

# Land and Water Boards of the Mackenzie Valley



## Standard Process for Setting Effluent Quality Criteria

February 2023

## Revision History Table

DATE	SECTION	REVISION
February 2023	General	Separated from the LWB/GNWT <i>Guidelines for Effluent Mixing Zones</i> .
	General	Administrative updates: <ul style="list-style-type: none"><li>• Updated to reflect separation from the LWB/GNWT <i>Guidelines for Effluent Mixing Zones</i></li><li>• Updated terminology</li><li>• Updated references to the LWB <i>Waste and Wastewater Management Policy</i> and other new and updated LWB guidance documents</li><li>• Corrected typographical and grammatical errors</li></ul>
September 2017	New Guideline	Original release as part of the MVLWB/GNWT <i>Guidelines for Effluent Mixing Zones</i>

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## Definitions and Acronyms

TERM	DEFINITION
applicant	A person who has filed an application with a LWB.
application	Any application for or in relation to a land use permit or water licence submitted in accordance with the <i>Mackenzie Valley Resource Management Act</i> (MVRMA), the <i>Waters Act</i> , or their regulations, and includes a request for a Board ruling, a plan approval, or any step required to advance a Board proceeding.
Boards (LWBs)	<p>The Land and Water Boards of the Mackenzie Valley, as mandated by the MVRMA.</p> <p>Part 3 of the MVRMA establishes regional land and water boards with the power to regulate the use of land and water, and the deposit of waste, including the issuance of land use permits and water licences, so as to provide for the conservation, development, and utilization of land and water resources in a manner that will ensure the optimum benefit to the residents of the management area and of the Mackenzie Valley and to all Canadians.</p> <p>Part 4 of the MVRMA establishes the Mackenzie Valley Land and Water Board (MVLWB).</p> <p>Regional Land and Water Boards have been established in the Gwich'in, Sahtu, and Wek'èezhii management areas and now form Regional Panels of the MVLWB.</p>
CCME	Canadian Council of Ministers of the Environment
COPC	contaminant of potential concern
deposit of waste	As defined in section 1 of the MVRMA: a deposit of waste in any waters in the Mackenzie Valley or in any other place under conditions in which the waste, or any other waste that results from the deposit of that waste, may enter any waters in the Mackenzie Valley.
discharge	A direct or indirect deposit or release of any water or wastewater to waters in the receiving environment.
effluent	A wastewater discharge.
effluent quality criteria (EQC)	Numerical or narrative limits on the quality or quantity of effluent authorized for deposit to the receiving waters.
GLWB	Gwich'in Land and Water Board
GNWT	Government of the Northwest Territories
licensee	A person who holds a water licence issued by a LWB.
Mackenzie Valley	That part of the Northwest Territories bounded on the south by the 60 <sup>th</sup> parallel of latitude, on the west by the Yukon Territory, on the north by the Inuvialuit Settlement Region as defined in the Agreement given effect by the <i>Western Arctic (Inuvialuit) Claims Settlement Act</i> , and on the east by the Nunavut Settlement Area as defined in the <i>Nunavut Land Claims Agreement Act</i> , but does not include Wood Buffalo National Park.
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	<i>Mackenzie Valley Resource Management Act</i>

TERM	DEFINITION
NWT	Northwest Territories
POI	parameter of interest
project	Any undertaking <sup>1</sup> that requires a water licence.
receiving environment	The natural environment <sup>2</sup> that, directly or indirectly, receives any waste from a project. <sup>3</sup>
receiving waters	The waters <sup>4</sup> in the receiving environment that receive any direct or indirect deposit of waste from a project.
regulated mixing zone	The defined area contiguous with a point source effluent discharge site or a delimited non-point source effluent where the effluent mixes with ambient receiving waters and where concentrations of some substances may not comply with water quality objectives that have been established site-specifically for the receiving waters.
SLWB	Sahtu Land and Water Board
waste	As defined in section 1 of the <i>Waters Act</i> and section 51 of the MVRMA. <sup>5</sup>
wastewater	Any water that is generated by project activities or originates on-site, and which contains waste, and may include, but is not limited to, runoff, seepage, sewage, minewater, and effluent.
watercourse	As defined in section 1 of the Waters Regulations and section 2 of the Mackenzie Valley Federal Areas Waters Regulations: a natural watercourse, body of water or water supply, whether usually containing water or not, and includes, but is not limited to, groundwater, springs, swamps, and gulches.

<sup>1</sup> “undertaking” is defined, in section 1 of the [Waters Regulations](#) and section 2 of the [Mackenzie Valley Federal Areas Waters Regulations](#) as: an undertaking in respect of which water is to be used or waste is to be deposited, of a type set out in Schedule B, or Schedule II, respectively.

<sup>2</sup> “environment” is defined in section 2 of the [MVRMA](#) as: the components of the Earth and includes

- (a) land, water and air, including all layers of the atmosphere;
- (b) all organic and inorganic matter and living organisms; and
- (c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

<sup>3</sup> The receiving environment is generally outside of the project boundary. Where a project is located in a previously disturbed area (i.e., the receiving environment is no longer considered ‘natural’), the definition of ‘receiving environment’ may be modified to account for this.

<sup>4</sup> “waters” is defined in section 1 of *Waters Act* as: water under the administration and control of the Commissioner, whether in a liquid or frozen state, on or below the surface of land, and in section 51 of the MVRMA as: any inland waters, whether in a liquid or frozen state, on or below the surface of land.

<sup>5</sup> “waste” is defined as:

- (a) any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of the quality of the water to an extent that is detrimental to its use by people or by any animal, fish or plant, or
- (b) water that contains a substance in such a quantity or concentration, or that has been so treated, processed or changed, by heat or other means, that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water to the extent described in paragraph (a), and, without limiting the generality of the foregoing, includes:
- (c) any substance or water that, for the purposes of the Canada Water Act, is deemed to be waste,
- (d) any substance or class of substances prescribed by regulations made under subparagraph 63(1)(b)(i),
- (e) water that contains any substance or class of substances in a quantity or concentration that is equal to or greater than a quantity or concentration prescribed in respect of that substance or class of substances by regulations made under subparagraph 63(1)(b)(ii), and
- (f) water that has been subjected to a treatment, process or change prescribed by regulations made under subparagraph 63(1)(b)(iii).

TERM	DEFINITION
water quality objective (WQO)	A numerical concentration or narrative statement that has been established to protect the receiving environment at a specified site. <sup>6</sup>
WLWB	Wek'èezhìi Land and Water Board

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<sup>6</sup> Paragraph 26(5)(c) of the [Waters Act](#) and paragraph 72.03(5)(c) the [MVRMA](#) states that “any waste that would be produced by the appurtenant undertaking will be treated and disposed of in a manner that is appropriate for the maintenance of water quality standards (...).” There is no definition of the term “water quality standard” in the *Waters Act* or the MVRMA, but the LWBs consider it to be equivalent to the more widely accepted term “water quality objective,” which has been defined by the Canadian Council of Ministers of the Environment (CCME) as: “a numerical concentration or narrative statement that has been established to support and protect the designated uses of water at a specified site.”(CCME (1999), Canadian Environmental Quality Guidelines. Guidelines and Standards Division, Winnipeg, MB.)

## 1.0 Introduction

The Land and Water Boards of the Mackenzie Valley (the LWBs or Boards) regulate the use of water and deposit of waste through the issuance of water licences (licences) in accordance with the [Waters Act](#) and [Waters Regulations](#), and the [Mackenzie Valley Resource Management Act](#) (MVRMA) and [Mackenzie Valley Federal Areas Waters Regulations](#) (MVFAWR).

### 1.1 Purpose

The overall purpose of the *Standard Process for Setting Effluent Quality Criteria* (Standard Process) is to improve the clarity and consistency of water licensing decisions related to effluent quality criteria (EQC). Specifically, the Standard Process:

- Describes the relationship between EQC and water quality objectives (WQOs);
- Describes the process that the LWBs use when setting EQC in a licence, and;
- Summarizes the information the LWBs require from the applicant to set EQC and related licence conditions.

### 1.2 Authority

The LWBs have the authority to develop and implement guidelines under sections 65, 102, and 106 of the MVRMA.

### 1.3 How the Standard Process Was Developed

The Standard Process was originally developed as part of the LWB/GNWT [Guidelines for Effluent Mixing Zones](#). Both the Guidelines and the Standard Process are guided by the LWB [Waste and Wastewater Management Policy](#).

The Standard Process has been in effect since September 2017 – initially as part of the Guidelines until February 2023, when it was separated, with administrative updates, into a separate document.

### 1.4 Application

The Standard Process will be applied by the following LWBs when setting EQC:

- Mackenzie Valley Land and Water Board
- Gwich'in Land and Water Board
- Sahtu Land and Water Board
- Wek'èezhìi Land and Water Board

The Standard Process applies to all new water licence applications received after the effective date of the Standard Process. In the case of existing water licences, the Standard Process may be applied, at the discretion of the LWBs, to water licence renewal and amendment applications that include a proposal to

amend any conditions that are related to EQC. In all cases, the LWBs will make decisions regarding EQC based on the application and all other evidence presented during the regulatory process.

### 1.5 **Monitoring and Performance Measurement for this Standard Process**

The Standard Process will be reviewed periodically to determine whether revisions are necessary. Information gathered through the application of the Standard Process during regulatory proceedings and through the implementation of relevant licence conditions will guide the frequency and nature of revisions to the Standard Process. The LWBs will seek input on proposed revisions through public reviews and, in some cases, may establish working groups; however, the LWBs may also make administrative updates to the Standard Process from time to time as necessary.

### 2.0 **General Principals for Setting Effluent Quality Criteria**

As per the [Waste and Wastewater Management Policy](#) (the Policy),<sup>7</sup> the LWBs set water licence conditions, including EQC,<sup>8</sup> with the goal of ensuring that current and future water uses in the receiving environment will be protected. As stated in the Policy:

Protection of water quality in the receiving environment is the primary objective. In licences for projects that include deposit of waste to water, the level of protection will be defined by narrative or numeric water quality objectives (WQOs) that have been established specifically for the receiving waters in question. Licence conditions for a project will be set as needed for the WQOs to be met. Land use permits will typically also include conditions that are, directly or indirectly, intended to generally protect water quality in the receiving environment.

EQC that are set to meet this Policy objective are called “water quality-based EQC.” As described in the following subsections, water quality-based EQC are considered with the goal of protecting water uses and WQOs in a project’s receiving waters.

The second and third objectives of the Policy are to minimize the amount of waste produced from a project, and the amount of waste to be disposed or deposited to the receiving environment, respectively. To meet these objectives, the LWBs expect licensees to manage waste in accordance with best practices as appropriate for the project, and to provide rationale for proposed waste management methods. As stated in the Policy:

For proposed waste management measures and practices, applicants must provide rationale, which can include consideration of various factors and should reflect engagement discussions and recommendations. In identifying best practices to prevent, reduce, reuse, recycle, or treat waste, new and alternative technologies and methods should be considered.

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<sup>7</sup> See the Policies and Guidelines page on any of the LWBs’ websites to access the LWB [Waste and Wastewater Management Policy](#).

<sup>8</sup> When EQC are determined to be needed, the EQC will always be set out in conditions in the main body of the licence.

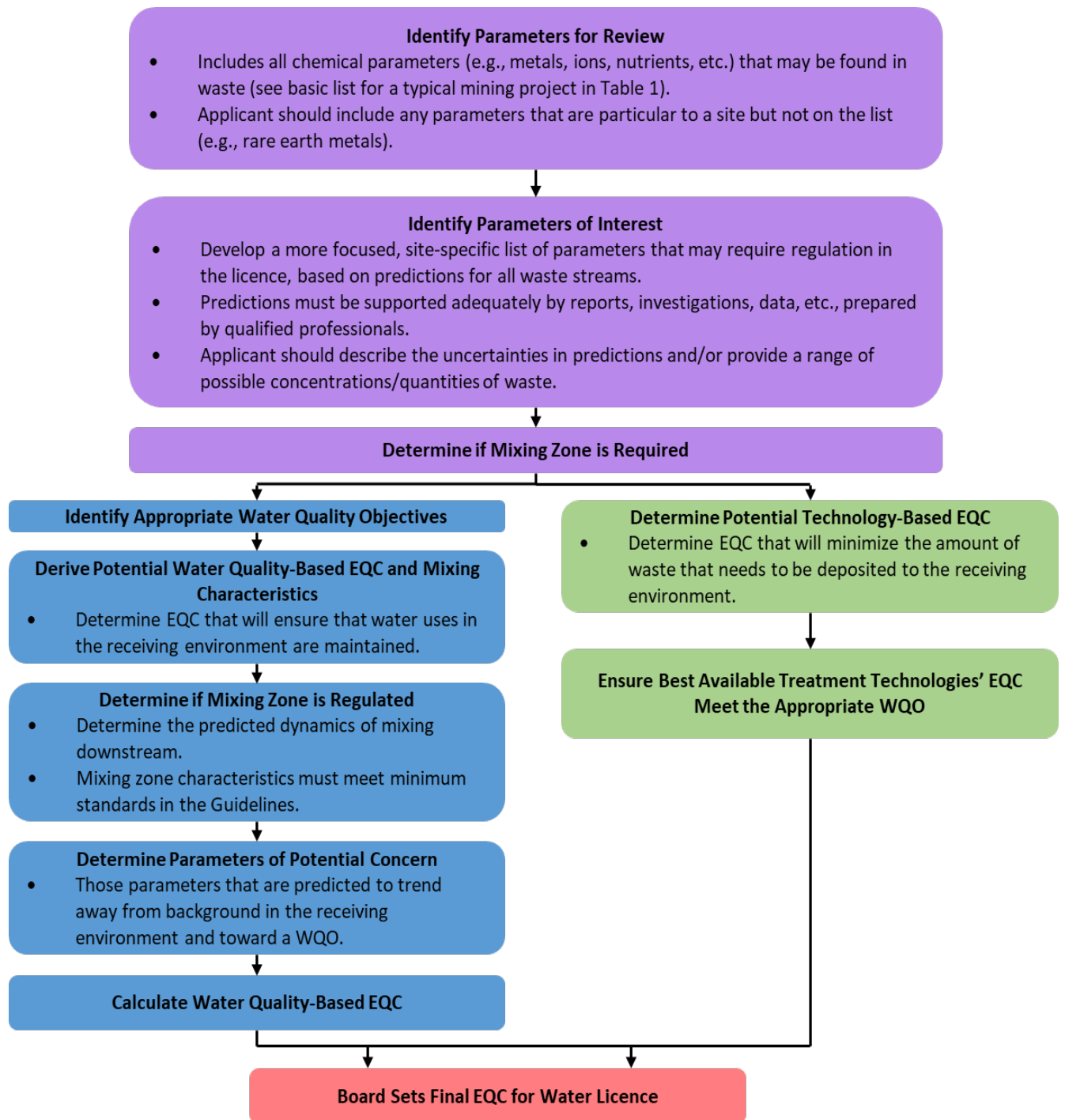


EQC that are set to meet these Policy objectives are called “technology-based EQC.” Some projects may employ formal wastewater treatment methods through, for example a water treatment plant while others rely only on waste minimization practices implemented on site. In either case, technology-based EQC are dependent on what is reasonably and practically achievable for specific effluent streams. In the case of a new water licence, technology-based EQC may be based on predictions made by the applicant based on an analysis of all waste streams and the predicted treatment efficiencies (if applicable).

The LWBs’ general process for setting EQC is to first derive water quality-based EQC and then consider whether a) the EQC are reasonably achievable, and b) if the EQC could be made more stringent based on what is technologically feasible for the site. The stepwise process for deriving EQC is depicted in Figure 1 and summarized as:

- **Identify the Parameters for Review:** In this step, the Board evaluates the evidence to determine which chemical parameters may be elevated in the effluent relative to background concentrations and that, therefore, may need to be regulated through EQC in the water licence.
- **Derive Water Quality-Based EQC:** EQC are first derived with the goal of ensuring that the WQOs will be met in the receiving waters during all phases of the project.
- **Determine Technology-Based EQC:** These EQC are not calculated per se but are based on what effluent quality the applicant can reasonably and practically achieve at the end-of- pipe. This could include any specified variability in treatment performance from the plant manufacturer.
- **Determination of final EQC values for the licence:** Generally, the Board will choose those EQC that are the lower of the values derived as per step 2) or 3) above. However, and as per the Policy, the Board will ensure that EQC are set at levels that the licensee can reasonably achieve on a consistent basis.

To set EQC, the LWBs require that the applicant submit an EQC Report with the application for a new water licence as well as for the renewal or amendment of an existing water licence. The information required in an EQC Report may vary depending on the type of project(e.g., municipal, oil and gas, mining, exploration).



*Figure 1: Summary of Process for Setting Effluent Quality Criteria*

## 2.1 Information Requirements for Setting Effluent Quality Criteria – the EQC Report

The purpose of the EQC Report is to provide a standalone document containing all information required by the Board to set EQC and related water licence conditions such that the objectives<sup>9</sup> of the Policy will be met.

The LWBs have provided details below of what information is specifically required and have recommended the way in which the information should be organized. This will ensure that this Report meets the LWBs' expectations. To put the information requirements into context, each step in the process is summarized below along with a list of specific information the applicant is required to submit to enable completion of that step.

### *Step 1: Identify Parameters for Review*

In this step, all chemical parameters that are typically associated with a proposed project should be identified. The list that is generated, called the Parameters for Review, represents all the parameters that should be evaluated with respect to the quantity that will be generated by the project and that may need to be discharged. Each type of project (e.g., mining, exploration, oil and gas production, municipal, etc.) will have a different list of Parameters for Review that may include metals, organics, nutrients, major ions, or biological components (e.g., *E. coli*, biological oxygen demand).

A comprehensive list of Parameters for Review for a typical mining project is provided in Table 1, below, as an example. Depending on the project site, additional parameters may need to be included; the applicant should add those parameters that are not on the list in Table 1 but that could be of concern at its unique site (e.g., rare earth metals). Applicants should contact LWB staff for information on typical Parameters for Review for projects other than mining.

### Information Required from the Applicant:

- Provide a final list of Parameters for Review that includes all those chemical parameters that are typically associated with the proposed project. For mining applications, applicants may start with the parameters listed in Table 1 as well as any other parameters that may be unique to the project site and that should be considered in the EQC evaluation.

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<sup>9</sup> The LWB [Waste and Wastewater Management Policy](#) outlines three objectives that are to be met with respect to the management of waste:

1. Water quality in the receiving environment is maintained at a level that allows for current and future water uses.
2. Waste is prevented and/or minimized.
3. The amount of waste to be disposed or deposited to the receiving environment is minimized.

Table 1: Basic List of Parameters for Review for Mining\*

Aluminium	Colbalt	Nitrate as N	Total Organic Carbon (TOC)**
Ammonia as N	Copper	Nitrite as N	Total Petroleum Hydrocarbons
Antimony	Fluoride	pH	Total Suspended Sediments (TSS)
Arsenic	Hardness**	Total Phosphorus	Turbidity
Barium	Iron	Potassium	Uranium
Beryllium	Lead	Selenium	Vanadium
Boron	Manganese	Strontium	Zinc
Cadmium	Mercury	Sulphate	<i>Escherichia coli</i>
Chloride	Molybdenum	Temperature	Biological Oxygen Demand
Chromium	Nickel	Total Dissolved Solids (TDS)	

\*Notes to Table 1: This table contains a typical list of parameters for review for a mine, although the applicant may need to add other parameters specific to the project (e.g., rare earth metals). This list was generated by taking a list of what is monitored in a typical Aquatic Effects Monitoring Program and eliminating those parameters that are either:

1. Numerical indicators of water quality (rather than constituents of the water itself), e.g., alkalinity, conductivity, ion balance, and in some cases temperature, or,
2. Adequately and appropriately represented by another parameter that is on the list above – for example:
  - Major ions that do not cause toxicity, like bicarbonate, calcium, magnesium, sodium. These are not parameters for review because the analysis of TDS is sufficient.
  - Total Kjeldahl Nitrogen (TKN). This is not a parameter for review because other nitrogen species that have known toxicity are in Table 1 (e.g., ammonia, nitrate, and nitrite).
  - Other forms of phosphorus (e.g., orthophosphate, dissolved phosphate, and total phosphorus). Total phosphorus has been requested in Table 1 because this is the measure used by the CCME in its Guidance Framework for Phosphorus (CCME 2004).
  - Dissolved metals: Generally, WQOs are set for total metals instead of dissolved metals although there may be some exceptions (e.g., cadmium). Since the concentration of total metals includes the contribution of the dissolved form, it is most conservative to perform the analysis on total metals. Accommodation for individual cases where dissolved metals are of interest can be made if and when necessary.

\*\* Although TOC and Hardness are very unlikely to be regulated parameters, they are included in Table 1 because they influence toxicity for certain parameters; therefore, the Board requires the information described below in Step 2 for TOC and Hardness.

### **Step 2: Identify Parameters of Interest (POI)**

Parameters of Interest (POI) are those chemical parameters that may need to be regulated through water licence conditions such as EQC. The list of POI will be unique for each project and can only be identified after a thorough analysis of the predicted quantity and quality of waste generated on site. The idea of this step is to eliminate those parameters from the list of Parameters for Review for which there is no evidence that their respective concentrations could increase in the receiving environment due to the project. The final determination of whether a parameter is “of interest” or not will be made by the Board based on the specific evidence before it. Factors the Board may consider in its determination include, but are not

limited to, the following:

- Whether predicted concentrations of a parameter are at or below method detection limits in any of the proposed effluent(s).
- Whether predicted concentrations of a parameter in any of the proposed effluent(s) exceed the natural range of background concentrations in the receiving waters.
- The uncertainty in the predictions of effluent quality and quantity. For example, in some cases, the Board may only consider setting EQC based on effluent quality and quantity scenarios that have the highest probability of occurring. However, there may also be cases in which the Board will set EQC based on a low probability scenario if there is the potential for a high impact to the environment.
- Whether there is a reasonable mitigation or treatment method for a given parameter – that is, can the applicant control the amount of a parameter that needs to be discharged. For example, the Board often sets EQC for ammonia to ensure that the applicant will use best practices when blasting. Another example might be based on the proposed treatment technology.

Although the Board will make the final determination of what constitutes a POI for each project, the applicant should propose a list for the project, with rationale.

*Information Required from the Applicant:*

- Identification of all wastewater streams and proposed effluents for the project as well as the predicted annual water balance for the site (for some projects, this may already be summarized in a draft Water and Wastewater Management Plan).
  - a. For each wastewater stream, the applicant should provide:
    - i. the predicted concentrations of each of the Parameters for Review, including those concentrations before and after treatment; and
    - ii. the predicted quantities of each wastewater stream that will be collected, stored, treated, and/or discharged.
  - b. The predicted concentrations and/or loads of each parameter in the effluent that the applicant proposes to discharge to the receiving waters.
  - c. A description of how predictions may change over time or during different phases of the project (e.g., construction, operation, closure etc.), if applicable.
  - d. Each of the information items above should include an analysis of the amount of uncertainty in the predictions/results given. That is, if there is a range of possible values, give the range and an indication of what factors will increase the likelihood of the low or high extremes being realized. For example, it is common for there to be a range of possible mine water quantities depending on whether certain assumptions (e.g., hydraulic connectivity in the underground) prove to be true once mining commences.

Where possible, it would be helpful to describe the likelihood of different events to occur – low probability, high probability, best (i.e., most likely) estimates etc. Another example is provided by the difficulty in simulating a sample of effluent prior to the construction of the mine. In this case, the applicant should describe the ways in which the simulated sample may differ from the final effluent and, again, estimate a range of possible values.

- Evidence that supports the above predictions must be submitted as well. Evidence should be in the form of investigations or reports from suitably qualified professionals. Examples of supporting reports are listed below; however, it is up to the applicant to provide those supporting reports that are specifically relevant for its unique project:
  - i. Geotechnical investigations of mining area
  - ii. Geochemical analysis of waste rock and ore samples
  - iii. Analysis of process water from milling and/or simulated effluent samples
  - iv. Tailings analysis
  - v. Groundwater analysis
  - vi. Precipitation data/reports
  - vii. Design criteria for any structures that are meant to contain water (for seepage etc.)
  - viii. Explosives use and management
  - ix. Summary of treatment technology and expected treatment efficiency including bench-scale testing results with simulated effluent
- A list of the background concentrations of each Parameter for Review in the receiving waters to which the applicant proposes to deposit waste, including enough of the statistical (e.g., average, 90<sup>th</sup> percentile, median etc.) as well as seasonal information to fully describe the background conditions.
- The applicant should propose a list of POI based on an analysis of the above information with an appropriate level of rationale.

### ***Step 3: Determine Potential Water Quality-Based EQC***

The primary objective of the Policy is to set water licence conditions that are intended to protect current and future water uses in the receiving environment. As stated in the Policy:

Protection of water quality in the receiving environment is the primary objective. In licences for projects that include deposit of waste to water, the level of protection will be defined by narrative or numeric water quality objectives (WQOs) that have been established specifically for the receiving environment in question. Licence conditions for a project will be set as needed for the WQOs to be met.

Water quality-based EQC are, therefore, considered for parameters where there is some concern over potential effects on water uses. The determination of water quality-based EQC requires information about the receiving environment which is listed below.

Information Required from the Applicant:

- Identification of the appropriate current and future water uses for the receiving environment with rationale and supporting evidence. For example, water uses may have been identified by parties during engagement with the applicant. Water uses that must be protected may also have been identified during the environmental assessment or environmental impact review of the project.
- Proposed WQOs for the receiving environment that would protect the identified water uses. Proposed WQOs should consider site-specific conditions in the receiving waters if appropriate (e.g., hardness, temperature, types of aquatic life, etc.).
- Definition of the location at which the proposed WQOs must be met, as per the CCME definition of a WQO.<sup>10</sup> In some cases, the environmental assessment or environmental impact review may have described assessment boundaries that could be used to define a location for meeting WQOs. The applicant may also propose to define a mixing zone such that WQOs will be met at the edge of the mixing zone.
- If a regulated mixing zone is proposed, the applicant should provide all information listed in section 6 of the LWB/GNWT [Guidelines for Effluent Mixing Zones](#). For example, applicants must define the dimensions with rationale and provide an analysis of how the effluent will dilute and mix in this zone. The applicant should also provide an estimate of the amount the effluent should be diluted at the edge of the proposed mixing zone.
- An analysis of how the effluent will physically mix with and disperse into the receiving waters past the proposed mixing zone. The analysis should extend away from the outfall to the point at which the effluent is diluted to less than 1% if possible.
- Estimated concentrations of each POI at the edge of the proposed mixing zone or other assessment boundary as defined above. If the amount of waste to be discharged is predicted to change over time or during different project phases (e.g., construction, operation, closure etc.), then estimates may have to be provided for the different conditions. Estimates of receiving water concentrations of POIs should be provided for a range of potential conditions at this stage. For example:
  - If there was a range of predicted effluent quality concentrations, then it would be helpful to model the best-case, worst-case, and average or expected concentrations.

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<sup>10</sup> Canadian Council of Ministers for the Environment (CCME) 1999 “Canadian Water Quality Guidelines for the Protection of Aquatic Life”, CCME, Winnipeg, MB. For the latest guideline values see: <http://cegg-rcqe.ccme.ca/>. In this document, the CCME defines a water quality objective (WQO) as “a numerical concentration or narrative statement that has been established to support and protect the designated uses of water at a specified site.”

- If there was a range of predicted effluent quantities, then it would be helpful to model the best-case, worst-case, and average or expected quantities.
- If effluent is being discharged to a flowing watercourse such as a river, stream, or creek:
  - effluent dilution should be modelled on the seasonal low, high, or average flow conditions of the watercourse;
  - it should be assumed that the fraction of upstream flow that will be available for dilution of the effluent is equal to only 10% or lower, and;
  - the upstream (background) load of each parameter should be included when estimating downstream concentrations.
- If effluent is being discharged to a lake, it may be necessary to account for the accumulation of contaminants in the lake over time. This is especially important when discharging to small lakes or headwater lakes for example. To do this analysis, it is likely a mass-balance model or simulation should run using the following data:
  - estimates of the amount of effluent that will be discharged over the life of the mine;
  - estimates of the recharge rate of the lake – which will include precipitation and flows from other streams or lakes to the receiving lake, and;
  - inclusion of background concentrations of parameters in lakes in estimation of in-lake or in-stream water quality concentrations in the receiving environment.
- A table that compares, for each POI, the background concentration, the WQO, and the estimated concentration at the edge of the mixing zone or at the relevant assessment boundaries.
- Proposed Contaminants of Potential Concern (COPC) are those parameters that may negatively affect water quality in the receiving environment to the extent that water uses are potentially at risk. The Board will make the final decision on which parameters are “of concern” but the applicant should propose COPC with rationale.
- The applicant may calculate water quality-based EQC for each proposed COPC. Water quality-based EQC should be calculated with the goal of meeting WQOs at the edge of the mixing zone or other relevant assessment boundary. Calculations of proposed EQC should be accompanied by a rationale for assumptions made in the calculations. If calculations are performed in EXCEL spreadsheets, those EXCEL files should be submitted as well.

#### ***Step 4: Determine Potential Technology-Based EQC***

As referenced in [section 2.0](#), the goal of the second objective of the Policy is to minimize the amount of waste produced, and the goal of the third objective is to minimize the amount of waste to be disposed or deposited to the receiving environment. Although the waste management practices a licensee implements to meet these objectives are also linked to the primary objective and water-quality-based EQC, technology-based EQC are based on the effluent quality that can be achieved through waste management methods.



As per the Policy, the LWBs will set EQC that licensees can reasonably and consistently achieve; however, the Policy also states that “the LWBs may set EQC that are more stringent than what is necessary to meet WQOs in the receiving environment.” Accordingly, to support the assessment of the proposed waste management practices and the subsequent development of appropriate EQC and related licence conditions, applicants must provide rationale for proposed waste prevention, minimization, and management measures, and this rationale “can include consideration of various factors and should reflect engagement discussions and recommendations.”

Waste prevention, minimization, and/or management measures should have already been identified in the application package;<sup>11</sup> if so, then there is no need to repeat any of that information here. Instead, technology-based EQC may be proposed at this stage based on treatment technology.

#### Information Required from the Applicant

- A description of all mitigations or other best practices that will minimize the amount of waste that needs to be discharged. For example, grouting may be used to minimize the inflow of water into an underground mine. Another example is the use of best practices for blasting to minimize the amounts of ammonia and nitrate in the final discharge. A summary should be included if it is known how source reduction activities will affect parameter concentrations in the effluent.
- For each POI, list:
  - a. its concentration in the influent to the proposed water treatment process and the concentrations of the POI post-treatment and pre-discharge. Influent concentrations should reflect the effects of any source reduction activities that reduce parameter concentrations.
  - b. the range of effluent concentrations possible during different phases of the project (e.g., construction, operation, closure) if applicable.

#### **Step 5: Determination of Final EQC for the Water Licence**

The Board will consider all the evidence before it to set EQC in the licence conditions per the principles and objectives of the Policy.

#### Information Required from the Applicant:

The applicant may propose EQC for the project based on the evidence provided in the EQC Report.

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<sup>11</sup> See the Apply for Permit/Licence webpage on any of the LWB websites to access the Application Forms and Guides.