

**Yukon Water Board**  
*Office des eaux du Yukon*

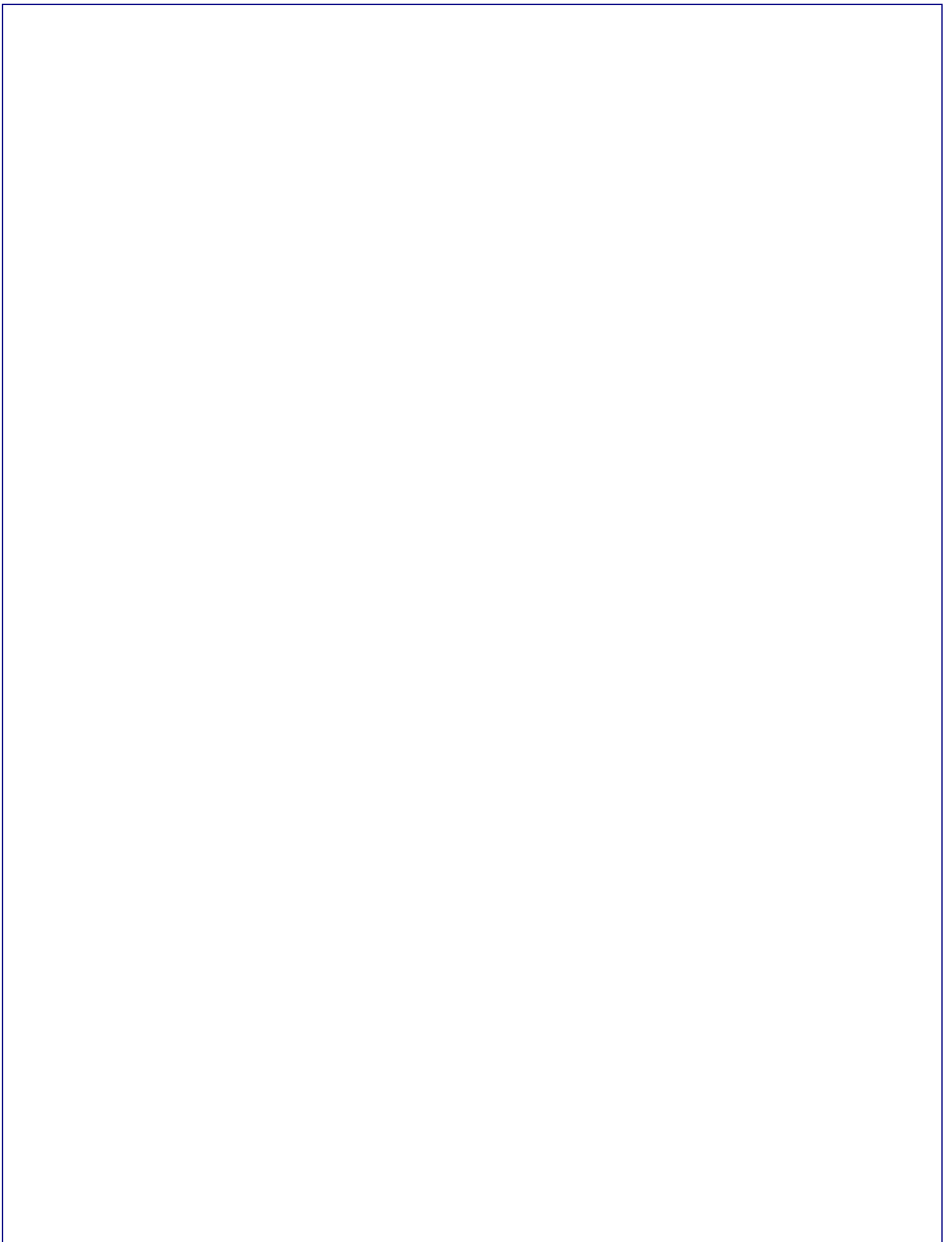


**TYPE A AND B**

**QUARTZ MINING UNDERTAKINGS**

**INFORMATION PACKAGE FOR APPLICANTS**

**October 2011**



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## 1 INTRODUCTION

The purpose of this information package is to assist applicants in developing and submitting Water Use Licence applications for Type A and B Quartz Mining Undertakings and in understanding the deliberation process that will be completed by the Yukon Water Board (“the Board”) in rendering a decision on the application.

The specific information presented in this package is not intended to serve as fixed standards for licensing. Rather, the information package is intended to set out a framework of information expectations and of principles and policies that the Board may apply in its licensing deliberations. The Board may deviate from or supplement the criteria or general information requirements identified in this package.

The Board acknowledges that each quartz mining undertaking is a unique project and that they vary significantly in their magnitude and in the potential environmental effects associated with them. The information contained in this document assumes the development of a metal mine with significant potential for environmental impacts that may arise from a wide variety of performance issues, such as the potential failure of waste impoundment structures or the discharge of contaminated water from mine wastes following the cessation of active mining.

The table of contents laid out in Appendix B of this package is also suggested as guidance for lower impact project applications, such as the majority of type B licence applications for quartz mining undertakings. It is understood that for these types of projects not all information requirements will apply.

The information package contains the following sections:

- Section 1:**        **Introduction** – an outline of this information package.
- Section 2:**        **Statutory Requirements** – An overview of relevant statutory requirements related to applications for water use licenses for quartz mining undertakings.
- Section 3:**        **Yukon Water Board and the Licensing Process** – A description of the Yukon Water Board and its licensing process.
- Section 4:**        **Licensing Principles and Position Statements** – presentation of the principles and position statements considered by the Board in deliberating and rendering decisions on quartz mining applications;
- Section 5:**        **Information Requirements for Applications** – an outline of the expected information required to support a water use licence application for a quartz mining undertaking.
- Section 6:**        **Guidance Documents** – information on the use of third party guidance documents in applications and identification of guidance documents consider relevant for quartz mining in Yukon.
- Section 7:**        **Application Contents and Format** - The required contents and format of applications.
- Section 8:**        **Licensing Conditions** - Typical conditions that may be associated with issued licences.

## 2 STATUTORY REQUIREMENTS

Under the terms of the *Waters Act* (the *Act* or “*WA*”), the Yukon Government has delegated to the Board the authority to adjudicate applications for the use of, and deposit of waste in, water in the Yukon. As the adjudicating body, the Board can deny an application or approve an application with conditions. For Type A Water Use Licence applications or Type B applications that were adjudicated on the basis of a public hearing, the water use licence also requires the approval of the Yukon Government Minister responsible for the administration of the *WA* before it can be issued by the Chair of the Board.

In exercising its powers, the Board recognizes and respects its objects that are described in Section 12 of the *WA*, as follows:

*“The objects of the Board are to provide for the conservation, development and utilization of waters in a manner that will provide the optimum benefit therefrom for all Canadians and for the residents of the Yukon Territory in particular.”*

The Board also has statutory obligations under Chapter 14 of the Umbrella Final Agreement (“*UFA*”) between the Governments of Canada, Yukon and Yukon First Nations. Section 14.8.0 of the *UFA* provides that the Board shall not authorize any substantial alteration of the quantity, quality or rate of flow of water on or adjacent to settlement land, unless it is satisfied that:

- a) there is no alternative which could reasonably satisfy the requirements of the applicant; and
- b) there are no reasonable measures by which the applicant could avoid causing the alteration.

Section 14.9.0 imposes similar obligations upon the Board where a traditional use of water by a First Nation person in their traditional territory may be adversely affected by a licensed use.

In addition, as a territorial authority for Water Use Licences, the Board's actions in enabling a project, i.e. issuance of a licence, cannot occur until a decision document allowing for the project to proceed has been issued under the *Yukon Environmental and Socio-economic Assessment Act* (“*YESAA*”), allowing for the project to proceed to the regulatory stage, i.e. in this case the possible granting of a Water Licence. Where such a decision document includes conditions, the Board may not issue a Water Use Licence with conditions that conflict with those of the Decision Document. It is important to note, though, that any interaction with the Secretariat of the Yukon Water Board in preparing a water use licence application for public comments can occur concurrently with the *YESAA* process.

Finally, mining projects must, at a minimum, also meet the requirements of the federal *Metal Mining Effluent Regulations* (“*MMER*”) for the discharge of waste. Therefore, the Board cannot issue a licence with terms or conditions that do not at least meet the requirements of *MMER* with respect to waste discharges. For clarity, the Board can and often does require more stringent requirements related to the discharge of waste than those required by *MMER*.

### **3 YUKON WATER BOARD AND THE LICENSING PROCESS**

The Yukon Water Board is an independent quasi-judicial board with members nominated by the Government of Canada, the Government of Yukon, and the Council of Yukon First Nations and then appointed by the Yukon Government Minister responsible for administration of the *WA*.

Board members are independent of their nominating government. As a quasi-judicial body, the Board's adjudication of applications must be conducted according to the principles of natural justice and the decisions of the Board are legally binding.

It is a fundamental principle of natural justice that, other than during a public hearing, the Board members not interact with the Applicant or other parties with an interest in the application. Such interactions include those required to determine the adequacy of an application. Therefore, all communications with the Board, except for questioning and representations during a public hearing, must be directed to the Board's staff: the Yukon Water Board Secretariat ("Secretariat").

To ensure adherence to natural justice, the Board has delegated to the Secretariat the role of reviewing applications to ensure that they satisfy all mandatory requirements, are of acceptable scope and clarity to allow for the effective participation of other parties who may wish to intervene (Intervenors) and will facilitate the efficient adjudication of the application by the Board. This process termed "adequacy review" must be completed to the Secretariat's satisfaction prior to the application being made public by the Secretariat and accepted for adjudication by the Board.

There is currently no timeline to complete the adequacy process, but the Secretariat is planning to draft guidelines intended to provide more process and timelines certainty. Staff of the Secretariat make best efforts to work with the Applicant to ensure that the application is adequate and provide direction as necessary to address deficiencies as may be found in the application.

Once deemed adequate, the Secretariat will post the application on the Board's website registry and will publicly advertise that the application has been accepted for adjudication by the Board. The advertisement will identify an intent date for interested parties to provide comments on the application and to identify whether they wish to have and/or wish to participate in a public hearing. In addition to public advertisement, the Secretariat will also directly notify key departments of the Government of Canada, Government of Yukon, and Yukon First Nation Governments potentially affected by the undertaking.

Except for rare circumstances, the adjudication of Type A Quartz Mining Water Use Licence application will include a public hearing that follows the rules of procedure of the Board that are attached as Appendix A of this information package. For Type B applications, a public hearing is not required unless the Board determines it to be in the public interest for a hearing to be conducted. In the absence of a public hearing the Board will deliberate upon an application during normally scheduled monthly Board meetings.

In its deliberations, the Board will consider the arguments of the Applicant and of any intervenors, will assess and evaluate the evidence submitted to the Board by the Applicant and any intervenors, and will apply the licensing principles and position statements of the Board.

The current licensing principles and position statements of the Board are presented in section 4 of this information package.

If the Board agrees to issue a licence, it will develop a licence document complete with conditions acceptable to the Board and consistent with any statutory requirements associated with YESAA, MMER, or any other applicable legislation. Irrespective of whether the Board agrees to issue a licence or not, the written reasons for its decision will be issued and made available publicly.

If deemed acceptable, a water use licence issued for a quartz mining undertaking is based on the application of the Applicant and the submissions of interveners to the process. The Board cannot change the nature of the work proposed by the Applicant other than to establish conditions for that work in a licence under the *Waters Act*.

Prior to finalizing a Type A licence, particularly for a very complex project, the Board may elect to distribute a draft of the licence to the Applicant and interveners to seek technical comments on the contents. The Board will not re-hear or reconsider its decision but will seek feedback on the clarity and/or correctness of specific parameters, names, and terminology presented in the licence. For example, an error in the units of a given parameter may be identified and subsequently corrected as a result of technical comments.

Type A water use licences approved by the Board are submitted to the Minister for approval and do not become effective until the Minister's and the Chair's signatures are applied. Type B water use licences approved by the Board become effective upon the signature of the Board's chair.

The above described licensing process is summarized graphically in Figure 1, below.

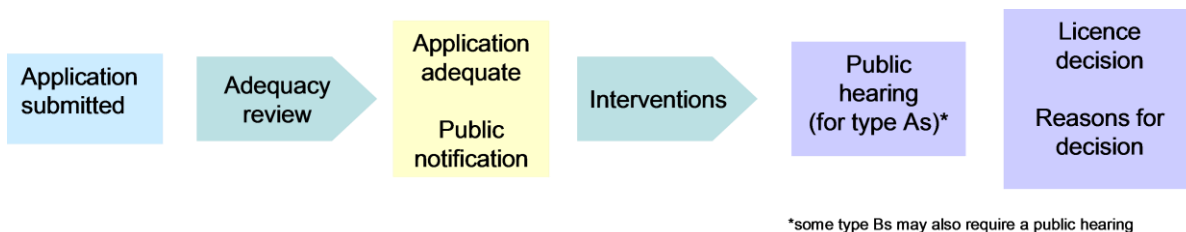


Fig. 1: Yukon Water Board Licensing Process

## 4 LICENSING PRINCIPLES AND POSITION STATEMENTS

### 4.1 Licensing Principles

In deliberations and rendering decisions on quartz mining undertakings, the Board will endeavour to apply the following principles:

- 4.1.1 Only issue water use licences where doing so is consistent with the objects of the Board and supported, on the balance of probabilities, by the evidence presented;
- 4.1.2 protect public health and safety and, in particular, minimize risk to human life;
- 4.1.3 avoid, minimize and/or mitigate significant adverse environmental effects from the potential uses of waters authorized by it under the *WA*;
- 4.1.4 at least achieve the objectives set out in the mitigation included in the YESAA decision document, subject to the Board's authority and responsibility under the *WA* and the *UFA*;
- 4.1.5 issue licences that do not grant or renew rights in respect to water contrary to a YESAA decision document;
- 4.1.6 consider impacts on other applicants and authorized water users, consistent with its other obligations to the public;
- 4.1.7 issue licences with conditions that address the specific aspects of the project being authorized and the site under development;
- 4.1.8 issue licences that are clear and enforceable and administratively consistent;
- 4.1.9 issue licences that recognize the need for a reclamation plan that takes into account that the life of the project may exceed the term of a particular licence and that impacts or potential impacts of a particular project may persist or develop after activity directly related to the project has ceased;
- 4.1.10 encourage the use of robust, proven technologies, but allow for the use of innovative technologies where significant advantages can be shown. In the case of innovative yet unproven technologies, the Board will take a cautious approach, expecting Applicants to provide detailed rationales and contingency plans to manage the performance risk the innovative approach may entail; and
- 4.1.11 act openly, pursuant to the principles of procedural fairness and natural justice.

## 4.2 Board Position Statements

The Board gives notice to potential Applicants that its deliberations will consider the following Board position statements:

- 4.2.1 that dilution of wastewater is not an acceptable approach to wastewater management or to compliance with wastewater quality standards.
- 4.2.2 that the  $LT_{50}$  96-hour bioassay is the recognized test for non-toxicity of effluent.
- 4.2.3 that the reuse and recycling of water used in the operations should be maximized to the extent practicable to limit the need for raw water withdrawals from the environment.
- 4.2.4 that an adaptive management plan shall not be the basis for the management of the project but only for the adaptation of pre-defined and detailed management plans that are already in place.

## 5 INFORMATION REQUIREMENTS FOR APPLICATIONS

The Board expects that Applicants for water use licences for quartz mining undertakings will at a minimum:

- 5.1 submit an overall **project description** that details: the project location(s); the project setting and history; the proposed development, its major components and schedule for development and operation; the proposed ore(s) to be extracted, the resulting processed metal product(s) or concentrate(s) and the resulting mine wastes; the proposed mining and mineral processing schemes; mine waste management plans; and other relevant details to provide a full understanding of the proposed project. The project description must be of sufficient detail to facilitate an understanding of the project, its purpose, life cycle, and to support more detailed sections of the application as described in subsequent sections of this list.
- 5.2 submit comprehensive information regarding the **Project Environment**. It is assumed that the majority of these data will have been generated for the YESAA process. Such information will normally be required to be based on measurements and/or observations from a period of at least two consecutive years, inclusive of all available monitoring programs conducted at the site by the Applicant and/or past parties managing the site and will include:
  - a) surface water and groundwater quality and quantity, including seasonal variations in quality and quantity;
  - b) surface water and groundwater flow patterns;
  - c) stream sediment data;
  - d) climatic data (particularly precipitation);
  - e) characterization of the presence and nature of permafrost at the site;

- f) characterization of the acid rock drainage and metal leaching potential of all geological materials that will be disturbed by the project or that have been previously disturbed at the project site. The characterization shall consider both the current states and forms of such geological materials and any states or forms they will be altered into over the life cycle of the project;
- g) descriptions of aquatic ecosystems particularly those used by fish and other organisms;
- h) descriptions of terrestrial ecosystems used by wildlife; and
- i) descriptions of existing human activities and uses of resources.

Investigations should be sufficiently specific and detailed that they provide an appropriate understanding of the variability of the site, including seasonal variability. Historical information, if any, shall be summarized and limitations on its accuracy and precision identified.

- 5.3 submit a **prediction of drainage chemistry from waste streams** that will be created by the development. This will primarily entail an assessment of the potential for Acid Rock Drainage and Metal Leaching (ARD/ML) of disturbed geological materials. The prediction must also include consideration of the contribution of mining and mineral processing chemicals and reagents on drainage chemistry.
- 5.4 submit a **comprehensive water balance model** and modelling results incorporating all components, water uses, and waste deposits of the project, with all assumptions and calculations clearly explained, that is sufficiently detailed to assess normal and extreme operations for all phases of the mine life and all critical components of the undertaking's water management infrastructure.
- 5.5 submit a **water quality model** and modelling results, with all assumptions and calculations clearly explained, that is sufficiently detailed to assess normal, seasonal, and extreme performance of the project on both a short-term and long-term basis, and that is clearly linked to outputs of the water balance model.
- 5.6 submit **water and waste management plans** based on the mine plan, site water balance, the site water quality model, the determined potential for acid drainage and metal leaching of exposed geological materials, infrastructure designs, and potential environmental effects of project operations. The management plans should outline the objectives, strategies, activities to manage water and waste either produced or affected by the development. Typically waste management plans will include tailings and waste rock management plans. The water management plan must be integrated with all of the waste management plans to show how water will be managed from source to discharge.

- 5.7 submit **hazardous materials management plans** for hazardous materials that will be manufactured, transferred, stored, or utilized at the site. Such materials include but are not limited to petroleum products, reagents for mineral processing and/or water treatment, and explosives. The management plans will detail safe handling, storage, and disposal of such materials. The plans will also detail response plans to contain and clean up any spills of hazardous materials. It is assumed that the majority of this information will have been generated to the YESAA or the quartz mine licensing process.
- 5.8 submit **Preliminary designs** of site specific project components, including mining and mineral processing infrastructure, water management infrastructure, and mine waste emplacements. For clarity the Board considers that the preliminary design stage builds upon feasibility and/or conceptual studies required to determine the desirability of proceeding with a particular project. The objectives of preliminary designs submitted to the Board are:
- (i) to provide evidence that the proposed project component can satisfy its desired function in the normal and extreme operational and environmental conditions it will be exposed to throughout the life cycle of the component;
  - (ii) to show compliance with relevant standards or guidelines that may apply to that class of infrastructure, whether that is for human health and safety or environmental protection; and

To accomplish the above objectives, preliminary designs for project components are to be based on engineering analysis and environmental impact assessments that establish the location, function, construction, and operation of the components. In addition, preliminary designs should identify how decommissioning has been accounted for and any necessary post-closure modifications to allow for decommissioning of the components.

Preliminary designs are normally expected to be based on the results of specific site investigations, although additional investigations may be required later in the detailed design process.

Finally, the Board advocates that preliminary designs be based on the application of robust and proven technologies both in terms of the design methodology utilized and of the materials or components incorporated into the designed object. The use of more state-of-the-art or innovative approaches is also acceptable; however, the Applicant will be expected to submit clear, technically defensible and comprehensive explanations and justifications to the Board to utilize a less proven technology. Regardless of whether a technology is considered to be proven or innovative, evidence of its applicability in a cold region environment will be required.

Preliminary design briefs or reports submitted as part of the application should include:

- a) a complete description of the designed project component and its intended function, the data and analysis supporting the design, and design standards or criteria utilized in the design;
  - b) performance specifications of critical materials and equipment utilized in the component;
  - c) scaled preliminary plans showing layouts and general dimensions of structures and components; and
  - d) a project schedule covering further engineering, and construction activities.
- 5.9 submit a **preliminary decommissioning and reclamation plan** for closure of the project that is based on a progressive reclamation approach. It is assumed that this plan will have been generated as part of the quartz mine licensing process.
- The plan needs to show detailed **security** calculations with a complete estimate of the cost of implementing the reclamation plan, covering each stage of the development.
- 5.10 submit a detailed **monitoring plan and program** for all phases of the undertaking that allows for the collection of data to validate assumptions and predictions of:
- a) Climatic, geochemical, hydrologic, and hydrogeologic inputs to the project;
  - b) The nature, geochemistry, and quantity of mine waste materials produced;
  - c) The quality, quantity, and time history of water use and waste deposition; and
  - d) The performance of water and waste management infrastructure or of components of such infrastructure including, but not limited to, tailings dams, water treatment plants, heap leach liners, treatment pond liners, and waste cover systems;
  - e) The effectiveness of measures taken to mitigate any adverse environmental effects of the project; and
  - f) The effects of water use and waste deposition on the environment.
- 5.11 submit an **adaptive management plan** specifically designed to guide management decisions arising from unexpected performance of the project. In particular, the plan must identify trigger levels for management actions and potential management actions that would be enacted based on the results of monitoring activities. The adaptive management plan should focus on aspects of the project performance that can directly or indirectly lead to unexpected or unacceptable impacts to the aquatic environment.

Applicants should be aware that licences, if issued, are tied to the information submitted in the application to the Board and that any significant change to the project will likely trigger a requirement for an amendment of the licence. Therefore, it is imperative to ensure that the application accounts for all currently planned or foreseen activities of the proposed quartz mining undertaking.

## **6 GUIDANCE DOCUMENTS**

Within the Canadian and international mining sectors there are numerous guidance documents that have been developed to assist mine owners in the responsible planning, design, operation, and closure of mining projects. The Board recognizes the following guidance documents, or their most recent revisions, as being generally applicable for quartz mining undertakings in Yukon

- 6.1 The Environmental Code of Practice for Metal Mines. Environment Canada. 2009.
- 6.2 Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials, MEND Report 1.20.1. Natural Resources Canada. 2009.
- 6.3 Draft Guidelines For Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia. British Columbia Ministry of Energy, Mines and Petroleum Resources. 1998.
- 6.4 Draft Guidance Document on Water and Mass Balance Models for the Mining Industry. Environment Canada. 2011.
- 6.5 Yukon Mine Site Reclamation and Closure Policy. Yukon Government. 2006.
- 6.6 Yukon Mine Site Reclamation and Closure Policy. Financial and Technical Guidelines. Yukon Government. 2008.
- 6.7 Dam Safety Guidelines. Canadian Dam Association. 2007.
- 6.8 Canadian Environmental Quality Guidelines and Summary Table. Canadian Council of Ministers of the Environment. 2011.
- 6.9 Interim guidelines for Investigation and design of mine dumps, British Columbia Mine Waste Rock Pile Research Committee. 1991.
- 6.10 Guidance Document for Flow Measurement of Metal Mining Effluents. Environment Canada. 2002.
- 6.11 Guidance Document for the Sampling and Analysis of Metal Mining Effluents. Environment Canada. 2002.

It is the Board's view that these documents present guidelines and not standards and will therefore consider more or less stringent requirements that are duly supported by rationale derived from evidence in the application or in interventions.

In addition to the above list of guidance documents, the Board acknowledges that numerous other guidance documents exist that may be relevant to any specific quartz mining undertaking. Where the Applicant or Interveners believe it is appropriate they may identify and submit such documents as evidence to support either the application or interventions and the Board will give due consideration to the value of the guidance document in deliberating upon the application.

## **7 APPLICATION CONTENT AND FORMAT**

The Board expects that water use licence applications for quartz mining undertakings will be accompanied by the following (*\* indicates mandatory form*):

- (1) Completed Schedule 4 application form\* (available on the Board's website);
- (2) Copy of the Quartz Mine Licence;
- (3) Proof of business entity,
- (4) Environmental Health form (available on the Board's website)
- (5) Applicable fees
- (6) Agent Authorization Form\* (if applicable)
- (7) Completed Project Confirmation Form\* (available on the Board's website), as well as a copy of the YESAA evaluation/screening report and the signed decision document.

The above information would be included in an application report that presents at least the information identified in section 5 and that follows the general Table of Contents outlined in Appendix B of this information package. In addition to the application report, the Board expects that technical appendices would be provided to present detailed supporting studies and preliminary design briefs.

The Board expects that the completed application report and technical appendices would be submitted in draft form for adequacy review by the Secretariat and technical consultants and that it would be resubmitted in final form complete with any revisions, modifications, updates, or additions, resulting from the adequacy review by the Secretariat.

Both the draft and final application documents shall be provided in hard copy and unsecured, searchable electronic form such as PDF document(s). Numerical data associated with the application shall also be provided in useable electronic spreadsheet format.

## **8 POTENTIAL LICENCE CONDITIONS**

If the Board decides to issue a water use licence for a quartz mining undertaking, the licence may contain conditions related to the following:

- 8.1 a requirement to submit to the Board prior to the commencement of construction, the final detailed design drawings, construction plans and

specifications for all proposed structures and facilities including, but not limited to:

- a) waste rock dumps;
- b) dams;
- c) coffer dams;
- d) impoundments;
- e) drainage works;
- f) diversions;
- g) spillways;
- h) waste storage facilities;
- i) water supply systems;
- j) wastewater transportation systems and treatment facilities; and
- k) any other structure or facility relevant to the conditions of the licence.

For clarity, detailed design is the last level of project design. It should include the results of any additional investigations identified during the preliminary design process and all of the final detailed drawings and specifications required to construct the project. All engineering drawings and specifications submitted to the Board must be sealed by a Professional Engineer licensed to practice in Yukon.

- 8.2 a requirement for additional water quality and flow monitoring points in addition to the points proposed in the application and/or more frequent sampling of proposed monitoring points. Such modifications to the monitoring plan may be established for the purposes of monitoring the overall performance of the project and for identifying emerging problems in their early stages, as well as, for example, measuring and monitoring environmental effects including receiving water quality and biological and physical impacts.
- 8.3 a requirement to submit to the Board details of any modifications to or variations from the preliminary designs previously submitted, in advance of any related construction. Such submissions must include an explanation of the reasons for the change and an assessment of the potential environmental impact. All such design modifications must be sealed by a Professional Engineer licensed to practice in Yukon.
- 8.4 a requirement to submit to the Board a comprehensive decommissioning and reclamation plan, based on the preliminary plan submitted with the application, and a requirement to update the plan, including the cost estimates, from time to time as circumstances warrant.

- 8.5 a requirement to submit to the Board final record (as-built) drawings of all structures and facilities following the completion of construction. All drawings must be sealed by a Professional Engineer licensed to practice in Yukon.
- 8.6 a requirement to submit to the Board a detailed construction quality assurance/quality control manual before beginning the construction of structures or facilities and to submit the results of the monitoring following the completion of construction. Such a manual should be designed to ensure that construction materials and methods conform to the designs and specifications for the project, as well as generally accepted practices, and that proper documentation of construction is maintained. All construction monitoring should be carried out under the supervision of Professional Engineers licensed to practice in Yukon.
- 8.7 a requirement to submit to the Board specific plans or studies in a time frame specified.

**APPENDIX A:**  
**YUKON WATER BOARD**  
**RULES OF PROCEDURE**

## **APPENDIX B:**

# **TABLE OF CONTENTS FOR WATER USE LICENCE APPLICATION REPORTS FOR QUARTZ MINING UNDERTAKINGS**