilus mining project (i.e., excluding exceedances already observed at baseline conditions in the existing environment). These exceedances are anticipated up to Junction 27, located at the LSA boundary. No impact on surface water quality is anticipated at Junction 28 (located near the boundary between the LSA and the RSA).

Consequently, the moderate impact indicated in Table 12.14 extends over the entire LSA and affects only a minor area of the RSA (the zone between Junctions 27 and 28; see Map 12.3).

12.4.6 Summary of Adverse Impacts

Based on geochemical analyses of Troilus site rock formations and monitoring of previous operations, mined ore will not produce acid rock drainage (ARD), although this may occur locally. Water quality predictions have been modeled with a mine effluent pH of 8, as detailed in Appendix H.5. However, if effluent pH is not maintained between 7 and 8, the modeling results will be considered invalid and not applicable, based on data from previous site operations, and on the basis that mining effluent monitoring will be carried out on an ad hoc basis. In the event of effluent pH below 8, limestone will be applied to the sedimentation ponds to adjust the pH. The expected water quality following the release of mining effluent into the environment results in an increase in hardness and sulfate concentrations of at least one order of magnitude in the receiving environment, while complying with all regulatory criteria established by the MDMER and Directive 019 (MDDEP, 2012).

The predicted mine effluent discharge would result in exceedances of CCME criteria for arsenic, cadmium, nitrate, total ammonia nitrogen and selenium in the receiving environment (Junction 2 to Junction 27). These exceedances were not observed during the baseline characterization of the environment. CCME guideline criteria for the majority of parameters are below or similar to the detection limits stipulated by Directive 019 (MDDEP, 2012). Thus, not all CCME criteria exceedances can be confirmed, unless the parameters exceed another regulatory limit (e.g. Directive 019, MDMER) or the predicted values exceed both the detection limit for that particular element and the CCME regulatory criteria. Simulated uranium concentrations also exceed CCME criteria. Anticipated water quality at Junction 28 is expected to exhibit the same exceedances as those already observed in the baseline state of the existing environment (aqueous aluminum and copper concentrations), with no exceedances caused exclusively by mine effluent discharge.

12.5 Prediction Confidence

Geochemical modelling was carried out using PHREEQC software. This model simulates surface water quality along flow paths and in receiving environments in Year 21 of operations. This prediction includes a certain degree of unavoidable uncertainty, due to the necessary assumptions and simplifications applied to model complex reaction systems. The model results are based on data from reference studies and the EDCM. Effluent water quality parameters are based on the assumption that pH will be maintained at 8 throughout project operations. Model limitations and assumptions are described in detail in Appendix H.5. BluMetric recommends calibrating the model with data from previous or future operations to increase its accuracy. Calibrations will allow the geochemical environment to be corrected or better defined in order to increase the accuracy of predictions.

Maximum aqueous trace metal concentrations were used to define the base and effluent solutions, based on data from the baseline studies and the EDCM. Consequently, the predictions provided by the model are conservative with respect to the pH chosen to define the effluent solution.

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