



**Mackenzie Valley Land and Water Board**  
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October 22, 2013

File: MV2005L2-0015/  
MV2005C0032

Ms. Veronica Chisholm, Permitting Manager  
De Beers Canada Inc.  
Suite 300, 5102 – 50<sup>th</sup> Ave.  
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Email: [veronica.chisholm@debeerscanada.ca](mailto:veronica.chisholm@debeerscanada.ca)

Dear Ms. Chisholm:

**Submission Requirements for Mining and Milling Water Licence and Land Use Permit Applications**  
**Gahcho Kue Project - Kennady Lake, NT**

The Mackenzie Valley Environmental Impact Review Board (MVEIRB) released its Report of Environmental Impact Review (EIR) EIR0607-001 for the Gahcho Kue Project (Project) on July 19, 2013. The Minister of Aboriginal Affairs and Northern Development Canada provided his approval of the EIR including the acceptance of the recommended measures to the Mackenzie Valley Land and Water Board (the Board) on October 22, 2013.

In order to recommence the water licensing process, the Board requires De Beers to submit an Updated Project Description (UPD) and the information detailed below. Collectively this information is referred to as the *Post EIR Information Package*. This information is being requested by the Board, in accordance with section 16(2) of the NWT Waters Act, and section 21(1) of the Mackenzie Valley Land Use Regulations.

The UPD should incorporate changes made to the project design during the EIR process, as well as changes made to address relevant measures and commitments. The UPD should contain at a minimum the information listed in schedule 1.

In addition to the UPD, De Beers should submit the following items:

- Current mine plan and construction schedule;
- Draft design plans related to the construction of mine infrastructure (see schedule 2);
- Draft plans for the management of all relevant waste streams (see schedule 3);
- Draft Water Management Plan (see schedule 4);
- Draft Spill Contingency Plan (in accordance with AANDC Spill Contingency Guidelines);
- Conceptual Closure and Reclamation Plan, including a reclamation security liability estimate (using the RECLAIM model);
- Draft Engagement Plan (in accordance with the Board's [Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits](#));
- Effluent Quality Criteria Report (see schedule 5);
- Proposed Surveillance Network Program (see schedule 6);
- Conceptual Aquatic Effects Monitoring Program Design Plan;
- Draft Wildlife Habitat Protection Plan;
- Any other reports, including data, that support the predictions and assumptions listed in the preceding documents.

The requirements listed above are the minimum requirements of the Board. DeBeers may choose to submit additional information, as part of the *Post EIR Information Package*. Also, the Board will accept the submission requirements in a form other than that described above and within the schedules, provided DeBeers submits a concordance table demonstrating how all the requirements have been satisfied.

Attached as schedule 7 to this letter, is the Board's generic work plan for a type A Water Licence proceeding. Once the *Post EIR Information Package* is received by the Board, DeBeers can expect the timelines as outlined in the work plan.

Please note that the dates are approximate, and are subject to change due to Board, proponent and reviewer schedules, and the need for further information or reviews.

The Board is required to make a decision on land use permit applications within 42 days of receipt; at that time the Board may choose to issue, require further studies or hold a hearing. The Board acknowledges that DeBeers currently has application MV2005C0032 before the Board. It has been standard practice for

the Board to consider land use permit applications for a major operation, such as a mine, concurrently with the type A Water Licence application. If DeBeers has any opinions or specific requests on this issue, please submit them to the Board.

The Board recommends that a meeting be held between DeBeers and Board staff to discuss the requirements of this information request and any concerns or comments you may have. Please contact us at your earliest convenience to set up this meeting.

If you have any questions or concerns regarding this letter, please contact myself at (867) 766-7457 [zabey@mvlwb.com](mailto:zabey@mvlwb.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'Zabey Nevitt', with a stylized, cursive script.

Zabey Nevitt  
Executive Director

Copied to: Distribution List

## **Schedule 1: Updated Project Description Requirements**

### ***Purpose***

The Updated Project Description (UPD) is meant to be a stand-alone document that provides an overview of the entire proposed project. The UPD should give enough detail to allow the Board and reviewers to understand key aspects of the project setting as well as how the mine will be constructed, operated, closed and reclaimed. Where details have been provided in other submissions being made with the *Post EIR Information Package* (e.g., draft management plans for specific project components etc.), the Proponent should summarize the information and then refer to the more detailed submission.

The following is a list of the information the Board expects to see in the UPD; however, the Proponent may choose to add more subject headings and/or choose to format the information in a different order.

### ***Information Requested from the Proponent***

1. **Updated Project Description** containing the following information:
  - a. Project overview or summary
    - i. Ore type, proposed mine design, etc.
  - b. Project history
    - i. Regulatory history – e.g., previous exploration programs and associated permits/licences, currently held claims, environmental assessment/impact review, etc.
    - ii. Current site infrastructure
  - c. Project schedule – for example:
    - i. Summary of how the construction of roads, mine infrastructure and the camp will be sequenced
    - ii. Time lines for construction, mine operation and closure
  - d. Geology and geochemical characterization
    - i. Geological setting
    - ii. Geochemical characterization of rock, ore, tailings etc.
    - iii. Hydrogeology of the project site
  - e. Description of project components – describe components for proposed mine; provide drawings, maps or supporting documentation as necessary. Examples of typical project components for mines are listed below; however, the Proponent should include a description of only those that apply to this project. Also, if the Proponent is including a component-specific management plan with the *Post EIR Information Package*, then it may be referenced in the appropriate section below.
    - i. Buildings and infrastructure
    - ii. Roads and pads
    - iii. Camp
    - iv. Mine design – (e.g., underground or open pit)
    - v. Waste rock storage area(s)

- vi. Temporary ore storage
- vii. Dewatering and mine water management infrastructure
- viii. Fresh water withdrawal facilities
- ix. Wastewater treatment and discharge
- x. Ore processing/mill operations
- xi. Tailings facilities
- xii. Power
- xiii. Fuel use and storage
- f. Predicted environmental impacts and proposed mitigation
  - i. Description of receiving environment
  - ii. Conceptual model of how project will interact with the environment – e.g., pathways through which the project may have an effect on valued ecosystem components in the receiving environment
  - iii. Evaluation of potential environmental effects on valued ecosystem components with respect to magnitude, direction, duration and reversibility
- g. Description of mitigations to minimize environmental impacts. For example, the Proponent may refer to:
  - i. Management plans for specific waste streams (e.g., tailings management etc.)
  - ii. Contingency plans
  - iii. Other mitigations or best practices that will be employed
- h. Summary of plans for closure and reclamation; the Proponent can refer to the Conceptual Closure and Reclamation Plan.
- i. List of commitments made during the Environmental Impact Review and how the Proponent proposes to meet those commitments.
- j. A list of studies undertaken to date. This essentially means a list of all information/reports/investigations which support the information given in the Post-EIR Information Package, as necessary. Complete references should be included and these reports must be available upon request. Please note that raw data (e.g., data in Excel spreadsheets) may also be requested by the Board.

## **Schedule 2: Draft Design Plan Requirements Related to the Construction of Mine Infrastructure**

### ***Purpose***

The Water Licence will require final design plans for those structures that will contain, divert, collect or store water or wastewater on the site. This could include, for example, dams, dikes, collection ponds, tailings ponds, waste rock and/or ore storage areas, diversion ditches etc. The Board's intent in reviewing draft or final design plans is not to decide for the Proponent how to build the mine but to ensure that the Proponent's plans are feasible and comply with best practices. The design plans are also necessary to facilitate the Board's review of any associated management plans.

### ***Information Required from the Proponent***

**Design Plans** should be submitted for key structures in the mine plan. At this stage in the regulatory process, the Board expects the Proponent to have design reports or plans for key site infrastructure with the level of detail that would normally be required for a feasibility study.

## **Schedule 3: Draft Plan Requirements for the Management of Waste**

### ***Purpose***

No matter the size of a project, every water licence requires a Waste Management Plan and the Board has published guidelines<sup>1</sup> to describe the Boards' expectations for those plans. For a small project, only a single Waste Management Plan may be required by the water licence to cover all potential waste streams generated by the project. For major mining projects however, it is likely that, in addition to a central Waste Management Plan, the water licence will require individual plans for waste management facilities including, but not limited to:

1. Tailings containment areas
2. Wastewater treatment and discharge
3. Waste rock storage
4. Ore storage
5. Paste production
6. Explosives use and storage

It is up to the Proponent to propose which specific, stand-alone plans would be most appropriate for its project. For example, some projects have a single management plan that incorporates waste rock, ore storage and paste production. Other projects dispose of tailings and waste rock in the same facility and, therefore, have only one plan for both waste types. Proponents may also find that wastewater treatment and discharge activities can be described adequately in the central Waste Management Plan. Again, the Proponent is in the best position to judge how best to describe its activities and may submit those plans it thinks reasonable with the *Post EIR Information Package*. After hearing all the evidence, the Board will make the final decision as to which specific plans will be required in the water licence and/or land use permit.

### ***Information Required from the Proponent***

#### **1. Waste Management Plan**

##### *a. Format:*

See the MVLWB's Guidelines for Developing a Waste Management Plan.

##### *b. Notes about the content:*

Despite the need for additional plans, a Waste Management Plan for a mining project still serves the following purposes:

- As a central document describing waste management practices in general and the management of several specific waste streams in detail including<sup>2</sup> sewage, hydrocarbon-contaminated

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<sup>1</sup> See the [MVLWB's Guidelines for Developing a Waste Management Plan](#), March 2011

<sup>2</sup> Note that the Proponent may decide that it prefers to have separate management plans for the waste types and and/or activities listed; the Proponent may propose whatever it thinks is most appropriate for its site.

- soils, and solid waste as well as (possibly) practices such as incineration of waste and/or handling/storage of hazardous waste
- As a central document summarizing other waste streams and related infrastructure with references to separate additional plans like waste rock management plans etc.

## **2. Management Plans for Other Specific Waste Types**

### *a. Format:*

See the MVLWB's Standard Outline for Management Plans attached as Appendix 1.

### *b. Notes about the content:*

- I. The main body of the management plan (i.e., section 6 of the Standard Outline) should contain information regarding operation and management of the facility including for example:
  - A summary, with appropriate maps or diagrams, of the facility and all waste streams that report to it or from it.
  - A complete description of the operational procedures of the facility.
  - A description of the waste and water management procedures for the facility.
- II. The section on Monitoring and Evaluation (i.e., Section 7 of the Standard Outline) should contain:
  - Information regarding monitoring and inspection.
  - Details of the proposed monitoring plan for the facility to ensure that it is operating as designed (i.e., there should be a link to the design plan) including rationale. Monitoring in this sense includes, as appropriate, monitoring or inspection for water quality/quantity of seepage or run-off, geotechnical or thermal stability, etc.
  - Linkages to other monitoring plans if applicable.
- III. The section on Contingencies (i.e., Section 8 of the Standard Outline) should contain:
  - A description of how the results of monitoring will be linked to those corrective actions necessary to ensure that the facility continues to meet the objectives of the Policy and is operating as designed.
- IV. If the management of the specific waste type or facility differs depending on the project phase (i.e., construction, operations, closure, reclamation etc.), describe these differences in each of the plan sections.

## **Schedule 4: Draft Water Management Plan Requirements**

### ***Purpose***

A Water Management Plan is necessary to summarize how wastewater is collected, diverted, stored, contained, treated and/or discharged. Like the Waste Management Plan, the Water Management Plan is a key central document that summarizes many activities on site and is also used to set up the Surveillance Network Program<sup>3</sup>.

Water that needs to be managed on a mine site generally comes from four sources:

- Water pumped to and used on site
  - Most mine sites pump surface water onto the site for use as drinking water, for dust suppression, ore processing etc. The amount of water used is regulated through the water licence.
- Precipitation
  - Rain and snow that come down on the site may accumulate contaminants as it runs off of disturbed land, waste rock piles, ore storage piles, tailings containment areas etc.
- Groundwater coming up through the mine
  - Groundwater, released by mining activities, often contains elevated levels ions, nutrients and/or metals such that it cannot be discharged directly to surface waters without treatment.
- Seepage
  - From structures that contain or divert water including dikes, dams etc.
  - From waste rock or ore storage piles.

Overall, the plan should describe how the Proponent is managing water site-wide such that they are meeting the MVLWB's Water and Effluent Quality Management Policy<sup>4</sup> objective of minimizing the amount of waste that needs to be discharged.

### ***Information Required from the Proponent***

#### **1. Water Management Plan**

##### *a. Format:*

See the MVLWB's Standard Outline for Management Plans attached as Appendix 1

##### *b. Notes on the content of the plan:*

- I. The main body of the management plan (i.e., section 6 of the Standard Outline) should contain information about the water management system including for example:

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<sup>3</sup> The Surveillance Network Program (SNP) is an Annex to the water licence that details the site-wide monitoring program that the Licensee must implement. The SNP will contain the monitoring locations, sampling frequency, analytical requirements and reporting requirements.

<sup>4</sup> See the MVLWB's [Water and Effluent Quality Management Policy](#), March 2011

- a. A summary, with appropriate maps or diagrams, of the components of the water management system and all the water and waste streams that report to it.
  - b. A description of the process and facilities for:
    - i. obtaining fresh water;
    - ii. the collection, storage, and management of any surface run-off generated on site;
    - iii. the collection, storage, and management of any wastewater resulting from mining activities; and
    - iv. the treatment and discharge of wastewater.
  - c. Water balance estimates for each year of the proposed licence.
- II. The section on Monitoring and Evaluation (i.e., Section 7 of the Standard Outline) should contain:
  - a. Information regarding monitoring and inspection including
    - i. details of monitoring, including rationale, for each component of the water management system;
    - ii. details of groundwater monitoring, including rationale, for any wastewater that has the potential to bypass the water collection/containment system;
    - iii. an inspection plan for the water management system to ensure that it is operating as designed (i.e., there should be a link to any relevant design plans) including rationale; and
    - iv. linkages to other monitoring plans if applicable.
- III. The section on Contingencies (i.e., Section 8 of the Standard Outline) should contain:
  - A description of how the results of monitoring will be linked to those corrective actions necessary to ensure that the water management system continues to meet the objectives of the Policy and is operating as designed.
- IV. Site water management is likely to differ during the different project phases (i.e., construction, operations, closure, reclamation etc.). Therefore, describe these differences in each of the plan sections.

## **Schedule 5: Effluent Quality Criteria Report Requirements**

The purpose of the Effluent Quality Criteria Report is to provide a standalone document containing all of the information required by the Board to set effluent quality criteria (EQC) and related water licence conditions. If prepared appropriately, the Effluent Quality Criteria Report should provide the Board with the information necessary to ensure that the Board has all the information it needs to set EQC and other water licence conditions such that the objectives<sup>5</sup> of the Water and Effluent Quality Management Policy will be met.

Note that at this stage in the regulatory process (i.e., post-environmental impact review or environmental assessment), the Board expects that all of the information requested below should already be available to the Proponent. However, in order to ensure that this report meets the Board's expectations, the Board has provided details below of what information is specifically required and recommended the way in which the information should be organized. In order to put the information requirements into context, the typical process for setting EQC is summarized below as well.

### ***Summary of Process for Setting EQC:***

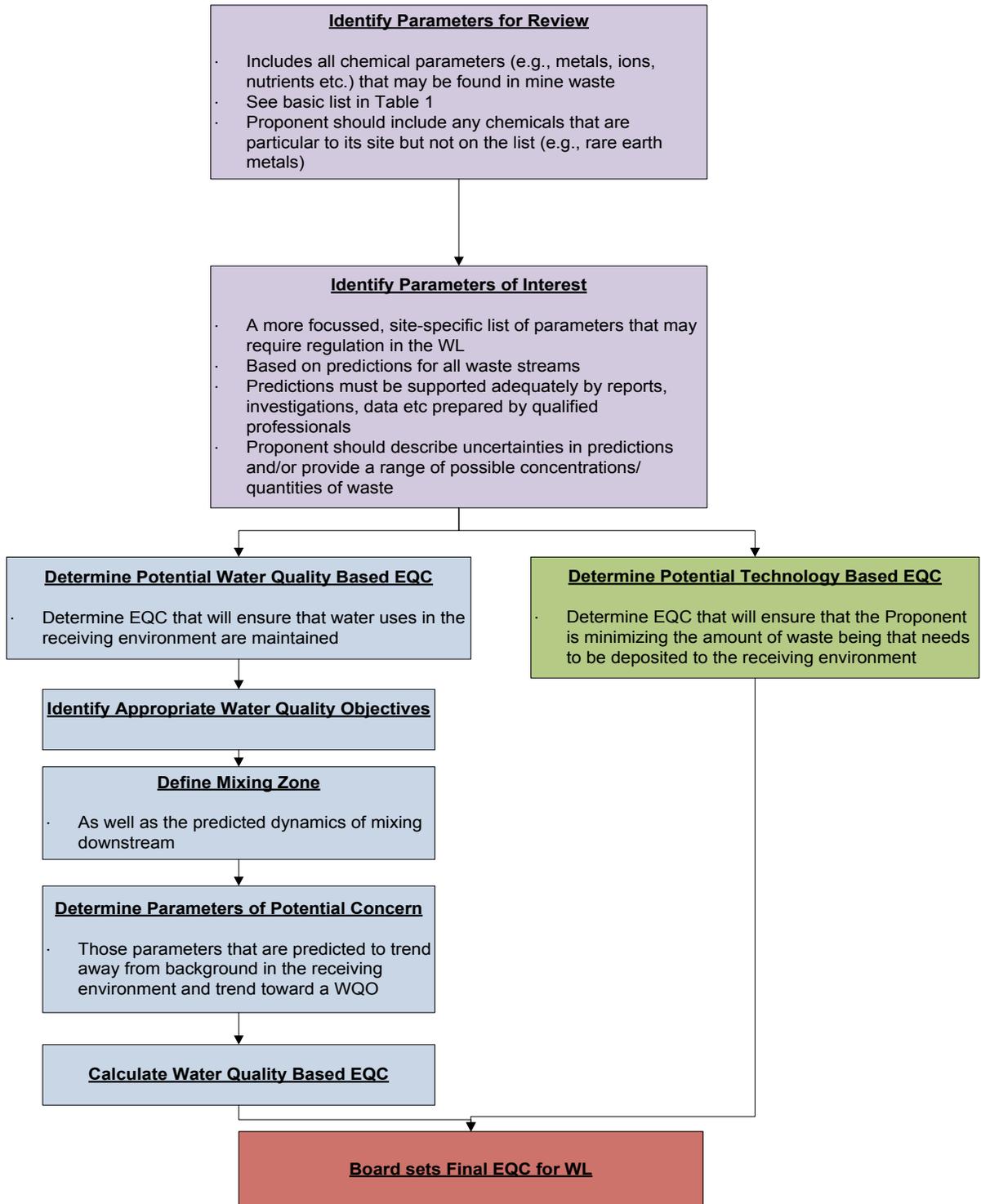
As depicted in Figure 1, the process for setting EQC is typically done in a step-wise manner in which we start with a comprehensive list of chemical parameters and progressively eliminate parameters based on various criteria as described below. Each step in the process is summarized below along with a list of specific information the Proponent is required to submit to enable completion of that step.

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<sup>5</sup> The Board's Water and Effluent Quality Management Policy outlines the two objectives that are to be met with respect to the deposit of waste:

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

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



## Step 1: Identify Parameters for Review

Parameters for Review are all those chemicals that are associated with any type of mining in any environment. This includes, for example, metals, major ions and nutrients. A comprehensive list is provided in Table 1, below. Depending on the project site, additional parameters may need to be included at this stage; the Proponent 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).

### Information Required from the Proponent:

- Provide a final list of Parameters for Review that includes the parameters in Table 1 as well as any other parameters that may be unique to this project site and that should be considered in the EQC evaluation.

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

Aluminum	Chromium	Nickel	Temperature
Ammonia as N	Cobalt	Nitrate as N	Total Dissolved Solids (TDS)
Antimony	Copper	Nitrite as N	Total Organic Carbon (TOC)**
Arsenic	Hardness**	pH	Total Petroleum Hydrocarbons
Barium	Iron	Phosphate (PO <sub>4</sub> -P)	Total Suspended Sediments (TSS)
Beryllium	Lead	Potassium	Uranium
Boron	Manganese	Selenium	Vanadium
Cadmium	Mercury	Strontium	Zinc
Chloride	Molybdenum	Sulphate	<i>Escherichia coli</i>

\*Notes to Table 1: This table contains a typical list of parameters for review for a mine, although the proponent may need to add other parameters specific to its 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 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).
  - Biological Oxygen Demand (BOD) – this parameter may be difficult to predict and/or model in the effluent or in the mixing zone as those values vary with factors such as temperature. Although the analysis that follows for determining POPC is probably not applicable directly to BOD, this parameter is often given an EQC (e.g., for sewage) because it can be acutely toxic to fish. This may be considered in the Final EQC setting step.
  - Other forms of phosphorus, e.g., orthophosphate, dissolved phosphate and total phosphorus. These are not parameters for review because they are sufficiently accounted for by an analysis of total phosphate (PO<sub>4</sub>-P).

- 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.
- Turbidity is not in Table 1 because it is covered by TSS

\*\* 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 site 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 eliminate those parameters 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 wastewater streams.
- Whether predicted concentrations of a parameter in any of the wastewater streams exceed the natural range of background concentrations in the receiving environment.
- The uncertainty in the predictions of wastewater 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 Proponent control the amount of a parameter that needs to be discharged? For example, the Board often sets EQC for ammonia to ensure that Proponent 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 Parameter of Interest for each project, the Proponent should propose its own list with rationale.

### **Information Required from the Proponent:**

- Identification of all wastewater streams for the project as well as the predicted annual water balance for the site. This may already be summarized in the Draft Water Management Plan.
  - a. For each wastewater stream, the Proponent 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 waste stream that will be collected, stored, treated and or discharged.
  - b. The predicted loads of each parameter in the effluent that the Proponent proposes to discharge to the receiving environment.
  - c. A description of how predicted waste may change over time or during different project phases (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, please 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 etc) 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 Proponent 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 Proponent 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 environment (i.e., the water body (or bodies) to which the Proponent

proposes to deposit waste). Please give enough of the statistical (e.g., average, 90<sup>th</sup> percentile, median etc.) as well as seasonal information to fully describe the background condition.

- The Proponent should propose a list of POI based on its own analysis of the above information with an appropriate level of rationale.

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

One of the objectives of the Water and Effluent Quality Management Policy is to set water licence conditions to ensure 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. The level of protection will be defined by the water quality standards that have been set site-specifically for the receiving environment in question. Effluent Quality Criteria (EQC) will be set for a project to ensure that water quality standards will be met. A Board may set other terms and conditions in the water licence that, in its opinion will aid in achieving this objective.”*

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 the information below.

#### **Information Required from the Proponent:**

- 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 stakeholders during engagement with the Proponent. Water uses that must be protected may also have been identified during the environmental assessment (EA) or environmental impact review (EIR) of the project.
- Proposed water quality objectives (WQOs) for the receiving environment that would protect the identified water uses. Proposed WQOs should take into account site-specific receiving water conditions 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>6</sup>. In some cases, the EA or EIR may have described assessment boundaries that could be used to define a location for

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<sup>6</sup> Canadian Council Ministers of 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.”

meeting WQOs. The Proponent may also propose to define a mixing zone such that WQOs will be met at the edge of the mixing zone.

- If a mixing zone is proposed, the Proponent must define the dimensions with rationale and provide an analysis of how the effluent will dilute and mix in this zone. The Proponent should also provide an estimate of the amount the effluent should be diluted at the edge of the mixing zone.
- An analysis of how the effluent will mix with and disperse into the receiving environment. The analysis should extend downstream 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. The process of estimating receiving water concentrations of POIs should be conservative at this stage. For example:
  - if there was a range of predicted effluent quality concentrations then the “worst-case” concentrations should be used.
  - if there was a range of predicted effluent quantities then the “worst-case” quantity should be used.
  - 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 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 then 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 will have to 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
  - background concentrations of parameters in lakes must be included 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 Parameters of Potential Concern. POPC 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 Proponent should propose POPC with rationale.
- The Proponent may calculate water quality based EQC for each proposed POPC. Water quality based EQC should be calculated with the goal of ensuring water quality objectives are met 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**

The second objective of the Water and Effluent Quality Management Policy is to ensure that the amount of waste to be deposited to the receiving environment is minimized. As stated in the Policy:

*“The Boards expect proponents to identify and implement waste prevention and/or minimization measures, whenever feasible. Implementation of such measures may be stipulated in the terms and conditions of a water licences. The Boards can assess how these measures are expected to impact effluent from a project in order to set EQC that proponents can reasonably and consistently achieve.”*

With respect to waste minimization, please note that the Policy also states that “the Boards may set EQC that are more stringent than what is necessary to meet quality standards in the receiving environment.”

Waste prevention or minimization measures should have already been identified in the Updated Project Description or in the other management plans requested as part of the Post EIR Information Package; if that is so, then there is no need to repeat any of that information here. Instead, technology based EQC may be proposed at this stage on the basis of treatment technology.

#### **Information required from the Proponent**

- 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. If known, please summarize how source reduction activities for example will affect parameter concentrations in the effluent.
- For each POI, list:

- a. its concentration in the influent to whatever water treatment process is proposed 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 project phases (e.g., construction, operation, closure) if applicable.

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

According to the Policy:

“Once all reasonable measures have been taken to limit the amount of waste, concerns may still exist about the quantity, concentrations, and type of waste deposited, and in these cases the Boards will set EQC in the water licence.”

The Board will consider all the evidence before it to set EQC for the water licence. However, the Proponent should propose what EQC should be included in its water licence, with rationale.

#### **Information Required from the Proponent:**

The Proponent may propose EQC for its water licence with rationale.

## **Schedule 6: Proposed Surveillance Network Program**

### ***Purpose***

The Surveillance Network Program (SNP) is an Annex to the Water Licence that details the site-wide monitoring program that the Licensee must implement. The SNP will contain monitoring locations, sampling frequency, analytical requirements and reporting requirements. Typically, SNP requirements are based on the information given in the Water Management Plan. For example, SNP site locations will correspond to key points for site water management, control, diversion or containment. There is also normally an SNP station at the last point of control before effluent discharge to check compliance with the EQC. An SNP site at the edge of a mixing zone is also often included as it shows whether water quality objectives are being continuously met.

Although the Board will make the final determination of the SNP requirements, the Proponent is asked to propose a draft program based on its knowledge of the site. Note that it is common for the initial SNP to be very comprehensive because of the inherent uncertainties pre-construction. Over time, the SNP requirements may be reduced and become more focussed as knowledge of the site increases.

Overall, SNP data should allow the Board to check that waste minimization efforts are working as intended.

### ***Information Required from the Proponent***

#### **1. Proposed Surveillance Network Program**

*a) Format:*

A tabular or spreadsheet format.

*b) Notes on the content:*

- I. Propose monitoring locations with a rationale that is consistent with the content of the Draft Water Management Plan. Provide UTM coordinates if known.
- II. For each location propose the frequency of sampling and which parameters should be analyzed, with rationale.

**Schedule 7: Type A Water Licence Generic Work Plan**

<b>Task</b>	<b>Responsible Party</b>	<b>Timeline (Calendar Days)</b>
Submission of Post-EIR Info Package	Proponent	Day 1
Board completeness decision on Post-EIR Info Package	MVLWB	Day 11
Circulate Post-EIR Info Package (assuming complete)	MVLWB	Day 12
Comments due from reviewers on the Post-EIR Info Package	Reviewers	Day 40 (4 week review)
Proponents response to comments	Proponent	Day 54 (2 week response)
Distribution of technical session agenda	MVLWB	Day 59
Technical sessions	All parties	Day 63-65
Circulate information request arising from technical sessions	MVLWB	Day 70
Deadline for proponent to respond to information requests	Proponent	Day 77
Request for Interventions sent to reviewers	MVLWB	Day 78
Deadline for interventions	Interveners	Day 120 (6 weeks for interventions)
Deadline for proponents response to interventions	Proponent	Day 134 (2 week response)
Pre-Hearing Conference	All parties	Day 138
Deadline for Intervener Public Hearing presentations	Interveners	Day 141
Deadline for Proponent Public Hearing presentations	Proponent	Day 148
Public Hearings	All parties	Day 155-157
Public Hearing undertakings due	All parties	Day 163
Intervener Closing Arguments Due		170
Proponent Closing Arguments Due		177
Draft WL sent for review	MVLWB	Day 205 (4 weeks to draft licence)
Comments due on draft WL	Interveners	Day 226
Deadline for proponents response	Proponent	Day 233
Board Approved WL and Reasons for Decision sent to the Minister	MVLWB	Day 275 (6 weeks for edits to licence, Board approval and writing RFD)
Final WL decision from the Minister	AANDC Minister	Day 335 (60 days for Minister's approval)

## **Appendix I**

### **MVLWB Standard Outline for Management Plans**



## Standard Outline for Management Plans

The Land and Water Boards of the Mackenzie Valley commonly require management plans as conditions of land use permits and/or water licences. This document provides an outline that will assist proponents in preparing management plans in a consistent way for all types of projects and allow reviewers to more easily locate specific information - which will in turn facilitate a more efficient review and approval process.

A management plan is a regulatory tool that contains detailed information about a particular aspect of a project so that all parties will understand how the proponent will manage that aspect and achieve specific objectives, usually related to mitigating or preventing environmental impacts or effects (e.g. erosion control, ammonia, or water management). It is a formal, approved document that outlines assumptions, decisions, and major milestones. This Standard does not apply to plans for which specific guidelines exist<sup>7</sup>.

The level of detail required in a management plan will ultimately be determined by the Board, but should be sufficient to ensure that all parties understand how the particular aspect of the project will be managed. Generally, management plans for projects that are relatively small require less detail than plans for larger, complex projects. The review and approval process allows stakeholders to provide input regularly to ensure the management plan is achieving its objectives and utilizing best practices.

### **1. PLAIN LANGUAGE SUMMARY**

This section should state the overall purpose of the plan and a summary of the key features of the plan using non-technical language.

### **2. REVISION HISTORY & CONFORMITY TABLE**

This section should list the dates on which every version of the plan has been submitted to the Board as well as outline the notable revisions compared to the previous version. This section should also provide a table showing where the plan addresses permit and licence conditions, and if necessary, a separate section for how the plan has addressed directives from the Board if revisions were required. For management plans that are harmonized to meet the needs of the Board and another agency (e.g., the National Energy Board), this section should include this information.

### **3. TABLE OF CONTENTS**

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<sup>7</sup> The Land and Water Boards have approved guidelines for the preparation of Engagement Plans, Spill Contingency Plans, Waste Management Plans, and Closure and Reclamation Plans.

#### **4. GLOSSARY & ACRONYMS**

#### **5. INTRODUCTION & BACKGROUND**

This section should address, at a minimum, the following topics:

- objectives of the plan
- what other plans and/or reports are directly linked to the plan; and
- the individuals or department responsible for updating and implementing the plan.

#### **6. MAIN BODY OF THE MANAGEMENT PLAN**

There should be one or more sections which explain the company's plans and how these will achieve the objectives. This would include documenting assumptions, decisions, any construction and associated scheduling, and any uncertainties and how they are being addressed. All information required to support decisions should be included in the management plan and appropriate references should be included if the information is presented in other management plans, reports, or studies. Any areas of uncertainty (e.g. unproven technology) should be detailed with the proposed methods to assess it. The level of detail required in the main body of the management plan will depend on the potential severity of the environmental effects, the scale of the project, reviewers' concerns, and the complexity of the issue.

#### **7. MONITORING & EVALUATION**

- a) All performance, environmental, and/or compliance monitoring related to the plan should be described along with identifying which individuals or departments are responsible for carrying it out. Describe links to Surveillance Network Program (SNP) and Aquatic Effects Monitoring Programs (AEMPs).
- b) A description of how the management plan will be evaluated to ensure its effectiveness should be included along with the frequency and triggers for when the plan will be updated.

#### **8. CONTINGENCIES**

This section should outline what contingencies have been identified to address non-compliance issues on site, unforeseen circumstances, or natural events.

#### **9. REFERENCES**

#### **10. APPENDIX A - STANDARD OPERATING PROCEDURES**

This section is not for Board approval and is at the discretion of the company whether they include a list of all relevant standard operating procedures or the actual standard operating procedures themselves.